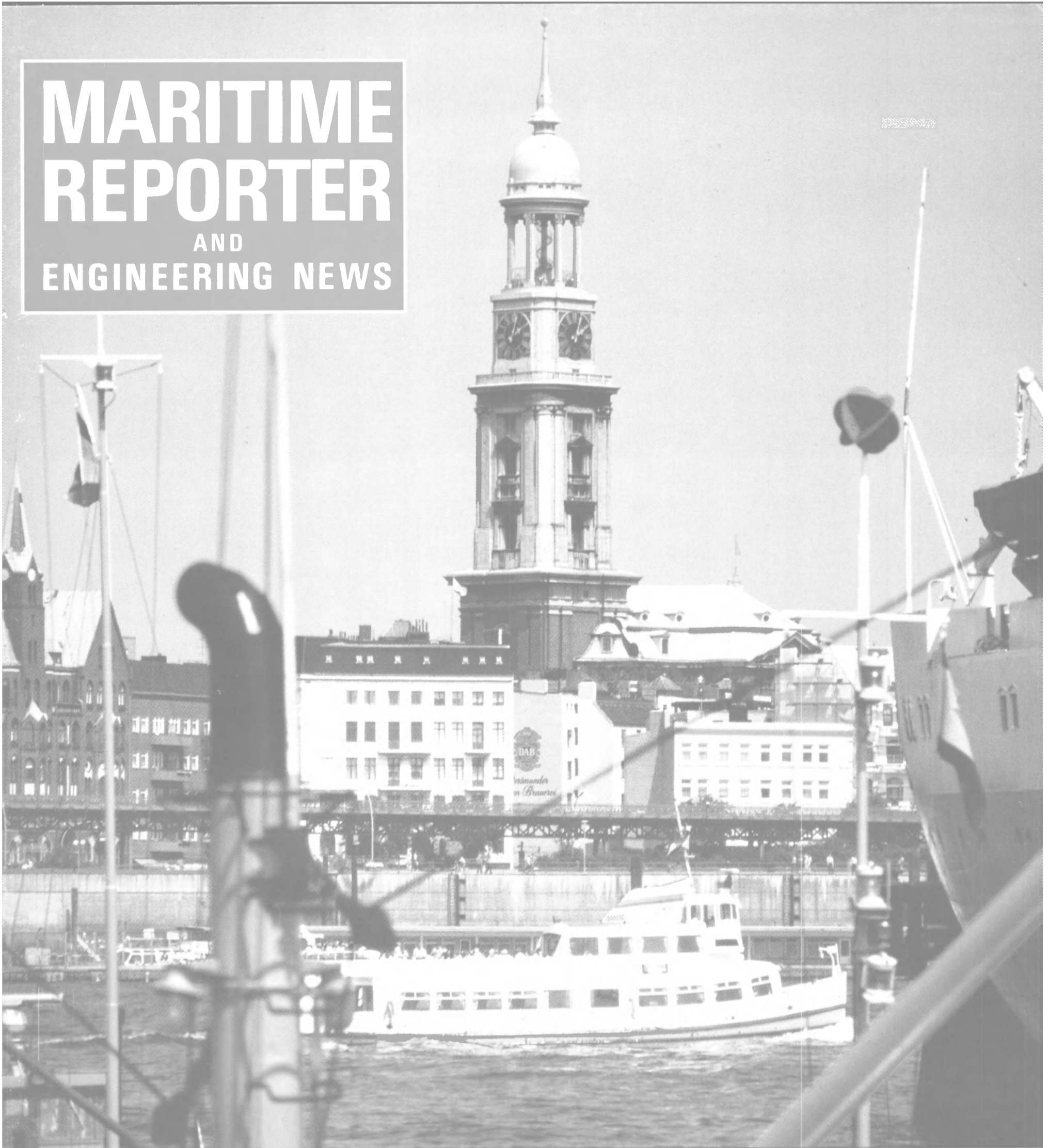


MARITIME REPORTER

AND
ENGINEERING NEWS



Hamburg Harbor

SMM '88 – THE HAMBURG SHOW PREVIEW
NAVAL TECHNOLOGY & SHIPBUILDING
SEPTEMBER 1988 ISSUE



**Newport News
Shipbuilding** 
A Tenneco Company
Newport News, Virginia 23607

 **Commitment
to
Quality**

McAllister Ship Docking Tugs...

The Largest Fleet Servicing U.S. East Coast Ports And Puerto Rico



McAllister Brothers Inc. Towing and Transportation
17 Battery Place, New York, N.Y. 10004 (212) 269-3200
Philadelphia (215) 922-6200 • Baltimore (301) 276-8000
Norfolk (804) 627-3651 • Wilmington (919) 762-2630
Georgetown (803) 577-2971 • Charleston (803) 577-6449
Jacksonville (904) 743-9226 • San Juan (809) 721-8888

McAllister



ON THE COVER

SMM '88
The Hamburg Show
 - Preview -
 PAGE 16
Yugoslav Shipbuilding
 - A Review -
 PAGE 24
Naval Technology
& Shipbuilding
 PAGE 31
oaval Propulsion
Update
 PAGE 40

Officine Mariotti Yard To Perform Conversion For \$118.8 Million

The Genoa shipyard of Officine Mariotti recently received a 150 billion lire (about \$118.8 million) contract for the conversion of a container vessel into a luxury cruise ship.

The contract, awarded by Italian cruise operator Costa Cruises, calls for the conversion of the 15,932-grt Italia into a cruise ship for the Mediterranean market. The vessel will be renamed the Costa Marina and is expected to be delivered in April 1990. She will be deployed on seven-day cruises.

One of the appealing factors in the selection of the Italia for conversion to a cruise ship by Costa was her Pielstick propulsion plant. The vessel's primary propulsion plant, which consists of two 12-cylinder and two 16-cylinder Pielstick engines, produces a total output of 26,000 bhp and a speed of 23 knots. Costa required a 22-knot cruising speed for her vessel.

The Costa Marina will be owned by a newly established shareholding company called Mediterranean Cruise Lines, 55 percent controlled by Costa Crociere, and the rest by the ship supplier Zerbone Catering and the tourist operator Quiriconi.

The conversion is part of a major cruise line upgrading by Costa, which has spent more than \$450 million to modernize its fleet.

For free literature detailing the shipbuilding and repairing facilities and services of Officine Mariotti,

Circle 118 on Reader Service Card

MARITIME REPORTER and Engineering News

Editorial and Executive Offices
 118 East 25th Street, New York, NY 10010
 (212) 477-6700 • ITT Telex: 424768 MARINTI
 Telefax: (212) 254-6271

Publishers: **JOHN E. O'MALLEY**
CHARLES P. O'MALLEY
 Editorial Director: **CHARLES P. O'MALLEY**
 Editor: **JOHN SNYDER**
 Senior Editor: **THOMAS H. PHILLIPS**
 Consulting Editor: **ROBERT WARE**
 Advertising Sales Director: **JOHN C. O'MALLEY**
 Regional Sales Manager: **LUCIA ANNUNZIATA**
 Production Manager: **LILIAN IRVINE**
 Circulation Manager: **M. SOTTILE**

Advertising Circulation and Sales Offices
 118 East 25th Street, New York, NY 10010
 Telephone (212) 477-6700

REPRESENTATIVES

U.S. Gulf States **MR. JAMES N. McCLINTOCK**
 Wheelhouse One Building
 634 Village Lane North, Suite 205
 Mandeville, LA 70448
 Telephone: (504) 626-7990
 Telefax: (504) 624-5163

France **MR. NORBERT M. HELLIN**
 6 bis, rue de la Belle Feuille
 F-92100 Boulogne, France
 Telephone: 1-46-05-63-77 Fax: 1-46-03-33-21

Italy **MR. VITTORIO F. NEGRONE**
 Ediconsult Internazionale
 Piazza Fontane Marose, 3-16123 Genova, Italy
 Telephone: (010) 543 659-268.334-268.513
 Telex: 211197 EDINT I
 Editorial Consultant: **DR. VICTORIA MUNSEY**
 Munsey Consultants
 Strada Del Nobile 59
 10131 Torino, Italy
 Telephone: 11-68-3639 Fax: 11-650-3478

Scandinavia **MR. STEPHAN R. G. ORN**
 AB Stephan R. G. Orn
 Box 184, S-271 00 Ystad, Sweden
 Telephone 0411-184 00
 Telex: 33335 Orn S Telefax: 411 10531

West Germany **MR. HELMUT MOLLER**
 Amhusarendenkmal 8A
 2000 Hamburg 70
 Federal Republic of Germany
 Telephone: (40) 6525-384

United Kingdom **MR. MICHAEL J. DAMSELL**
 Euromedia, Ltd.
 Tern House, Upper West St.,
 Reigate, Surrey RH2 9HX, England
 Telephone: 07372 42558
 Telex: 932699 KENPUB G.

Korea **MR. CHRIS MAENG**
 IPR Int'l PR, INC.
 Yongsan, P.O. Box 100, Seoul, Korea
 Telephone: 273-7765 Telex: MOCNDM K23231

Japan **MR. TOSHIO EGUSA**
 Publinetwork, Inc.
 Kaneko Bldg. 4-29-8,
 Shimbashi, Minato-ku, Tokyo 105 Japan
 Telephone: (03) 459-9618
 Fax: 436-1931 Telex: 2425280 BESNA J

Singapore **MR. VICTOR CHIA**
 Market Trends Pvt. Ltd.
 122 Middle Road, #07-08
 Midlink Plaza, Singapore 0718
 Telex: HENSAL RS20006

SAVE up to 300 barrels of oil per year!

ELIMINATE THAT OLD STEAM HORN

The Kahlenberg **TRITON** Piston Horn is a unique sound producing unit because it requires no compressed air and no diaphragms yet utilizes air vibrations in a tuned sound column. The unit consists of an electric motor driving a piston with a cylinder similar in appearance to an air compressor. Very economical to operate and install. Write for bulletin. 92C. The KB-20 electric horn is available in 110 volt, A.C. or 24 volt, D.C. for vessels up to 246' in length.



KAHLEIBERG BROS. CO.

1986 Monroe St.
 Two Rivers, Wisconsin, 54241 U.S.A.
 414-793-4507

Circle 234 on Reader Service Card

MARITIME REPORTER AND ENGINEERING NEWS

ISSN-0025-3448

No. 9

Volume 50

118 EAST 25th STREET
 NEW YORK, N.Y. 10010
 (212) 477-6700
 Telex: MARINTI 424768
 Telefax: (212) 254-6271

ESTABLISHED 1939

Maritime Reporter/Engineering News is published monthly by Maritime Activity Reports, Inc. Mailed at Second Class Postage Rates at Waterbury, CT 06701 and additional mailing offices.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 118 East 25th Street, New York, NY 10010.

Member

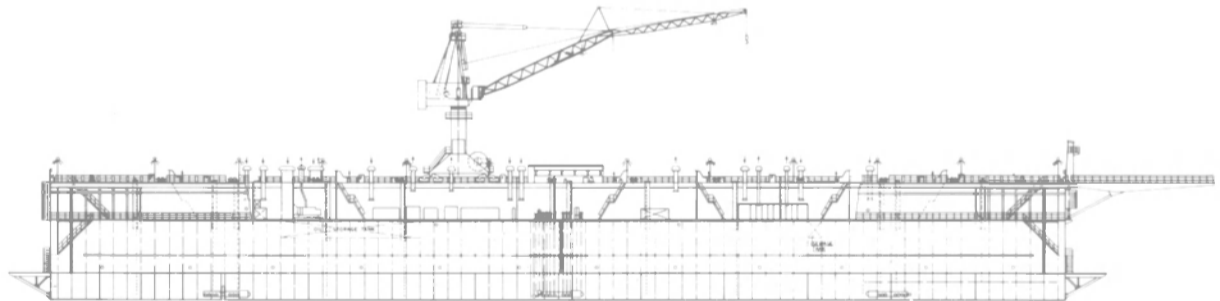


Business Publications
 Audit of Circulation, Inc.

Only specialists can build four floating drydocks within one year...



DD 586e2



...89 in a century. Floating drydocks have been on the programme of MAN GHH since 1878. Between April 1982 and May 1983 we designed, built and supplied a 20,000-t and a 30,000-t dock for the U.S.A. as well as a 22,000-t and a

10,000-t dock for Saudi Arabia. From June 1982 until September 1983, two GHH floating docks were commissioned by our specialists at their final destination in the U.S.A., another two in Saudi Arabia, one in Indonesia, and one in Singapore.

Our dock construction yard is also fully equipped for building floating cranes, such as the three 200-t units delivered to Saudi Arabia in 1983. For further information we shall be pleased to send you our brochures.

Convincing Technology

MAN GHH
P.O.B. 110240
D-4200 Oberhausen 11
Phone 0208/692-1
Telex 8 56691 ghh d



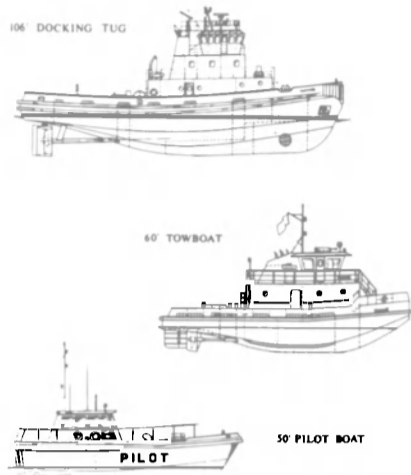
Trinity Marine Group Awarded \$13-Million Jordanian Contract To Build Five Workboats

The Trinity Marine Group has been awarded an approximate \$13-million contract for the construction of five workboats for the Jordan Ports Corporation of the Hashemite Kingdom of Jordan.

The U.S. AID (Aid for International Development) contract calls for construction of two 106-foot docking tugs, two 60-foot towboats and one 50-foot pilot boat.

John Dane III, president of the Trinity Marine Group, said construction of the four larger, all-steel boats has begun at Moss Point Marine, Inc., in Escatawpa, Miss. Equitable Shipyards, Inc., in New Orleans, La., is building the steel and aluminum pilot boat.

The docking tugs will work in the Gulf of Aqaba, helping to maneuver ships to anchorage and to and from piers. They will each be 106 feet 6 inches in length, with a 34-foot



molded breadth, and 16-foot molded depth.

Each of the tugs will be powered by two General Motors EMD-8-

645F7BA engines developing a total of 3,200 bhp. They will be equipped with controllable pitch propellers inside steerable Kort-type nozzles.

The tugs will also be equipped with four 1,600-gpm water/foam fire monitors and each boat will have accommodations for a crew of eight.

The two 60-foot towboats will move barges and lighters to and from ships at anchorage, and tow barge-mounted derricks for loading and unloading ships and lighters. The towboats will also assist in docking ships, but will not be equipped with towing knees common to American towboats.

Each of the towboats will have a beam of 22 feet and a depth of 8.5 feet. They will be powered by two Cummins KT19-M diesel engines developing a total of 850 bhp.

The pilot boat will have a 15-foot beam and a 7-foot molded depth. She will transport ships' pilots to the Gulf of Aqaba.

The pilot boat will have a lightweight steel hull and an aluminum superstructure. She will be powered by two Detroit Diesel 8V71T diesel engines developing 349 hp each.

The two tugs will be delivered nine months from contract finalization and the towboats and the pilot boat will be delivered six months after formal contract signing.

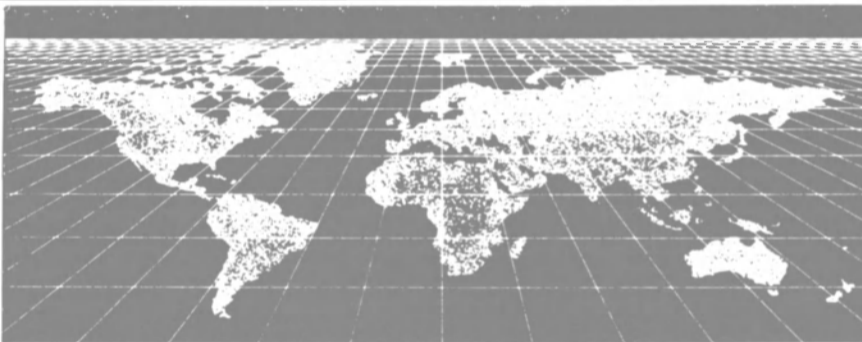
Mr. Dane said the contract also includes a two-year spare parts program and a training program for crew training in ship handling and maintenance.

For free literature completely describing the boatbuilding services offered by the Trinity Marine Group,

Circle 107 on Reader Service Card

\$4.1-Million Contract Won By Seacor To Support Naval Training Schools

Systems Engineering Associates Corporation (Seacor) has been awarded a \$4.1-million contract by the U.S. Navy to support naval training schools throughout the U.S. Under this four-year contract, Seacor provides technical and logistics services.



MARINE ELECTRONICS

Global sales and service.

Raytheon Service Company is the one-stop source of high-quality marine electronics sales and service.

We have been serving the marine industry for over a half-century, providing expert service, installation and overhaul of navigation and communications equipment at very competitive prices.

Our field engineers can rapidly respond to your needs anywhere in the world on a 24-hour basis—we operate from eight strategically located and fully-equipped service centers in the U.S.

We have built a reputation for service excellence that includes all Raytheon equipment and most other major brands.

For dependable, responsive and professional marine electronics service, count on Raytheon Service Company

Port of New York
Telephone: 718-981-1090
Telex II: 710-588-2105
TeleFax: 718-981-7560

Port of Philadelphia
Telephone: 609-662-4322
Telex II: 710-991-8748
TeleFax: 609-662-0758

Port of Baltimore
Telephone: 301-761-4300
Telex II: 710-861-0506
TeleFax: 301-768-0857

Ports of Hampton Roads
Telephone: 804-464-3318
Telex: 446134
TeleFax: 804-464-2417

Port of New Orleans
Telephone: 504-835-6491
Telex II: 810-951-5382
TeleFax: 504-838-7934

Port of Houston
Telephone: 713-941-2700
Telex II: 910-881-2755
TeleFax: 713-941-1432

Port of San Diego
Telephone: 619-571-3352
Telex: 678175
TeleFax: 213-835-5588

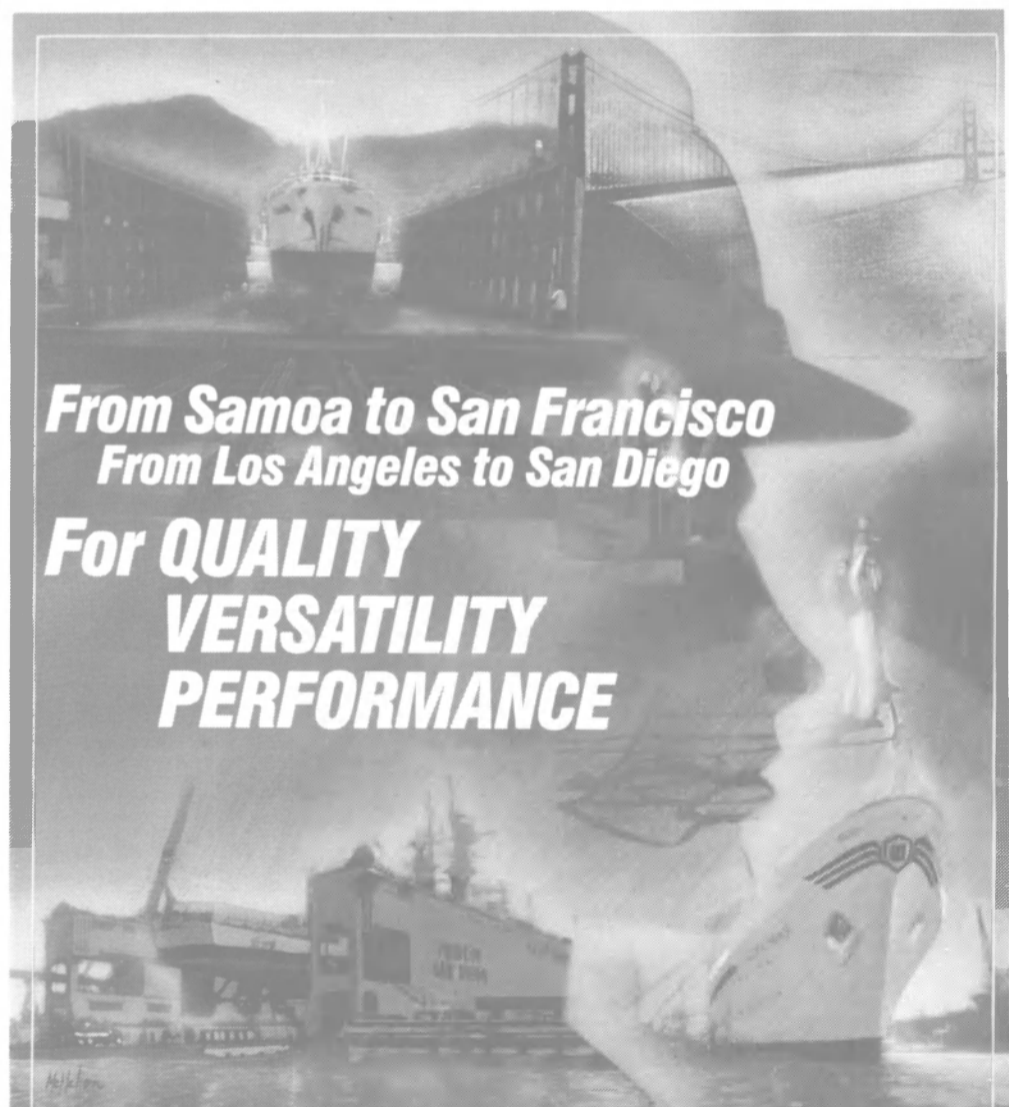
Port of Los Angeles/Long Beach
Telephone: 213-835-3911
Telex: 678175
TeleFax: 213-835-5588

For more information, contact:
RAYTHEON SERVICE COMPANY
Marine Sales & Service Division
7886 Browning Road
Pennsauken, NJ 08109
609-662-4322

Raytheon

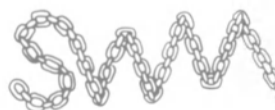
Invest in Experience

Circle 205 on Reader Service Card



From Samoa to San Francisco
From Los Angeles to San Diego

For **QUALITY**
VERSATILITY
PERFORMANCE



SOUTHWEST MARINE, INC.

SPECIALISTS IN THE REPAIR, MODERNIZATION & MAINTENANCE OF SEAGOING VESSELS

SAN DIEGO YARD
Southwest Marine, Inc.
Foot of Sampson Street
P.O. Box 13308
San Diego, CA 92113
(619) 238-1000
TWX No. 910-335-1167 SWM SDG
FAX No. (619) 238-0934

SAN PEDRO YARD
Southwest Marine, Inc.
985 South Seaside
P.O. Box 3347
Terminal Island, CA 90731
(213) 519-0600
TWX No. 910-345-6638 SWM TERM
FAX No. (213) 833-2222

SAN FRANCISCO YARD
Southwest Marine of
San Francisco, Inc.
Foot of 20th Street P.O. Box 7644
San Francisco, CA 94120
(415) 861-7447
TWX No. 910-372-0016 SWM SFO
FAX No. (415) 558-8466

SAMOA YARD
Southwest Marine of Samoa, Inc.
P.O. Box 1387
Pago Pago, American Samoa 96799
684-633-4122
TWX No. 525 SWM SB
FAX No. 011-684-633-2529
SOUTHWEST MARINE, INC. 1983

Circle 189 on Reader Service Card

Maritime Reporter/Engineering News

It's Time To Prepare For MARPOL Compliance*

Editor's Note:* This exclusive article has been excerpted from a special report by **Peter P. Lombard, president, American United Marine Corporation, and **Flemming D. Christensen**, A/S Vesta.

Starting December 31, 1988, the U.S. Coast Guard will begin enforcing Annex V of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution by Ships, 1973, known as MARPOL 73/78.

Known as "Regulations for the Prevention of Pollution by Garbage by Ships," it defines garbage to include victual, domestic and operational wastes and deals specifically with nonbiodegradable substances such as plastics.

In an article in its August 1, 1988 edition, *Time* reported that beaches around the world were being contaminated with industrial, human and hospital wastes. Large amounts of marine life are being killed as a direct or indirect result of man-generated pollution.

Time estimates that merchant fleets dump at least 450,000 plastic containers overboard per day. The U.S. Navy, in an effort to lower its

plastic waste disposal, has canceled an order for 11 million plastic bags and is testing alternative methods for dealing with garbage and trash.

Under Annex V of MARPOL 73/78, disposal into the sea is entirely prohibited for certain materials. These include all plastics such as synthetic ropes, nets, and garbage bags. These materials must not be discharged at any time, except for the purposes of securing the safety of the ship or saving life at sea.

Other items may be disposed of as far as possible from land, but not within certain minimum distances. These distances vary with the types of waste.

Certain sections of the sea, because of their particular oceanographical and ecological conditions, are designated as "special areas." Within these special areas, which include the Mediterranean, Black, Red and Baltic Seas and the gulf area located northwest of the line between Ras al Hadd and Ras al Festah, all waste disposal is entirely prohibited except for the discharge of food wastes, which must be dumped at least 12 nautical miles from the nearest land.

In addition, movements are now underway to designate the Gulf of Mexico and other ocean sections as special areas, possibly after the rules go into effect at the end of this year.

A further provision of the regulations states that the disposal of any materials regulated by Annex V is prohibited from fixed or floating platforms engaged in the explora-

tion, exploitation, and associated offshore processing of seabed mineral resources, and from all other ships when alongside of or within 500 meters of such platforms.

The implementation of Annex V is going to require some changes in the way most oceangoing vessels deal with their refuse.

At present, three alternative

(continued)

MÄRKISCHES WERK HALVER

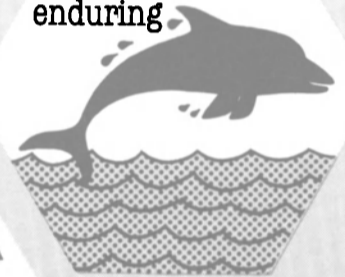


MWH VALVES — AT HOME ON ALL OCEANS

More than 50 years experience guarantee the highest standards.

A highly sophisticated and flexible production ensures total conformity to original diesel engine specifications.

Strong, reliable, enduring



Further advantages:

Highest precision

Long life

Special stem coating to avoid corrosion of the engine parts

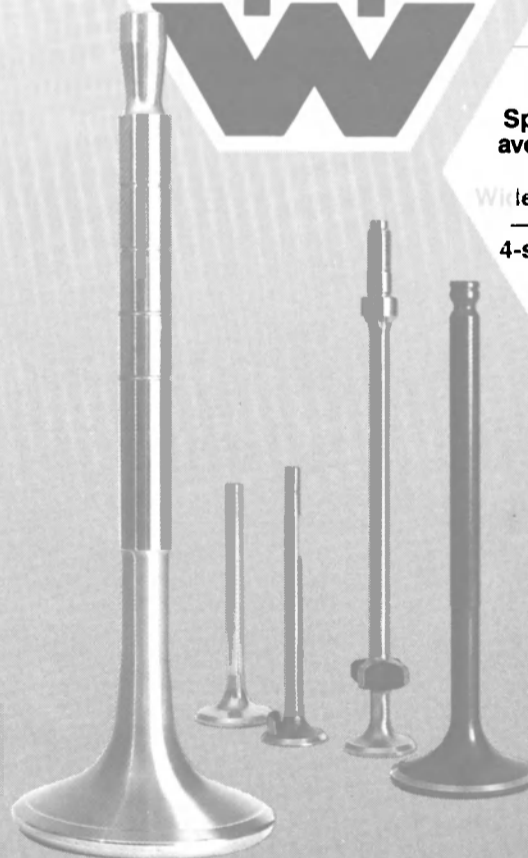
Wide production program

— from the smallest

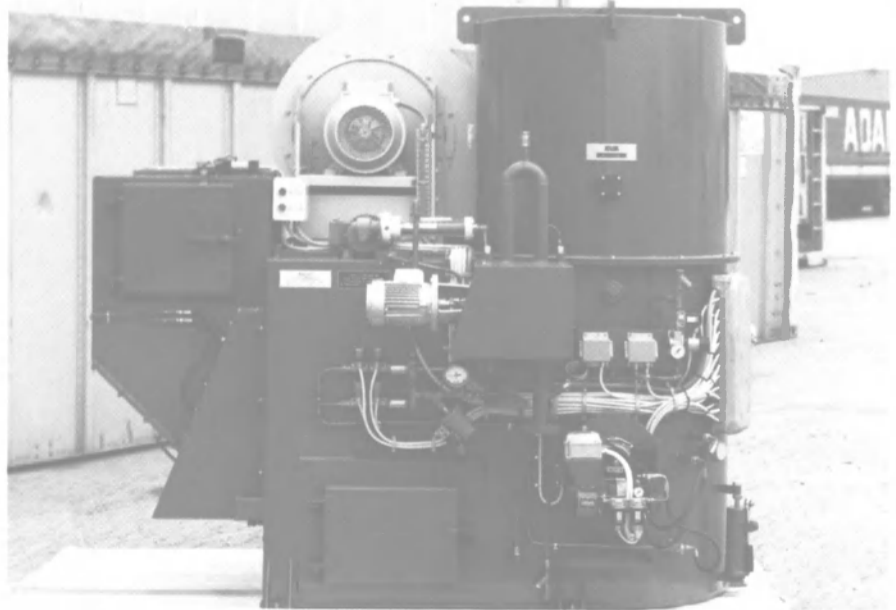
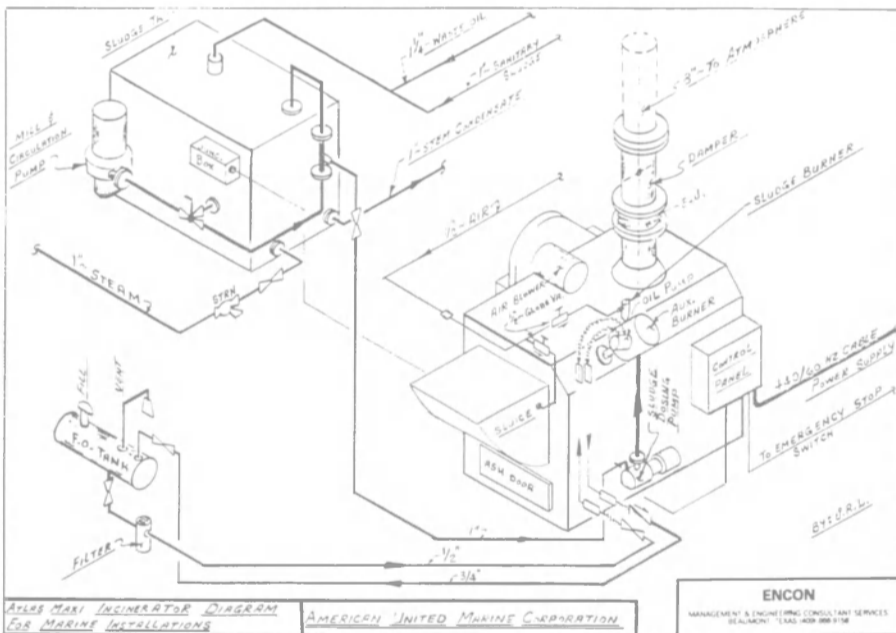
4-stroke to the largest

2-stroke valve

Short delivery times



Märkisches Werk GmbH, P.O. Box 1442, D-5884 Halver
Phone (23 53) 7 22 74 Telex B 263 649 mwkd Telefax (23 53) 7 22 55



MARPOL

(continued)

methods of dealing with the problem exist. These are: (1) onboard storage until the vessel reaches a port with disposal facilities; (2) compaction and storage until on-shore disposal; and (3) incineration.

Space requirements, problems of odor, insect control and general sanitation, make the first method, storage and shore disposal, unattractive. Additionally, problems may be encountered scheduling the necessary number of stops at ports with adequate disposal facilities.

Although the second method, trash compaction, partially solves

the problem of space requirements, it still requires the scheduling of stops at ports with disposal facilities.

Annex V provides that if wastes, such as foodstuffs, paper products, rags, glass, metal and similar refuse, have been comminuted or ground to the point where they will pass through a screen with openings no

greater than 25 millimeters, the minimum distance from shore required for ocean discharge is reduced to three nautical miles. Also, food wastes which have been comminuted to 25 millimeters or less, can be discharged from floating or fixed platforms located more than 12 miles from land, and from other ships when alongside or within 500 meters of the platform.

In other words, simply reducing the particle size of refuse to 25 millimeters or less lowers the ship-to-shore dumping limit from 12 to 3 miles.

However, the most efficient method of fulfilling the newest MARPOL requirements is through the use of an onboard incinerator. Vesta/Atlas incinerators, for example, all produce ash residues which meet Annex V requirements.

Incinerators are offered in a wide variety of models to meet every combination of requirements, depending on what type of materials are to be burned and how much.

Requirements for shipboard incinerators are governed by 46 CFR Part 63, and the safety requirements for them are found in 46 CFR 58 and 46 CFR 56. When purchasing an incinerator, it is important to ascertain that it meets all these requirements, and is so certified by the manufacturer.

While incinerators do require a moderately large initial investment for purchase and installation, they have the advantages of providing a completely reliable and efficient method for disposing of waste materials without any expenses for or dependence on disposal facilities in ports of call.

Modern incinerators, with their two-chamber design, produce no particulate emissions in the exhaust gases because of complete combustion during the retention in the second chamber. They can be shipped either as one-piece units, or knocked down for assembly onboard, simplifying retrofits on existing vessels.

A number of factors are important for evaluating the best methods for solving the waste disposal problem of each individual vessel. For example:

(1) *Type of power*—steam ships will be concerned with disposing of solid garbage and trash. Motor ships will have the same types of waste as the steam vessels with the addition of oil sludges, which require special techniques for holding and disposal.

(2) *Use of vessel*—the volume of the material to be disposed of will vary greatly depending on the use of the vessel—whether it carries passengers, freight, crude oil or liquid products, containerized cargoes, and other types.

(3) *Trade routes*—the routes followed by ships can have a big effect on disposal handling. Largely coastal operations, for example, have the disadvantage of never being far out enough to dump but also have the advantage of being always close to ports with disposal facilities. These vessels traveling through the MARPOL "special areas" must be prepared to deal with the special prohibition in those areas.

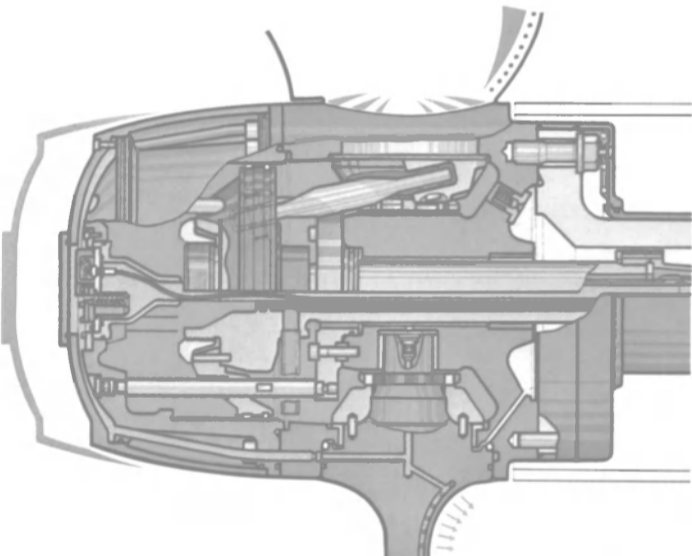
The versatile **ESCHER WYSS Controllable Pitch Propeller** design that fulfills the stringent hydrodynamic, hydroacoustic and mechanical requirements of today's high technology naval vessels.



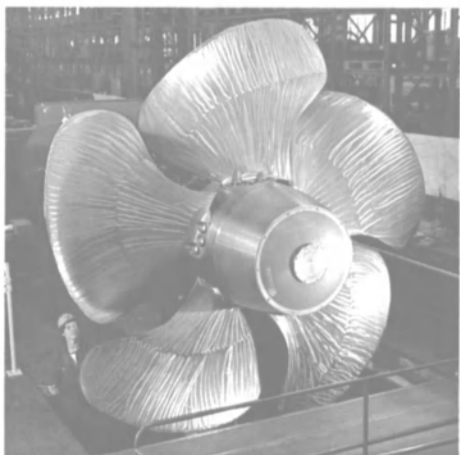
CONTROLLABLE PITCH PROPELLERS



Nonmagnetic C.P. propellers for a mine countermeasure vessel.



A fivebladed naval propeller with prairie air supply, additional electronic pitch measuring device and hub purging system.



A frigate propeller: 25000 HP.

SULZER ESCHER WYSS

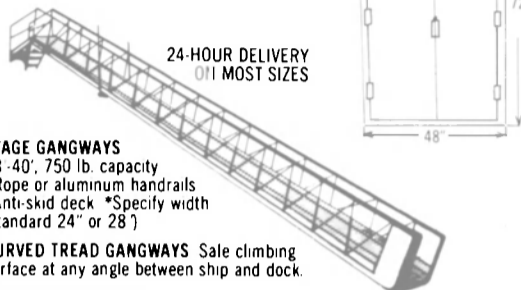
D-7980 Ravensburg/F.R.G., Tel. (07 51) 8 30, Telex 7 32 901

VP 72

Circle 151 on Reader Service Card

★FIBERGLASS PRODUCTS★ ★GANGWAYS★

SURVIVAL SUIT STORAGE CABINET
Available with or without window. Optional shelves. Stainless steel hardware and hinges; gel coat interior and exterior. Watertight. Safety yellow, red, emerald green, gray, white, blue, orange.



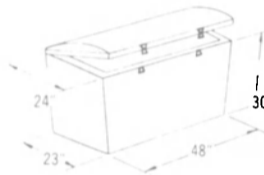
24-HOUR DELIVERY OF MOST SIZES

STAGE GANGWAYS
*8'-40', 750 lb. capacity
*Rope or aluminum handrails
*Anti-skid deck *Specify width (standard 24" or 28")

CURVED TREAD GANGWAYS Safe climbing surface at any angle between ship and dock.

TRUSSED GANGWAYS
*Available with ropes, rails or all aluminum construction *Aluminum anti-skid deck surface *All stainless steel bolted and welded for maximum safety and trouble-free service *Lengths up to 60 ft. *RENTALS AVAILABLE IN STOCK 10'-50'

WE REPAIR GANGWAYS—COMPLETE RESTORATION 50% OF ORIGINAL COST
24-HOUR TURNAROUND ON MOST REPAIRS



LIFEJACKET BOX
For LIFEJACKETS. Stainless steel continuous hinge. Chrome brass latches. Gel Coat exterior. Full liner interior. 60 lbs. Lid will support 250 lbs. Color orange standard.

NATIONAL SPECIALTY PRODUCTS, INC.

P.O. Box 590188 Houston, Texas 77259
713-488-3003 Fax: 713-643-9751

Circle 235 on Reader Service Card

UNIVERSAL MARINE MEDICAL SUPPLY CO.

Emergency Medical Supplies For Your Ship and Crew

MAIN OFFICE:
6906 3rd Avenue
BROOKLYN,
NEW YORK 11209
(718) 745-7005
MIAMI, FLORIDA
(305) 371-6769
HOUSTON, TEXAS
(713) 738-5101
SAN FRANCISCO, CA
(415) 861-3252
LOS ANGELES, CA
(213) 222-1155
TELEX NUMBER
423104 UNIMARI
FAX: (718) 833-2182

• **OVER 15 YEARS of dependable, efficient, and economic, service. We specialize in servicing vessels worldwide, including cruise ships, freighters, tankers, off shore rigs, shipyards, drydocks, ship chandlers, and ship builders.**

• **Call or write today for our free 8 page full color brochure with full details.**

DIRECT SAME DAY DELIVERY SERVICE TO SHIP CHANDLERS AND STEAMSHIP LINES IN ALL U. S. PORTS 7 DAYS A WEEK.

24 HOUR WORLDWIDE SERVICE

Circle 130 on Reader Service Card

(4) *Business arrangements*—the choice of disposal methods may be affected by the type of business arrangements of the vessel—such as whether it is in a fixed market, an open (spot) market, or a long-term charter arrangement. For example, some long-term charter agreements may specifically require incineration capabilities.

For determining the disposal capability required for a particular vessel, the following rule-of-thumb formulas are generally applied: (1) *for solid waste*—number of people on board multiplied by 3 equals the kilograms of solid waste per 24-hour period; (2) *for sludge waste*—engine capacity in kilowatts by 0.0024 by 24 equals the liters of sludge per 24-hour period, including lubricating oil.

For disposing of these wastes by incineration, the energy released is as follows: solid waste 3,200 kilocalories per kilogram; oil sludge 6,000 kilocalories per liter.

After these requirements values are computed, an incinerator is chosen which will handle the necessary kilocalories, while operating 12 hours in each 24-hour period.

Steps toward installation of an incinerator which will result in full compliance with Annex V ordinarily proceed on a schedule similar to the following one:

(1) The vessel is surveyed (one to two days) and a location for the incinerator is chosen (usually in the engine room or, in case of space limitations, a self-contained, pre-wired and piped module is available for easy deck installation), and utilities connections are located.

(2) Development of drawings, which will be submitted to regulations (ABS) (one to two weeks). These drawings will include: (a) the general arrangement of the incinerator installation; (b) diesel oil piping system, showing the connection points at the incinerator and the diesel oil supply point; (c) electrical system, showing the power supply and cable connections to the incinerator control panel; (d) exhaust gas piping for the incinerator, to either a common or independent stack; (e) foundation support; (f) detailed isometric drawing for diesel oil, electric cabling, and exhaust stack; (g) detailed installation specification write-up, which can be used by owners, shipyards, riding crew, or installation operators; (h) complete electrical and mechanical bills of materials; and (i) one set of reproducible drawings.

(3) Installation by two men, in a matter of days.

(4) Commissioning and start-up in one day.

When these steps have been completed, shipowners and operators can be assured that they are capable of complying with all waste disposal regulations which are planned for the foreseeable future.

A special advantage of Vesta/Atlas incinerators is that they are manufactured by both A/S Vesta, Copenhagen, and their subsidiary, Klinge Products, Inc., York, Pa., for fast local delivery both in Europe and the U.S. American United Marine Corporation, Saugus, Mass., in

the exclusive U.S. agent for A/S Vesta.

For a free copy of the special report by **Peter P. Lombard** and **Flemming D. Christensen**, as well as further information on waste disposal regulations and systems and on Vesta/Atlas systems,

Circle 113 on Reader Service Card

R.J. Bazzini Associates To Represent Advanced Control Systems

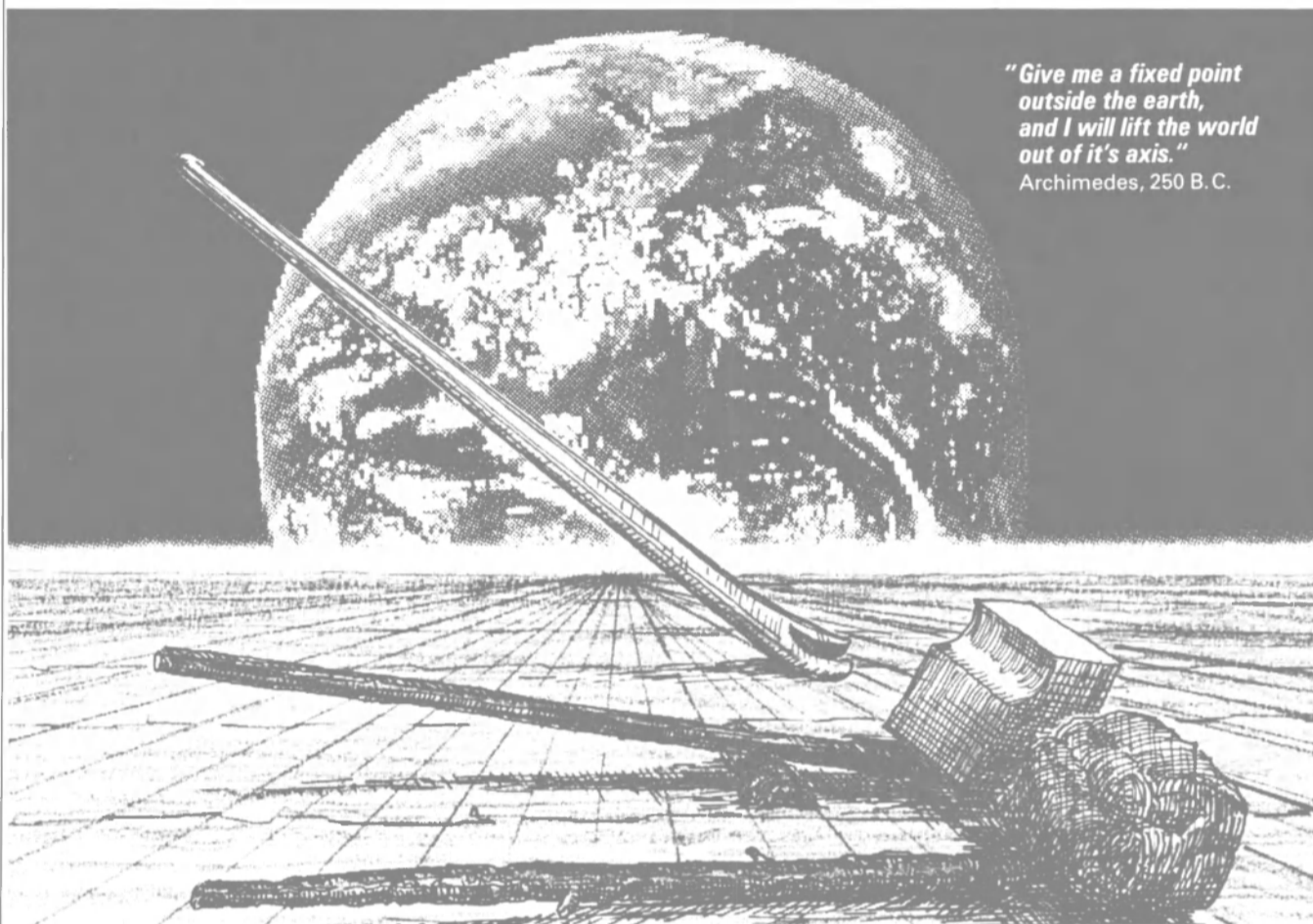
Robert J. Bazzini, P.E. of R.J. Bazzini Associates, a company that specializes in the application and sale of engineered equipment and systems, recently announced that his company has been named the representative of Advanced Control

Systems, Incorporated, for the East Coast.

Advanced Control Systems designs and markets a boat operating system which has the capability of reducing diesel propulsion system operating costs.

For free literature describing the services of both R.J. Bazzini Associates and Advanced Control Systems,

Circle 59 on Reader Service Card



*"Give me a fixed point
outside the earth,
and I will lift the world
out of its axis."*
Archimedes, 250 B. C.

Is it true that Archimedes caused a big sensation with the use of JDN-Hoists?

Definitely not. But his discovery of the use of the lever led to developments which quite often caused big sensations.

In 1745 J.D. NEUHAUS began with the production of winches, the predecessors of our modern hoists of today. At that time, as today, the motive was the same: Easier lifting, lowering, pulling or transportation of loads. Then, as now, precision, sturdiness, and the use of only the best materials and tools have a distinct significance for us.

In 1952 J.D. NEUHAUS caused a sensation with the development of his "on the spot idea" idea: To equip hoists with a pneumatic motor instead of the then usual, manual drive. This brought distinctive advantages, especially the explosion proofing. An idea went round the world. Today, JDN-pneumatic-hoists are successfully in operation in over 90 countries and more than 40 different branches of industry.



Please, request
our latest
information material
on the complete
JDN-hoists
programme!

JDN – The successful synthesis of tradition and progress

J. D. NEUHAUS HEBEZEUGE GMBH & CO · D-5810 WITTEN-HEVEN

Telefon (02302) 208-0 · Telex: 8229162 · Telefax (02302) 208-286

Circle 14 on Reader Service Card

**Versatile Pacific Delivers
\$80-Million Icebreaker
'Henry Larsen'**

The Canadian Coast Guard recently took delivery of the Can\$97-million (about \$80-million) icebreaker Henry Larsen, the largest of 12 icebreakers built so far by Versatile Pacific Shipyards Inc. of North

Vancouver.

The Henry Larsen has dimensions of about 327.5 feet overall length and 64.6 feet beam with a displacement of 8,290 tons at 23.7 feet draft. The vessel can accommodate a crew of 72, has a cruising range of 15,000 nautical miles, a cruising speed of 15.5 knots, and a total shaft horsepower of 12,000 kw through two propellers.

Versatile Pacific is currently completing the definitive design of the proposed Can\$347-million (about \$284.5-million) Polar 8 icebreaker, which will be one of the largest icebreakers ever constructed.

For free literature giving full information on the facilities and capabilities of Versatile Pacific Shipyards,

Circle 54 on Reader Service Card

**Emerling Named President
TANO Marine Systems**



R.W. Emerling

R.W. (Pete) Emerling has been named president of TANO Marine Systems, Inc., which designs and manufactures automation and control systems for military ships and industrial applications.

Mr. Emerling, who has been with TANO since its formation in 1972, is in charge of all sales, engineering, customer service and manufacturing personnel. He has served in a variety of engineering and executive positions while with the company.

Mr. Emerling is subcommittee co-chairman for the Shipbuilding Committee of the American Society for Testing and Materials.

TANO Marine Automation Systems have been installed on more than 240 ships for the U.S. Navy, Coast Guard, Military Sealift Command and U.S. merchant marine. TANO Marine Systems, Inc. is a subsidiary of TANO Corporation.


For more information and free literature,

Circle 29 on Reader Service Card

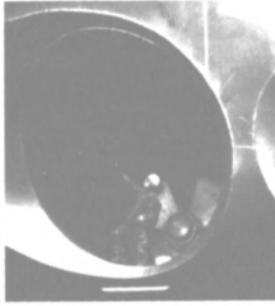
KAMEWA

FOR MODERN PROPULSION TECHNOLOGY

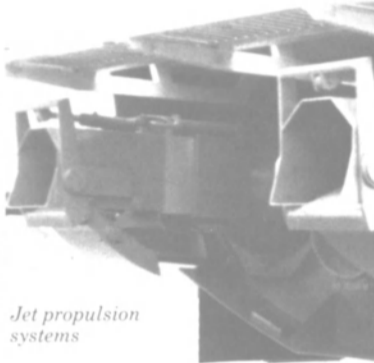
- Design and manufacturing of electronic control systems for all products
- Comprehensive research and development facilities in the hydrodynamic laboratory
- Training school
- Worldwide service



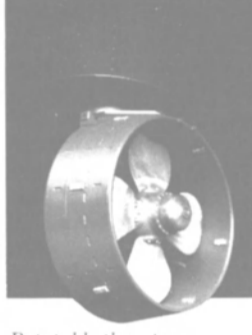
Controllable pitch main propellers




Tunnel thrusters



Jet propulsion systems



Rotatable thrusters



KAMEWA
A Vickers P.L.C. company

KAMEWA AB · P.O. BOX 1010 · S-681 01 KRISTINEHAMN · SWEDEN
TELEPHONE +46 550 840 00 · TELEX 66050 · TELEFAX 181 90

Circle 244 on Reader Service Card

ECKOLD KF 665

— Many Tools in one

Compound & Blanks

formed on the same machine






KRAFT FORMER

ECKOLD AG · Machine Tools
CH 7203 Trimmis
Switzerland
Telex 85 1343 · Fax (81) 27 5639

in the USA contact:
Craig Leber
Houston, Texas
Phone: (713) 484 1688

Circle 14E on Reader Service Card

**New Radars By Simrad
Offer Desirable Selection
—Literature Available**

Simrad/Anritsu's new radars, according to the manufacturer, offer superior short range performance, and exceptional resolution and definition. They include the following selection.

The RA720UA (0.25 - 60 NM, 5 kw) and RA721UA (0.25 - 96 NM, 10 kw), which Simrad describes as compact, affordable and offering outstanding performance and reliability, have 12-inch monochrome displays.

The RA711CA (0.25 - 60 NM, 5 kw) and RA712CA (0.25 - 96 NM, 10 kw) have 11-inch color displays and boast a high level of performance.

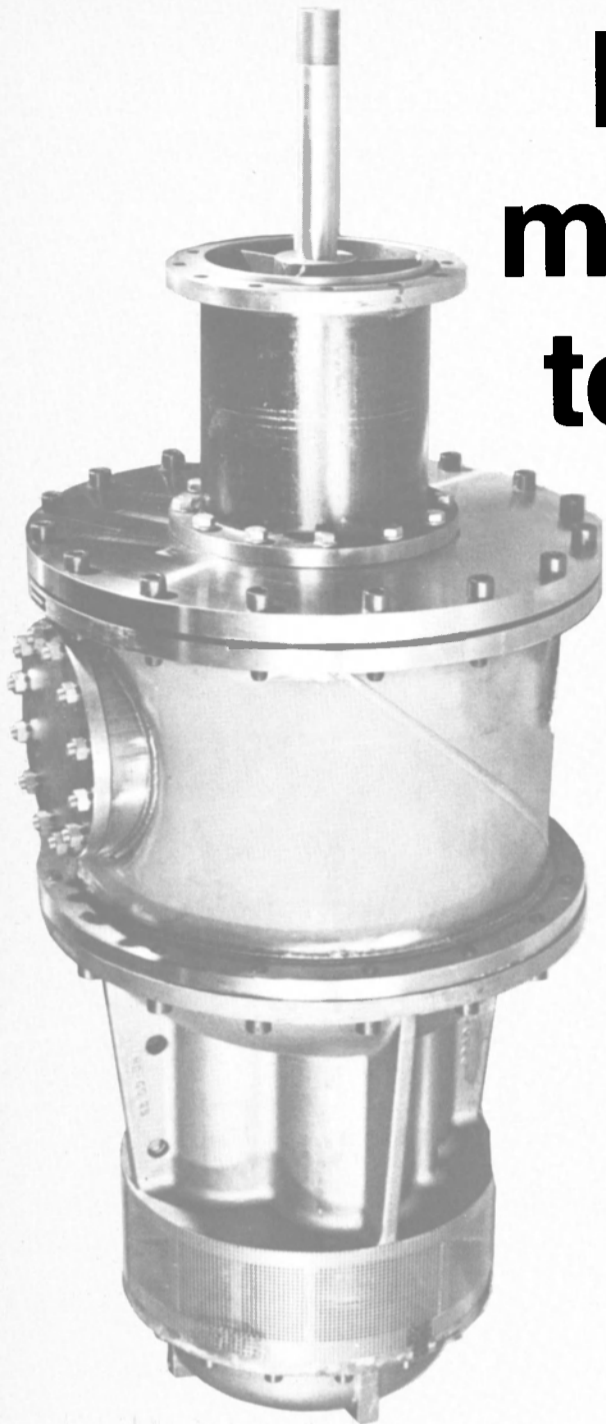
The AR-C12A has a large 14-inch color display and a 10-kw transmitter combined with, according to Simrad, superior detection, extremely high resolution and definition.

All Simrad/Anritsu radars feature full function menus with self-test facilities, a high level of user programming ability, one-year parts and labor warranty, and the full support of Simrad's comprehensive dealer network.

For further information and free literature on radars by Simrad,

Circle 18 on Reader Service Card

Engineered marine pumps to solve your special problems...

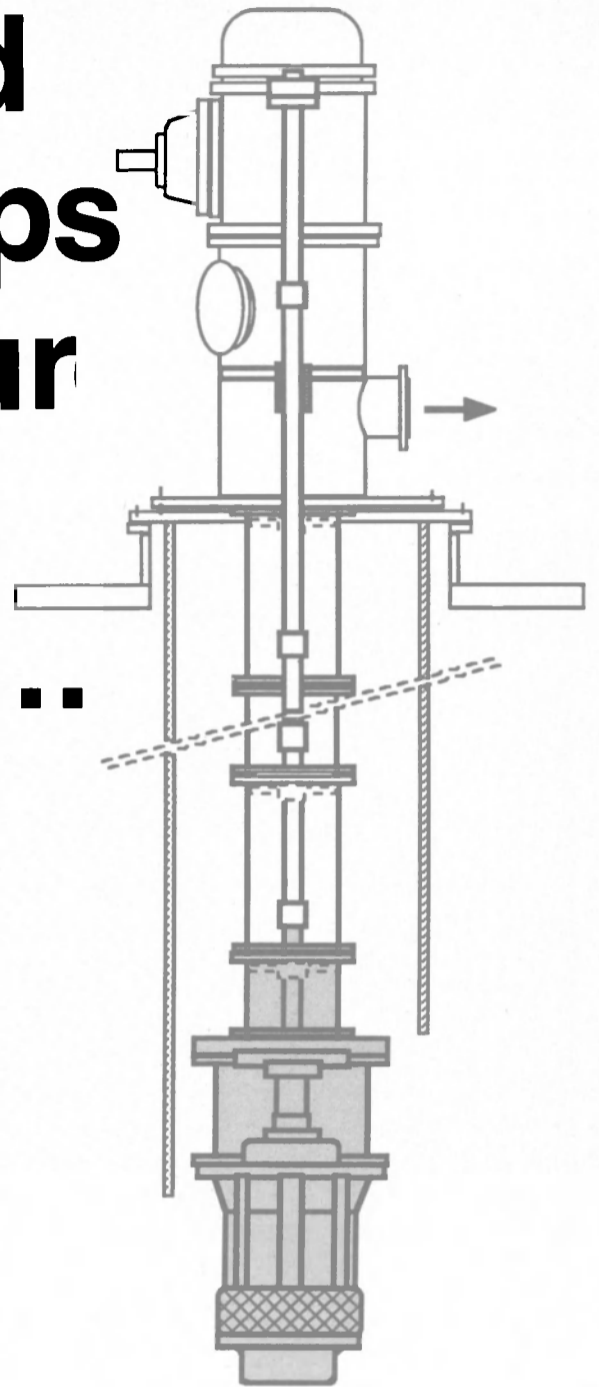


The Leistriz five-rotor, single-flow screw pump on the left was specially designed to unload asphalt and #6 fuel oil from an ocean-going barge.

The pump is one of two we designed and built for an East Coast barge operator. These pumps, each with a capacity of approximately 5000 BPH, are the largest of their type ever installed aboard a U.S. vessel.

The diesel-driven pumps operate at 145 PSIG, at a viscosity of 3000 SSU and temperatures to 340° F.

The entire pump assembly, including the column assembly and discharge head, is shown in the schematic at right.



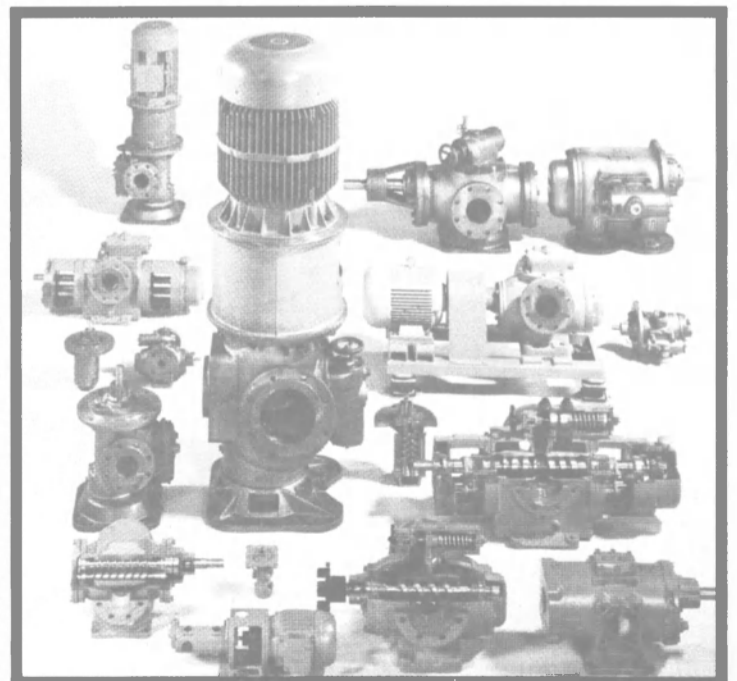
plus a full line of standard units.

While engineering and manufacturing marine pumps to solve all kinds of fluid-handling problems has been a Leistriz specialty for more than 60 years—we make a full line of *standard* pumps, too.

The line includes two, three and five-screw pumps for lube-oil service, fuel-oil service, hydraulics, sludge handling, cargo loading and unloading. And these pumps serve both shipboard and off-shore applications worldwide.

So whether you have a special pumping problem to be solved, or an application that a standard pump can handle, you can count on Leistriz for a pump design that will—without compromise—meet your exact pumping requirements. And at the same time, you'll get the quality, reliability and efficiency that Leistriz is known for.

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



Leistriz

Circle 110 on Reader Service Card

Ulstein Group Becoming A Major Force In Ship Equipment

Following amalgamation with the BMV Group (Bergens Mekaniske Verksteder A.S.), the Ulstein Group has become one of the largest companies in Norway producing equipment for ships. Ulstein has held a majority interest in BMV in recent

years and has now considered it appropriate to combine the two groups. This means that the Ulstein Group, with over 2,000 employees, stands out as a central force in the sale of Norwegian ship design and equipment in international markets.

The company Ulstein International A.S. will be responsible for the marketing and sale of what will be one of Europe's broadest product ranges to ships from one supplier.

This wealth of resources will provide the Ulstein Group with the increased investment potential throughout its 30 companies established in nine countries. Investment areas will include the sole remaining Norwegian-owned engine manufacturer Bergen Diesel, deck machinery, rudders, propellers, steering systems, tank systems and electronic remote control equipment. They will also include the extensive activities in the field of ship design car-

ried out by three of these companies.

In recent years, the Ulstein Group has increased investment in the development of high-technology ship-equipment and design. Greater resources have also been directed toward the development of service functions in the production companies.

Shipbuilding and repairing will continue to play a significant role in the activities of the Ulstein group through BMV Laksevåg A/S in Bergen and Ulstein Hatlo A/S in Ulsteinvik and subsidiaries.

For more information and free literature on the Ulstein Group,

Circle 40 on Reader Service Card

**WHAT PRICE
ARE YOU
WILLING TO PAY
FOR MARITIME
SATELLITE
COMMUNICATIONS?**

For the lowest early morning ship-to-shore telephone rates to Europe, COMSAT comes through loud and clear.

With COMSAT Maritime Services, you can get the high quality that satellite calling offers at rates that are lower than anywhere else. You pay our new through-rate of \$8 per minute—ship to our Coast Earth Station then to Europe (one low price)...free of hidden charges or add-ons. And every call is backed by the technology and reliable service that has put COMSAT at the forefront of international satellite communications.

For a clear connection on maritime satellite calls, call 1-800-424-9152 or 202-863-6567 right now for your new rate card. And stop paying a high price for something less.

 **COMSAT**
Maritime Services

950 L'Enfant Plaza, S.W., Washington, D.C. 20024
Certain restrictions apply

Circle 204 on Reader Service Card

Textron Marine Wins USCG Contract Worth \$2.3 Million

Textron Marine Systems (TMS), a division of Textron Inc., was awarded a \$2.3-million contract for the detail design and construction of a U.S. Coast Guard 47-foot prototype motor lifeboat, according to an announcement by company president **John J. Kelly**.

The contract also contains an option to order five additional motor lifeboats after completion of the prototype.

The all-aluminum motor lifeboats will be built at the TMS facility in New Orleans, La. Construction will begin early next year and completed in December 1989.

The Coast Guard plans to use the new motor lifeboats to replace 100 20-year-old lifeboats currently in service.

For free literature on the boat-building and designing services offered by TMS,

Circle 10 on Reader Service Card

Oregon Ports Group Offers New Eight-Page, Full-Color Brochure On Facilities

The Oregon Ports Group (OPG), comprised of four deepwater ports in Astoria, Coos Bay, Portland, and St. Helens, is offering a new eight-page, full-color brochure describing the facilities and capabilities of the four ports, as well as pointing up that as a group, they cooperate to assure a favorable business environment within Oregon for fabrication projects.

Describing the OPG as a marketing association supporting oil industry projects, the brochure states that the Oregon legislature recently rewrote key segments of the state electrical safety code to make it easier for Oregon ports to compete in fabricating oil modules destined for use on the Alaskan north slope.

Colorful maps and photographs accompany the descriptive material in the brochure.

For more information and a free copy of the brochure from the Oregon Ports Group,

Circle 64 on Reader Service Card

JJH Inc. Appoints Ismail Kizilkaya VP

Richard R. Hopkins, president of JJH Inc., recently announced the appointment of Ismail (Chet) Kizilkaya to the position of vice president. In his new capacity, Mr. Kizilkaya will be responsible for government business development and management of related corporate functions involving naval ship projects.

Mr. Kizilkaya brings to this position over 30 years of experience in naval and commercial ship design, of which the last 18 years have been dedicated to the engineering management and technical direction of various special projects.

\$7.8-Million Navy Contract Awarded E-Systems, Inc.

E-Systems, Inc., a major producer of defense electronic systems and products, was recently awarded a U.S. Navy contract valued at approximately \$7.8 million for production of AN/WSC-3 "Whiskey-3" shipboard radio terminals.

The contract was awarded by the Navy's Space and Naval Warfare Systems Command after a competitive procurement. The work will be performed by E-Systems Communications Manufacturing Division (CMD) in St. Petersburg, Fla.

The Whiskey-3 is a UHF transceiver used by the Navy for long-haul tactical communications via satellite, and for line-of-sight communications with other ships and aircraft. It is the U.S. Navy's standard UHF terminal and is currently in use by 17 allied navies.

For more information and free literature from E-Systems,

Circle 58 on Reader Service Card

Dixie Carriers To Build And Operate Barges For Norwegian Firm

Dixie Carriers, Inc., a subsidiary of Kirby Exploration Company, Inc., has entered into a multiyear agreement with Odfjell Westfal-Larsen Tankers of Bergen, Norway, for the construction and operation of three specialty tank barges.

The barges, to be constructed by Platzer Shipyard, Inc., Channelview, Texas, a quality builder of barges and other equipment for industrial use, will feature multigrade stainless steel cargo tanks with separate piping, pumping and vapor emission control systems. Furthermore, the barges will be equipped with closed gauging systems, separate ballast tanks and an innovative hydraulically driven deepwell pump system supplied by Frank Mohn A/S (Framo) of Bergen, Norway.

These special barges will be capable of safe and simultaneous handling and carriage of a wide variety of petrochemicals and other specialty bulk liquid products, including cargoes that presently move by truck and rail only.

Odfjell Westfal-Larsen Tankers (OWLT), a pioneer and leader in

the ocean transportation of specialized petrochemicals, owns and operates one of the world's largest fleets of sophisticated chemical tankers involved in worldwide transportation.

As part of its cargo consolidation program, OWLT has contracted with Dixie to handle certain domestic transportation needs involving cargoes to and from OWL Tankers at its Baytank Marine Terminal on the Houston Ship Channel, thus

saving costly port time for the ships. The Port of Houston serves as home port for OWLT's fleet of advanced chemical tankers.

Dixie, a marine transportation service company, transports liquid cargoes, primarily petrochemicals, on the inland waterways system. Dixie's other subsidiaries provide offshore transportation of both dry and liquid products, diesel repair and harbor services.

Joseph H. Pyne, president of

Dixie Carriers, stated that besides meeting the needs of OWLT, the new barges would enable his firm to compete in the specialty chemical handling market now dominated by the truck and rail industries.

The new barges will be ready for service during the first part of 1989. Dixie and OWLT are also presently in the process of converting existing barges to multigrade units which will be in service in late summer of this year.

MARINE INDUSTRY STANDARD



Make the *right* connections with Flagg Flow. The only complete line of fittings and flanges for the Marine Industry.

When you specify bronze fittings, unions and flanges, specify the Marine Industry standard. Flagg Flow.

For nearly 50 years, our complete line of sil-brazed products has been made to exact Navy specifications . . . made in America . . . and made to last.

Flagg Flow products are in stock now, at key locations across the country.

Plus, you can count on Flagg for a level of assistance, training and support no other supplier offers.

Specify Flagg Flow, and you'll make all the *right* connections.

Marine Products

Threadless Bronze Fittings for Brazed Joints

- Fittings • Flanges • Unions
- Pressure Classes 200-3,000#
- Made to Commercial and Military Specifications
- U.T. Designs Available
- Malleable Threaded and Brass Threaded Fittings Also Available



Now available! Step-by-Step Successful Brazing Video and Booklet.

Stanley G. Flagg makes brazing simple and successful. This new instructional video and booklet covers step-by-step techniques from proper fit and clearance, to cooling and cleanup.



STANLEY G. FLAGG & CO., INC.

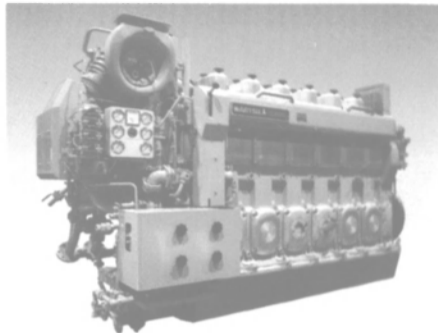
A Subsidiary of Amcast Industrial Corporation

1020 W. High Street, Stowe, PA 19464 • (215) 326-9000 • FAX: (215) 326-9502

Circle 237 on Reader Service Card

PROPULSION UPDATE

Wartsila Engines Selected To Power 2 New Bulk Carriers And Re-Engine A Cargo Carrier



Lasco's new bulk carriers will be equipped with Wartsila Vasa 22/26 auxiliary engines. Pictured is a six-cylinder in-line version of the engine.

Two new bulk carriers ordered by the principals of Lasco Shipping Co. of Portland will be equipped with Wartsila Diesel's Vasa 22/26 auxiliary engines. The 64,000-dwt vessels are under construction at Jiangnan shipyard in Shanghai.

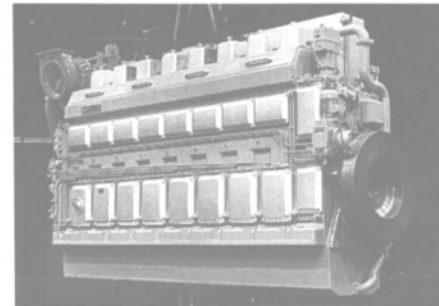
The contract includes three Wartsila Vasa 4R22/26 auxiliary engines per vessel, each developing 540 kw at 720 rpm. The auxiliaries will burn the same 380 cSt heavy fuel as the main engines. The auxiliary engines for the first vessel will be delivered in early 1989, and for the second, at the end of the same year.

The Vasa 22/26 selected for the

Lasco Shipping vessels is a powerful new medium-speed auxiliary engine which is well-suited for power production in different types of vessels. Rigid design components combined with an optimized combustion process guarantees reliable and economical operation at all loads, even on the lowest grade heavy fuels.

The Vasa 22/26 has a cylinder bore of 220 mm and a piston stroke of 260 mm. The output range is 540-3,000 kw at speeds ranging from 720 to 1,100 rpm. The Vasa 22/26 is manufactured in 4-, 6-, and 8-cylinder in-line versions and 8-, 12-, and 16-cylinder V-versions.

The 7,500-dwt dry cargo carrier Rosadaniela, owned by Transpapel Naviera C.A. of Venezuela, will be refitted with new propulsion machinery. The vessel will have its existing main engine replaced with one eight-cylinder, 3,300-kw Wartsila Diesel heavy fuel engine type Vasa 32. It will also be fitted with a new reduction gear, a new CP-propeller and new remote control system. Wartsila Diesel will supply all the equipment and be in charge of both project planning and management. The vessel will be refitted by



The Rosadaniela will be refitted with a Wartsila Vasa 8R32 main engine with an output of 3,300 kw. Shown is an eight-cylinder Vasa 32 engine.

the Venezuelan company Tenaval C.A. at the Dianca shipyard in Puerto Cabello, Venezuela. Re-engining is scheduled for completion by the end of August of this year.

Wartsila Diesel is a leading designer and manufacturer of medium-speed fuel engines in the 500 to 16,000-kw range. The company also delivers complete propulsion packages for different vessel types and sizes.

For further information and free literature on Wartsila Diesel engines,

Circle 101 on Reader Service Card



Power For Power.
Spectra® the strongest, lightest weight fiber made is now available in four Samson Braids — The Power Braids:

These high performance fibers are specially engineered by Allied-Signal Inc. for the most outstanding physical properties. Combined in Samson's unique braid process, the Power Braids can increase drum storage capacity up to 25% while providing

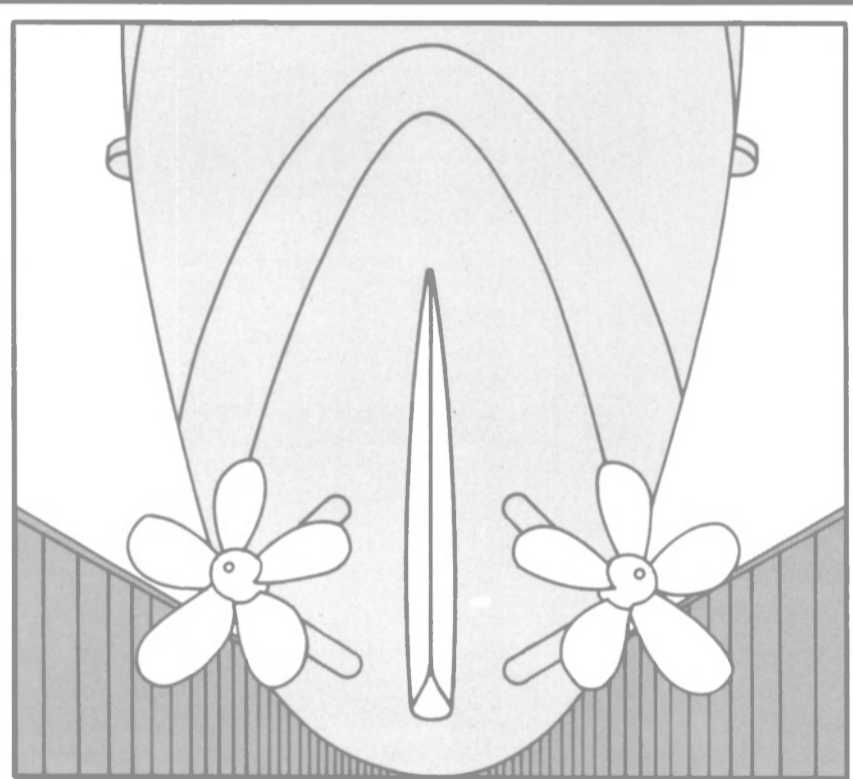
potential strength increases of over 50%. The Spectra Power Braids have relatively zero stretch and excellent handling properties.

Send for your Samson Power Braids evaluation kit with special evaluation prices, samples and complete technical data. Samson Ocean Systems, 2090 Thornton St. Ferndale, WA 98248

SAMSON OCEAN SYSTEMS, INC.

Circle 125 on Reader Service Card

ENSERCH



Cavitation

DuraTough™ — the only product that resists cavitation erosion 5 times better than carbon steel.

PROTECT: Rudders, Struts, Screws, Hubs



PALMER INTERNATIONAL, INC.

P.O. Box 8 Worcester, PA 19490

(800) 341-4408

(215) 584-4241

Polymers for the repair and maintenance of capital equipment
Call or write for details and test results.

Circle 270 on Reader Service Card

Korea Shipbuilding Delivering Six Tankers To Norwegian Owners

Five years after they were ordered, delivery by Korea Shipbuilding & Engineering Corp. (KSEC) of six advanced combination carriers worth \$171 million has begun to two Norwegian owners. KSEC said four of the 37,000-dwt products/ore/bulk/oil carriers were built for Klavness Co. and two for Havtor Co.

under contracts signed in 1983 for delivery in 1986.

When the original delivery time arrived, the Norwegian firms cited technical problems with the vessels and refused to accept delivery unless the price was cut. After long-running arbitration, KSEC reduced the price of each vessel by \$6 million.

Klavness announced that with technical alterations, the six vessels will be able to trade as originally intended.

Canadian Government To Spend \$624.4 Million For 12 Minesweepers

Canadian Defense Minister **Perin Beatty** recently announced plans to design and build 12 minesweeping vessels to fill a gap in Canada's aging naval fleet. The contract is valued at 750 million Canadian dollars (US\$624.4 million).

J.Y. Clarke, president of the Canadian Maritime Industries As-

sociation, said the project would provide a boost to medium-sized Canadian shipyards, which don't have the capacity to handle the larger frigate and submarine contracts. He estimated that 75 percent of the work could be done in Canada.

The vessels will be equipped with 40-millimeter Bofors guns and remote-control minehunting systems. They will be manned by the 3,000-strong naval reserve which, under Canada's new policy is responsible for maritime coastal defense



NOW
TWIN-PATHS™
Lifting Slings
with built-in
early warning
systems and
back-up
protection
(Patent Pending)

TWIN-PATH™ Lifting Slings
let you know instantly when
they've been cut or frayed.

MADE EXTRA TOUGH/AND EXTRA SOFT

TWIN-PATH™ slings are actually 2 complete slings in one, each making separate connections between hook and load. TWIN-PATH™ slings have double-layered covers for extra protection. This back-up system could help maintain control of the load should damage occur. It's the same kind of redundancy described in the lifting regulations for nuclear plants.

SOFT AND FLEXIBLE FOR ADDED LOAD PROTECTION

TWIN-PATH™ slings adapt easily to verticle, basket or choker lifts...shape easily to fit hooks or shackles that might be too small for other slings...and give the widest possible bearing contact with the load. Their flexibility makes

We don't recommend the abuse shown in this picture but if this damage happened to TWIN-PATH™ Lifting Slings, chances are good that you could still maintain control of the load.

them both easy to handle and easy to store in a restricted space.

EXTENDED USE MAKES THEM MORE ECONOMICAL

Wear points can be shifted so that TWIN-PATH™ slings last longer than many other types of slings...resistant to most acid conditions.

DOUBLE-LAYERED, COLOR-CODED COVERS MAKE THEM EASY TO INSPECT

When the orange outer cover is cut, the red inner layer shows through. This tells the inspector to remove the sling from service.

SLINGMAX™
RIGGING PRODUCTS

Fabricators of these patented products:

Tri-Flex® Slings	Patented Safety Belts
Twin-Path™ Slings	Chain Saddle Rings
Tri-Flex® Systems	Sling Saver Pads
Gator-Laid™ Slings	Protector™ Slings
Tri-Flex® Wire Rope	SLINGMAX® Utility Rope

30 Locations in North America

For the dealer nearest you Call: 1-800-874-3539

P.O. Box 2068 • Aston, PA, USA 19014
215-485-8500 • FAX 215-494-5835

Licensed fabricators make
SLINGMAX™
RIGGING PRODUCTS
to your exact specifications.
You'll always get exactly what
you want anytime, anywhere.
Contact the one near you!

ALBANY, NY (518) 465-3461
ATLANTA, GA (404) 351-2600
BOSTON, MA (617) 423-7390
BUFFALO, NY (716) 826-2636
CALGARY, ALBERTA (403) 236-1262
CHICAGO, IL (312) 799-5915
CINCINNATI, OH (513) 891-9777
CLEVELAND, OH (216) 362-4600
DENVER, CO (303) 799-6271
DETROIT, MI (313) 585-1063
EDMONTON, ALBERTA (403) 465-1431
EVANSVILLE, IN (812) 424-4611
FLORIDA (305) 833-6474
FT. WAYNE, IN (219) 432-7520
FT. WORTH, TX (817) 589-2404
GREENSBORO, NC (919) 855-6057
HOUSTON, TX (713) 674-2266
INDIANAPOLIS, IN (317) 634-2545
KENTUCKY/TENNESSEE (513) 321-7094
LAS VEGAS, NV (702) 798-9473
LOS ANGELES, CA (714) 639-1171
MILWAUKEE, WI (414) 342-7475
NEW LONDON, CT (203) 442-5801
NORFOLK, VA (804) 855-7139
PHILADELPHIA, PA (215) 485-8500
PITTSBURGH, PA (412) 322-4300
SAN DIEGO, CA (619) 233-5625
SAN FRANCISCO, CA (415) 285-1954
SEATTLE, WA (206) 623-7822
ST. LOUIS, MO (618) 462-0172
TORONTO, CANADA (416) 624-5131
UNION, NJ (201) 964-3690
WASHINGTON, DC (301) 350-1000

If there is no dealer in your area:
... Call (800) 874-3539

SLINGMAX™
RIGGING PRODUCTS

Circle 242 on Reader Service Card



SMM '88

13th Ship, Machinery & Marine Technology International Trade Fair Hamburg, West Germany, September 27-October 1

Today, more than ever before, the international shipping and shipbuilding industries are undergoing unprecedented change and evolution. In shipbuilding, offshore and marine technology, harbor and waterway construction, new technologies and new products are causing a revolution that will decide who will remain competitive now and in the future.

The 13th Ship, Machinery & Marine Technology International Trade Fair, SMM '88, will address this marine evolution when it opens September 27 at the Congress Centrum Hamburg, Hamburg, West Germany. With some 30,000 trade visitors expected to attend, SMM '88 will be one of the largest international events of its kind. The event is committed to bringing together top-level representatives of the companies that provide new technologies, products and services to the marine industry and the compa-

nies that utilize them. For five days, some 500 direct exhibitors from around the world will fill 12 exhibition halls with state-of-the-art products and services. The main exhibition sections are shipbuilding, oceangoing ships' propulsion systems, marine technology equipment, rudder and maneuvering systems and control, and measuring and regulating technology.

However, SMM '88 will feature more than just new products and services. The event will present the full scope of the developments in the marine industry, including new solutions and technologies that represent potential progress and growth for the entire industry. All in all, SMM '88 will provide a comprehensive overview of the entire international market in the areas of shipbuilding, marine and offshore technology and port and waterway construction. Some of the topics covered in these categories will include:

marine architecture, shipyard equipment, ship machinery and equipment, safety on board, marine technology, development and consultancy services, harbor construction and equipment, and information and communication systems.

The International Shipping and Marine Technology Market exhibition has a successful record as an international meeting place for key decision-making industry representatives.

Last held in 1986, SMM '86 drew 765 exhibitors from 20 countries. Over 40 % of the attendees of SMM '86 came from abroad, indicating that the show has a high international profile. This year's show is expected to draw visitors from such countries as China, Korea, Taiwan, Singapore, Venezuela, the Soviet Union, the Netherlands, Norway, Finland, Poland, Brazil, Egypt, Bulgaria, Greece and the United States.

According to Exhibition Survey SMM '86, about 31% of all the exhibitors made sales totaling in excess of a million deutsche marks at the event.

In addition to the various areas covered by SMM '88, this year the international port fair PORTEX '88, which will feature port and harbor equipment products and services, has been integrated into the event.

Marine Technology

Marine technology is one key theme of SMM '88. The marine offshore technology exhibits will be concentrated for the first time in one building—Hall 1, part of the complex of new halls in Hamburg. The exhibits include underwater equipment, ocean mining plant and equipment systems, stationary offshore plants and equipment and supply systems.

Marine technology is a field covering all the technical activities concerned with research into and the use and protection of the seas.

The importance of the presentation of West German R&D findings in marine technology is underlined by the demands of internationally renowned scientists such as Prof. **Konstantin Kokkinowrachos**, chairman of the German Committee for Marine Research and Marine Technology, for the intensification of national and international cooperation in the field, including that between universities and industry. A further keynote theme at SMM '88 will be information and exhibits concerned with scientific and technical cooperation with developing and newly industrializing countries aimed at an improved exploitation of the seas, i.e.—fishing and aquacultures or harvesting the protein-rich krills in the Antarctic.

The committee led by Professor **Kokkinowrachos** is also the organizer behind an SMM '88 congress entitled "Europe and the Sea—Marine Sciences and Technology in the 1990s." Whereas seaweed and eelgrass will only play a marginal role in the generation of power in the years to come, innovations from the field of offshore technology will increase in significance for other maritime areas. In this respect, particular attention should be paid to the research work being undertaken at Hamburg-based Harburg Technical University, which is one of the exhibitors at SMM '88. Harburg University is playing an important role in furthering the understanding of the complicated interrelationships between substances and of mechanical stress and the chemical effects of exposure to seawater.

In addition, the International Congress on Ship's Technology (ICST '88) will be held in conjunction with SMM '88 on September 28. The theme of ICST '88 will be the "Contribution on the Economy and Safety in Ship Technology." Highlighting the congress will be a presentation by Dr. **G.A. Lustgarten** and **K. Aeberli**, Sulzer Brothers AG, Winterthur, on "Two-Stroke Diesel Engines for Cost-Effective Ship's Operation."

Among the exhibitors at SMM '88 will be Hamworthy Engineering, which will be occupying Stand 2052 in Hall 2. The company's Pumps and Compressors subsidiary will display its new ranges of air-cooled compressors and centrifugal pumps.

Diesel engine manufacturers MAN B&W Diesel and MAN Nutzfahrzeuge, Werk Nurnberg, will present their complete line of marine engines, turbochargers and services in Hall 6, Stand 6078. Complete engines and components, videos, slides and wall charts will be on display.

In Hall 7, at Stand 7001, Markishes Werk Halver (MWH), specialists in components connected with the exchange of gases in combustion engines, will present its latest program of inlet and exhaust valves, valve inserts, valve springs, valve guides, valve cages and valve rotators.

Of particular interest to diesel engine users will be the company's patented Turnomat valve rotator, which ensures a definite valve rotation speed.

The latest developments in the Evac Vacuum Toilet System will be demonstrated at the stand of Triton Belco AG, the West German distributors for OY Wartsila AB Evac of Finland. Several working units will be on display, including the popular "silent" toilet, a toilet with Evac's

new electronic flushing control and the company's newest addition, the "toilet of the future."

At the stand of their West German subsidiary, ASEA-Hagglunds GmbH, Hagglunds Marine & Offshore AB will present their full range of deck crane technology. Low-profile versions of Hagglunds G2 and L2 type cranes will be on display, as well as the company's "hinged cab" wire-luffing cranes. An adjacent stand will display the

hydraulic products of the Hagglunds Denison group of companies.

Liebherr-Werk Nenzing, another marine lifting equipment and crane specialist, will also be exhibiting at SMM '88. The company will present its production line of offshore cranes, including the North Sea-proven BOS type and its series of ram luffing offshore cranes, RL type, with their low overall height
(continued)



MAN B&W Diesel and its licensees:
the competitive edge

in two-stroke and four-stroke Diesel engineering
as a result of long-standing experience,
consistent research and development.



SMM '88

(continued)

and horizontal boom storage features.

ICST '88 Conference Program

"Contribution on the Economy and Safety in Ship Technology"

9:30 a.m.—Opening of the congress by **Ernst A. Harm**, chairman of "Verein der Schiffs-Ingenieure zu Hamburg eV."

Introduction by **Reinhard Mau**, Germanischer Lloyd.

Lecture Group I—Moderator: **W. Schoteldreyer**, Association of German Shipowners.

10 a.m.—"Emergent Shipping Marine Hull Insurance Judgement on Technical Risks, Underwriter's Point of View," by Captain **Fuchs**, Allianz Versicherung.

10:30 a.m.—"Ship's Safety Aspects," by **J.A. Witt**, Cabinet Council.

11 a.m.—"New Trends in Ship's Operation," by **G. Fischer**, Germanischer Lloyd.

11:30 a.m.—discussions and coffee break.

12:30 p.m.—"Optimized Power Output and Safe Propulsion Plant Operation—Discrepancy or Harmony?" by **Eckhard Moeck** and **Siegfried Bludszweit**, author.

Lecture Group II—moderator: **G. Peters**, Hamburg Technical School.

1 p.m.—lunch break.

2:30 p.m.—"The FRECON-Shaft-Generator and Frequency Converters for Electrical Drives—Two Examples to Produce and

Consume Electric Energy Economically," by **Peter Andersen** and **Othmar Jakoby**, Siemens AG.

3 p.m.—"International Service of Ship's Plants," by **Gerd Lohmann**, Blohm & Voss AG.

3:30 p.m.—"Two-Stroke Diesel Engines for Cost-Effective Ship's Operation," by **G.A. Lustgarten** and **K. Aerbli**, Sulzer Brothers AG.

7 p.m.—End of conference.

SMM '88 Exhibitors

ABB-ASEA Brown Boveri
AB Elektronik
ABG-Pumpen
ACEBI
AEG Aktiengesellschaft
AGPOL
Ahmann Maschinenbau
AKZO Coatings
Alfa-Laval
Alki Hydraulik
Allweiler Marine
Alstom Chantiers de l'Atlantique
AMOT Controls
AMRI
Anschutz
Aqua Signal
Aquamaster-Rauma Repola
Armaturen-Wolff
Assfalg
AVIT
Lardet Babcock
Barry Controls
Fritz Bartel
Barthels & Luders
Willi Becker
Bedia Maschinenfabrik
Behne Apparatebau
Julius Fr. Behr
Behrenspumpen
Belzona Marine Engineering
Ben Marine
BEST
Bestobell Mobrey
Binder Magnete
Bischoff U. Hensel
Blohm & Voss
Bloksma
Bode
Ingenieurburo Bonke
Boge Kompressoren
August F.M. Bohnhoff
Bolit
Boll & Kirch
J.H. Bornemann
J. Bornhoft
Rich. Ad. Brandt
Braunschweiger Huttenwerk
Bremer Vulkan
Broneske
Le Bronze Industriel Deutschland
Bruel & Kjaer
Feodor Burgmann
Byggmaterial
Castrol Marine Division
Cedervall & Sohne
H. Cegielski
Centa Antriebe
Centromor
China State Shipbuilding Corp.
Chris-Marine AB
Citroen Engrenages
Holger Clasen
Clayton
CMR Controle
Cofrena
Compagnie Marseillaise De Reparations
Consulium Systems
Conver-OSR
John Crane
Cummins Diesel Deutschland
DAF Diesel
Dammstoff
Damen Shipyards
Danish Export Group
Deckma
Deerberg Systems Marine Division
Depa
Depac
Desch Antriebstechnik
Deugra
Deutsche Bundespost
Deutz MWM

Maritime Training Simulators

Radar & Navigation ❖ Engine Room ❖ Liquid Cargo ❖ Fishing Gear



NORCONTROL Simulation

More than 120 Maritime Training Simulators delivered since 1977

Our strength - competitive products and extensive experience
Your benefit - presale consultations and after-sale support

NORCONTROL Simulation a.s. P.O.Box 1024 N-3191 Horten, Norway Tel.: 47-33-41436 Fax.: 47-33-43410



Circle 220 on Reader Service Card

"Welcome back, Baldt."

It's nice to hear words of welcome. For Baldt, the past two years have been a rough voyage. We made it to 1988 by navigating tricky currents and uncharted waters.

Frankly, it wasn't easy. The world economy wobbled; Baldt wobbled with it. Oil prices plummeted; our off-shore business dried up.

We fought foreign competition all the way. Hanging tough, we won. Today, new orders have revived our basic chain and anchor business.

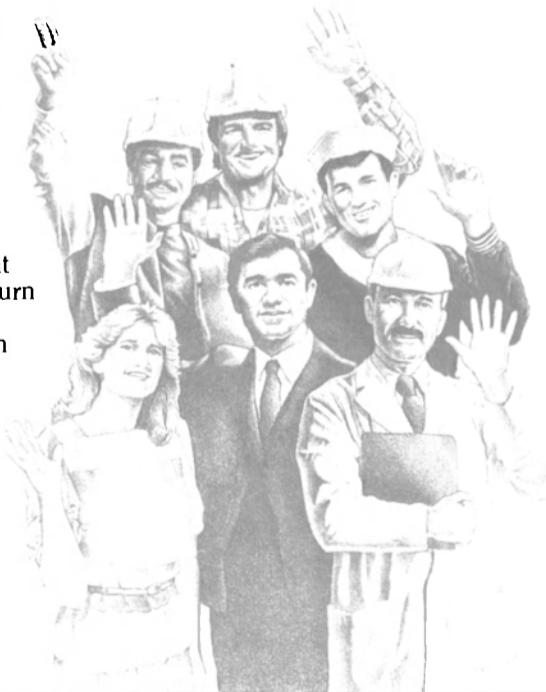
We've streamlined our company with a rededicated management team. We've divested our subsidiaries. We've renewed our plant modernization efforts, expanding our ability to do what we do best: turn out the world's strongest, longest-lasting chain and related products.

To all our friends on the seven seas, thanks for standing fast with us. With new direction, the word from Baldt is Full Speed Ahead.

It's nice to be back.



Baldt Incorporated, P.O. Box 350, Chester, PA 19106 215/447-5200
Telex 834367, FAX 215/874-8599



Circle 166 on Reader Service Card

Diesel & Gas Turbine
 Dok-En Werf-Maatschappij
 Wilton-Fijenoord
 Dornier, Albert Dieder. Schiffssicherheit
 Dorman Diesels
 Karl Dose
 Dragerwerk
 Dresser/Europe
 DSG D. Schmidt Pneumatik-Hydraulik
 EB Nachrichtentechnik
 Fr. C. Ehlers Kabelwerke
 H.E. Eissing
 Electrolux Foodservice
 Eleusis Shipyards
 Elna
 Engel & Meier Schiffselektronik
 Facet
 Fachhochschule Hamburg
 Fare Armatur AB
 Fare Armaturen
 Dr. Fahrentholz
 Fastnet Radio Marine-Decoder & Computer
 Fehrmann
 Ingenieurgesellschaft Feistel-Eckhardt
 R.W. Fernstrum
 Ferropilot
 Fincantieri-CNI
 Finnlands Aussenhandelsverband
 Georg Fischer
 A. Friedr. Flender
 Ford Werke
 Fredrichs Armaturen
 Frydenbo-Mjølner
 Gall & Seitz
 Ganz Danubius
 Peter Gast Shipping
 Gea Luftkühlergesellschaft
 Gea Ahlborn
 Dr. Geislinger
 Gemo Generatoren und Motoren Vertriebs
 Geodata Systems
 Gesellschaft Zur Förderung
 Der Meerestechnik
 Gisma Steckverbinder
 Goetze
 Gottwald
 Friedrich Graepel
 Gromex
 Grosshandels-Und Lagerei-
 Berufsgenossenschaft
 Guascor Gutierrez Ascunce Corporation
 GVT
 Hagenuk Vertriebs und Serviceges
 KG Hamann Wassertechnik
 Hamburgische Schiffbau-Versuchsanstalt
 P. Hammelman Maschinenfabrik
 Hamworthy Engineering
 Hansa-Flex Hydraulik
 Hapag-Lloyd
 Ernst Hatecke
 Hatlapa
 Haux-Life-Support
 HDW-Nobiskrug
 Georg Hechelmann Nachf.
 Ernst Heinrich
 Hempel Farben (Deutschland)
 Wilhelm Hilzinger
 Herion-Werke
 Herka Handelsgesellschaft
 Hilbert Marine
 HKS
 Alfred Hodt
 Holland Marine Equipment
 Hollming
 Hojbjerg Maskinfabrik
 Honeywell-Elac-Nautik
 Ludwig Hunger
 IABG
 IBAK Helmut Hunger
 IBH Antriebstechnik
 IFE
 IMO
 Ina Walzlager
 Intering
 International Farbenwerke
 International Trade Publications
 Interschalt
 ITT VAF Instruments
 Ludwig Jahn
 Japan Ship Machinery External
 Trade Association
 Jastram-Werke
 C.C. Jensen
 A. Johnson
 Jonge Poerink
 M. Jurgensen
 Jurong Shipyard
 Fritz A. Kahler

A. van Kaick
 KaMeWa
 Dietmar Kammer
 Karberg & Hennemann
 Gunther Klein
 Klockner Moeller
 Klockner Stahl
 Klockner-Werke
 Klockner-Wilhelmsburger
 Uwe Kloska
 Gebr. Kluver
 Aug. G. Koch
 Wilhelm Kopp
 Koser-Marine-Kiel
 Kolbenschmidt

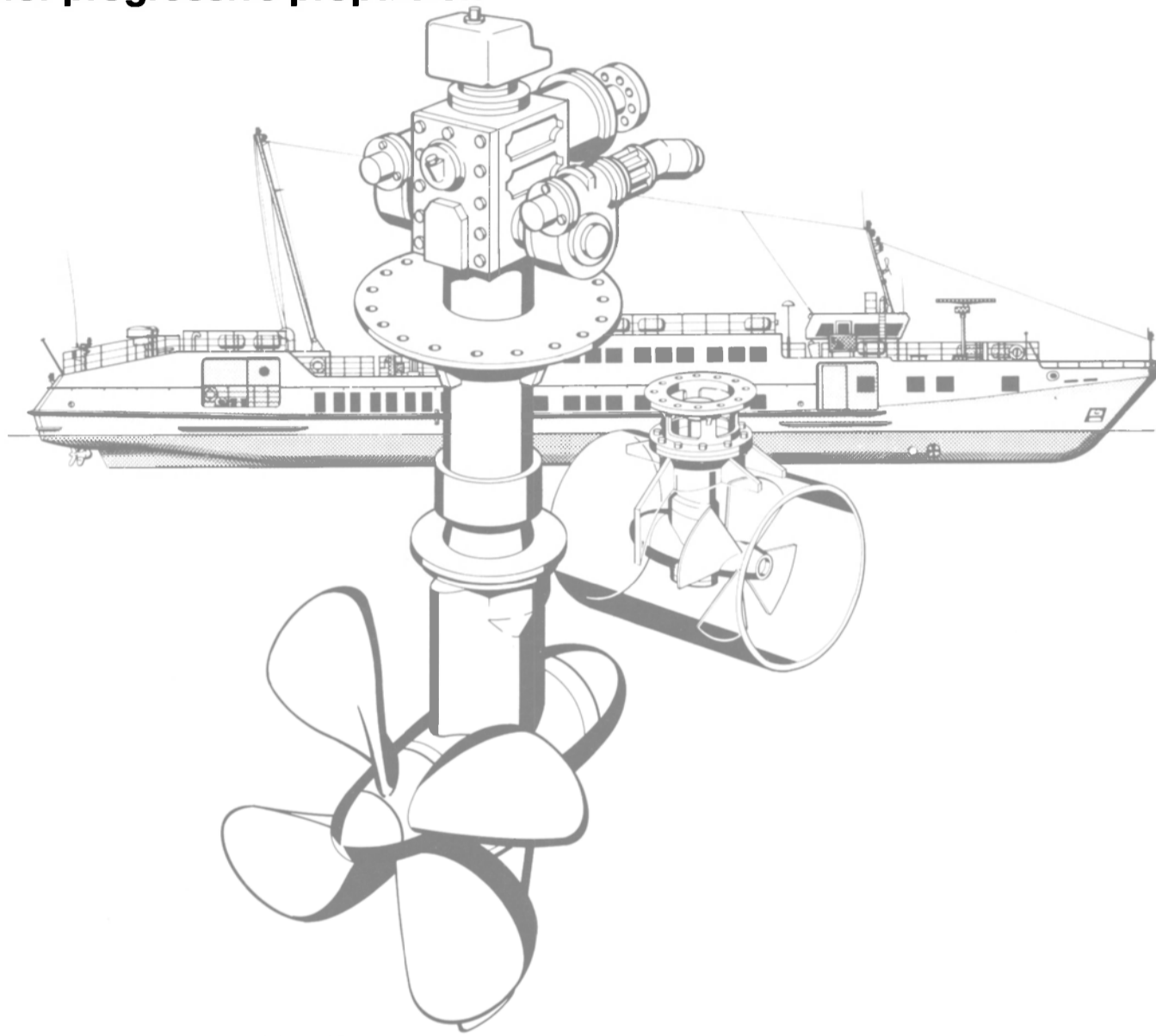
Koraboimpex
 Oskar Krautler
 Kraft
 Krupp Atlas Elektronik
 Krupp MaK
 Krupp Stahl Vertriebsgesellschaft
 KvaernerBrug
 Kvaerner Eureka
 Kvaerner Ships Equipment
 Langerer & Reich
 Wilhelm Layher
 LBL-Elektrotechnik
 Lehmann & Michels
 Leistriz
 Les Cables de Lyon

Lethe Metallbau
 Freidrich Leutert
 Liebherr-Werk Nenzing
 F.A.C. Van Der Linden
 Lippold Hydraulik
 Lips
 Lloyd Werft Bremerhaven
 Willibrord Losing
 Loggers Rubberteknik
 Loher
 LPA
 Maerkisches Werk

(continued)

SCHOTTEL

for progressive propulsion



SCHOTTEL-Rudderpropellers and Thrusters for Maximum Manoeuvrability

SCHOTTEL-Systems have proved themselves for more than 35 years and are available in numerous propulsion and steering units and manoeuvring aids in the range from 15-5,000 kW (20-7,000 hp).

SCHOTTEL-Rudderpropellers, SCHOTTEL-Transverse Tunnel Thrusters, SCHOTTEL-Navigators and SCHOTTEL-Jets guarantee

maximum manoeuvring capability and outstanding efficiency.

To date over 19,000 SCHOTTEL units with an accrued 6 million hp propulsion capacity have been delivered all over the world. If you plan a newbuilding or conversion - you can do no better than to consult one of the world-wide SCHOTTEL companies or representatives.

SCHOTTEL-WERFT, D-5401 Spay / West Germany, Tel.: (02628) 610, Teletex: (17) 262891 SW SPAY

SCHOTTEL OF AMERICA, INC., 8375 N.W. 56 Street, Miami/Florida 33166, Tel. (305) 592-7350

The SCHOTTEL-Group offers world-wide sales and service through SCHOTTEL companies located in Hamburg, The Hague, London, Paris, Genoa, Basle, Vienna, Miami, Buenos Aires, Porto Alegre, Singapore, Sydney, and representatives throughout the world.

Circle 146 on Reader Service Card





Shipyards

Cadiz

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

Sevilla

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

Bilbao

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

Santander

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

ASTANO Ferrol

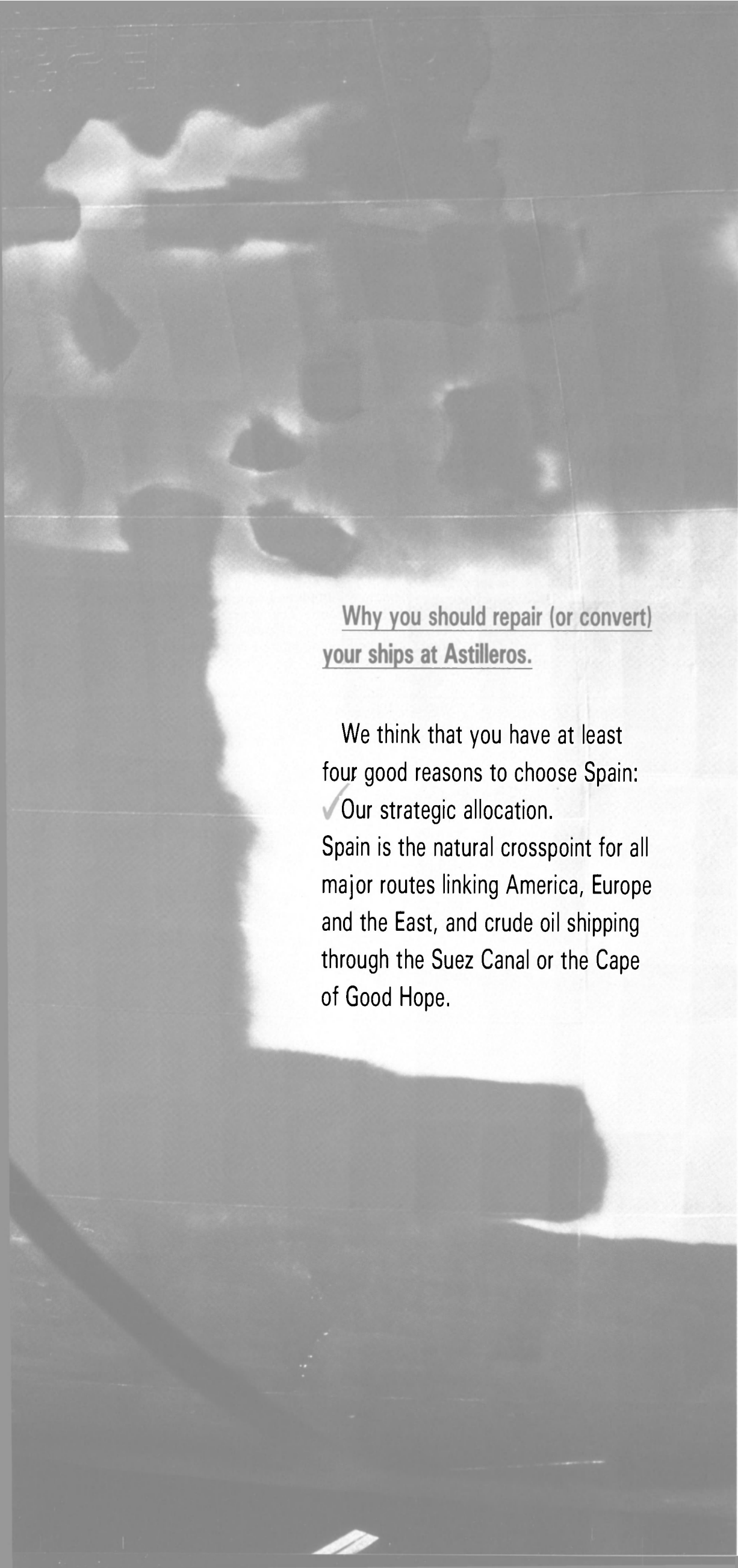
Telf.: (34-81) 34 07 00
Fax: (34-81) 34 09 54
(34-81) 34 32 52
Telex: 85507 ASTAN E
82381 ASTAN E

ASTICAN

Canary Islands

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

The Shipbuilders of Spain



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

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

✓ Our strategic allocation.

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

✓ Our technical skills and facilities.

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

✓ Our conversion experience

Ask for the facts. Astilleros has
successfully converted all kinds of
vessels (we have just delivered
3 chemical tankers for Gotaas Larsen,
and our recent contracts include the
conversion of a 21.000 dwt
Bulkcarrier into a molten Sulphur
carrier for Navimin). And Astilleros is a
well known leader in FPSO and FSU
and in Internal Blasting and Coating.

✓ A spread of specialized yards.

Along the long coastline of Spain,
and covering all tonnages.

✓ And the Spanish weather...

Last but not least: an excellent
climate means that work is rarely
held up by adverse weather.

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

**ASTILLEROS
ESPAÑOLES**



For further information:

Astilleros Españoles, S.A.

Padilla, 17

28006 Madrid

Tel. (341) 435 78 40

Télex. 27648 ASTIL-E

Fax. (341) 276 29 56

Circle 184 on Reader Service Card

Yugoslav Shipbuilding

(continued)

Split Shipbuilding is presently in the process of erecting a building berth with five turning slipways for the construction of vessels and off-shore structures. The new berth is expected to be able to handle ships up to 1,050 feet long, 282 feet wide and weighing as much as 65,000 tons.

The concept of the turning slipway was developed by Split and the Faculty of Engineering and Shipbuilding, Zagreb and the Naval Institute, Zagreb, as a simple, economic solution for both side and longitudinal launching.

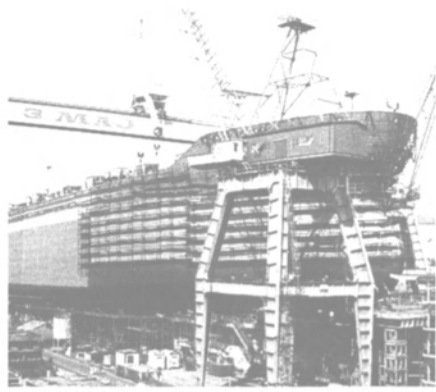
The Shoushane Spirit, a 100,000/110,000-dwt tanker being built for American owners, was recently launched at the Rijeka yard of 3. Maj Shipbuilding.

Intended for the carriage of crude oil of up to 10.5 tons/cubic meters specific gravity, the tanker was ordered by Teekay Shipping. She is 809-1/2 feet long, has a breadth of 139.3 feet, and draft of 47.3 feet.

The main propulsion engine for the tanker is a slow-speed, reversible, turbocharged Sulzer-3. Maj 5 RTA 72 diesel engine rated at 10,330 kw at 78 rpm. The engine is designed to operate on both diesel and heavy fuel up to 420 cSt at 50 degrees C (4,000 Redwood at 38 degrees C).

The vessel will have a total of 16 cargo tanks and two slop tanks for the carriage of four segregated cargoes simultaneously. The cargo tanks will have a 98 percent capacity of 123,000 cubic meters.

The tanker was constructed in accordance with the rules of the Lloyd's Register of Shipping for the



A 110,000-dwt tanker under construction at 3. Maj's Rijeka yard. The ship is being built for Teekay Shipping.

class +100A1 +LMC, UMS, IGS, OIL TANKER. The degree of automation aboard conforms to rules and requirements of the class for unattended machinery space.

For free literature detailing the shipbuilding services and facilities of Yugoslav shipyards,

Circle 112 on Reader Service Card

Lys Line Orders Second Paper Carrier From Titovo Shipyard

Simonsen & Slang's Lys Line of Norway recently ordered a second 3,400-dwt paper and forest products cargo carrier from the Yugoslavian shipyard Titovo Brodogradiliste, Kraljevica.

The cargo carrier will have an overall length of 295.2 feet, beam of 55.8 feet and draft of 19.2 feet and she will be specially designed for the needs of paper and forest products.

The vessel is expected to be delivered in late 1989 or early 1990, while the first carrier is scheduled for a July 1989 delivery.

PROPULSION UPDATE

3.MAJ Diesel Works Builds First Sulzer RTA 72 Engine Ever

From the moment of its introduction into the market seven years ago, the RTA series of Sulzer marine diesel engines set new dimensions to operating economy and reliability, and maintenance.

In 1984, the so-called "-8 series" engines, covering cylinder bores of 380, 480, 680, 760, and 840 mm, with a stroke-to-bore ratio of about 2.9, were complemented by the "-2 series" engines covering cylinder bores of 520 and 620 mm, and of a higher stroke-to-bore ratio of 3.46.

During 1985, the demands from the market called for an increase in the maximum speed and output of the "-2 series" engines. This is also the time when a new engine type, the RTA 72, with a complementary bore size of 720 mm was introduced. In its design concept, the RTA 72 is fully in line with the previous engines of the "-2 series" which, among others, means it is available in versions of up to eight cylinders maximum.

Main performance data of the RTA 72 engine: Two-stroke, single-acting, slow-speed, turbocharged engine; Output range 1,410-2,570 kw/cylinder; Speed range 66-91 rpm; stroke 2,500 mm; Cylinder bore 720; and Spec. fuel consumption at mcr 171 g/kwh.

Acceptance testing on the 5 RTA engine built by 3.MAJ, which has extensive experience in manufactur-

ing RTA engines under license, were recently completed. The first engine of this bore size ever built in the world, it will be installed aboard a motor tanker. Its particular performance data are the following: output, 10,550 kw; speed, 78 rpm; and sfc at mcr, 169 g/kwh.

In addition to possible variations in combinations of output speed (determining the layout field), the flexibility offered by the RTA 72 engine—actually by all the RTA types—has been further extended to optional possibilities of installing: Two-stage air cooler, providing an excellent possibility of recovering waste heat energy removed through the compressed scavenge air (4.5 percent of engine output); Standard optional power take-off for the connection of an alternator to the main engine for ship's electrical power generation, which for this particular engine features up to 1,350 kw; and Standard optional efficiency-booster using recovered exhaust gas energy directly at the engine crankshaft for further fuel savings—with the 5RTA 72, the recovered energy can be as high as 800kw, which in terms of fuel consumption means a fuel saving of about 5.5 g/kwh.

Design features of the RTA 72 engine: Sturdy engine structure with low stresses and small deflections, consisting of bedplate, columns and cylinder block, pretensioned by vertical tie rods; Single-wall bedplate with integrated thrust block. Standardized, large surface main bearing shells; Robust A-shaped columns, assembled with stiffening plates or of monoblock design; Single cast iron cylinder jackets, bolted together to form a rigid cylinder block; Lamellar cast iron, bore-cooled cylinder liners with load-dependent cylinder lubrication; Solid, forged, bore-cooled cylinder covers with bolted-on exhaust valve cage; Camshaft gear drive housed in a special double column placed at the driving end; For larger bore engines, where required, balancers mounted on the engine; Injection pump and exhaust valve actuator combined in common units for two cylinders, each camshaft driven; and Constant-pressure turbocharging system (highly efficient uncooled turbochargers) with uni-flow scavenging assisted by auxiliary blowers for low load operation. Possibility for in-service cleaning of charge air coolers.

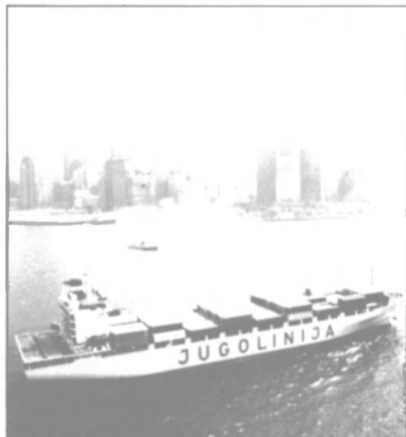
Service Results—The exhaust valve, introduced at Sulzer as a novelty for two-stroke diesel engines, has fully justified the designers' assurances of the exhaust valve actually not being a novelty for Sulzer. The exhaust valve, positioned symmetrically, made of a top quality material (Nimonic), and operating at relatively low temperatures, has

3,332 TEU More Service

For 40 years Jugolinija has taken pride in offering its shippers only the very best service.

This tradition continues with the introduction of 2 new full container vessels to the fleet.

The Sarajevo Express and the Koper Express will help complement Jugolinija's already modern and extensive fleet. In addition, in our anniversary year,



we have also introduced intermodal service in Europe.

All this helps to maintain the tradition of good service for which we have become renowned.

51001 RIJEKA, YUGOSLAVIA.
P.O. Box 379 Obala jugoslavenske
mornarice 16
Telex 24218 yu juline
24408 yu juline 24448 yu juline
Telephone (051) 33-111 422-555
Telefax 32914 421443
Telegrams Jugolinija Rijeka



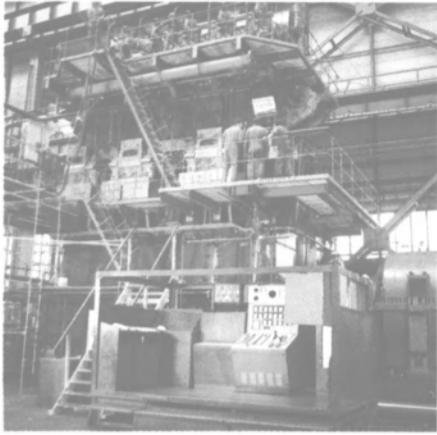
One of the world's most experienced cargo fleets.

Regular Lines: North Europe, North America (container service). **South America-Atlantic coast, South America-Central and Pacific coast, Levant** (conventional Ro-Ro and container service). **Middle East** (conventional service). **Middle East** (Ro-Ro and container service). **Bengal Bay/Sri Lanka, Far East, People's Republic of China.**

TRAMP VESSELS CARRY CARGOES TO PORTS ALL AROUND THE GLOBE.
U.S. GENERAL AGENT: CROSSCOCEAN SHIPPING CO. INC. Suite 2045, One World Trade Center, New York, N.Y. 10048 Tel (212) 432-1160/1170 Telex Domestic-TWX 710-581-6029 Overseas-RCA 232-283. **OTHER U.S. AGENTS: ATLANTA.** Crossocean Shipping Co. of Georgia Inc. Tel 404-982-0435 TWX 810-751-0017 **BALTIMORE.** Crossocean Shipping Co. Inc. Tel 301-282-5250 TWX 710-234-1032 **BOSTON.** Patterson Wylde & Co. Inc. Telex 62879909 **CHICAGO.** (Rolling Meadows) Trans Trade Inc. Tel 312-577-4484 Telex 275319 **PTCHI UR CLEVELAND.** Trans Trade Inc. Tel 216-331-6030 Telex 4937096 MWS Cl. **DETROIT.** Trans Trade Inc. Tel 313-5619780 Telex 910-2504807 **HOUSTON:** Overseas Freight Corporation. Tel 713-681-0205 Telex 170578 **OVERFERT HOU.** JACKSONVILLE Please see New York **CHARLESTON.** Please see Savannah **LONG BEACH.** Monitor Steamship Agency Inc. Tel 213-436-9081 Telex: 6711534 **MIAMI.** Farovi Shipping Corp. Tel 305-373-4765 Telex 6714066 **MOBILE.** Please see New York **NEW ORLEANS.** Overseas Freight Corporation Tel 504-581-3040 Telex 161889 **NORFOLK.** Crossocean Shipping Co. Inc. Tel 804-423-7561 TWX 710-881-1141 **PHILADELPHIA.** Robinson & Mastrangelo Inc. Tel 215-925-3810 TWX 710-670-1988 **SAN FRANCISCO.** (San Rafael) Monitor Steamship Agency Tel 415-453-8834 Telex 279040 **MSSFUR SAVANNAH.** Crossocean Shipping Co. of Georgia Inc. Tel 912-238-2170 Telex 543015 crossocean sav **TAMPA.** Fillette Green & Co. of Tampa Tel 813-223-1481 TWX 810-876-0695

Our worldwide agency network includes over 400 agents. Contact us for information on the agents in your particular area.

Circle 236 on Reader Service Card



The first Sulzer RTA 72 engine ever built was recently completed by 3.MAJ Diesel Works, a division of 3.MAJ Associated Shipbuilding Industry.

demonstrated excellent service performance and proved to be an excellent solution (more than 12,000 hours of operations between repairs-regrinds).

As for the cylinder liner wear, according to the latest results reported from m/v Malinska (both the ships and the engine built by 3.MAJ) after 5,214 hours of operation, a wear of 0.004-0.008 mm/1,000 h has been measured which is a very good rate. It is to be added that the measuring has been carried out by Sulzer, who follows its field tests on this ship.

For free literature giving full information 3.MAJ Diesel Works,

Circle 104 on Reader Service Card

For more information and free literature on Sulzer

Circle 105 on Reader Service Card

Brian Rafferty Joins Ingram Barge Company

Brian E. Rafferty has joined Ingram Barge Company as marketing manager. In making the announcement, Les Sutton, president, noted that Mr. Rafferty will be responsible for the company's day-to-day marketing operations.

Prior to joining Ingram, Mr. Rafferty was a marketing manager, in charge of South American Services, for Lykes Brothers Steamship Company, Inc. in New Orleans. He has also served as a systems analyst with Lykes Brothers.

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

Kelvin Hughes Successful At Posidonia Exhibition

Orders for radar systems valued in excess of \$620,000 were finalized by Kelvin Hughes Ltd., a subsidiary

of Smiths Industries PLC, during the Posidonia Exhibition in Pireas, Greece.

The orders for more than 20 ARPA-based radar systems were taken from 12 different shipowners. Most of these radar systems have been retrofitted to vessels in order to comply with the IMO Solas 1984 regulation for vessels between 15,000 and 20,000 GRT, which states that ARPA systems are to be

fitted before September 1, 1988.

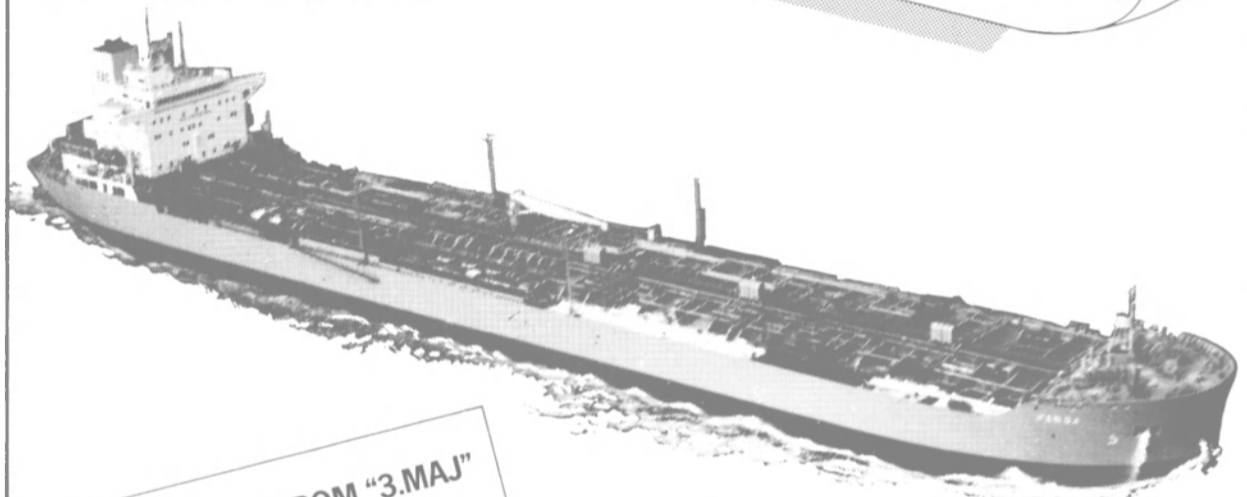
The total sales of Kelvin Hughes ARPA radars into Greece so far this year now exceeds 70 systems.

Alan Eldret, the director of Kelvin Hughes Merchant Marine business, said: "The Posidonia Exhibitions have always been successful for Kelvin Hughes, but this year even more so. These orders are a result of having the right products for the marketplace with Radtrak

and our new Concept range, and sustained effort by our local agent Elkime Ltd., working closely with our own salesmen. We believe Kelvin Hughes to be the major supplier of modern ARPA-based navigational radar systems into the Greek market." For more information and free literature on radar systems from Kelvin Hughes,

Circle 62 on Reader Service Card

You know what you want ...



LATEST DELIVERY FROM "3.MAJ"
"KHIRURG VISHNEVSKIY"
16,000 TDW, Product's Tanker

Principal Particulars
Length b.p. 142.60 m
Breadth, mid. 22.40 m
Depth 12.15 m
Draught, max 9.00 m
Deadweight at max. draught 16,200 t
Trial speed 15.5 knots
Main propulsion engines 2 x "Jadranbrod-S.E.M.T. Pielstick" type 6PC2-6/2 L400
Main engine output 2 x 2870 kW at 520 r/min.

LATEST LAUNCHING FROM "3.MAJ"
"3.MAJ"
60,600 TDW, Ore/Bulk/Oil Carrier

Principal Particulars
Length b.p. 216.00 m
Breadth, mid. 32.20 m
Depth, mid. 19.35 m
Design draught 12.60 m
Deadweight at design draught 60,600 t
Trial speed 15.00 knots
Main propulsion engine "3.MAJ-SULZER" 7 RTA 62
Main engine output 8760 kW at 86 r/min

... but where do you find it?



Sophisticated up to date vessels built by the people you can trust, the people with a first-class reputation for:

- design which meets your specific requirements
- quality construction and, of course
- delivery on schedule

Vessels to boost your profits.

Try



3.MAJ

Associated Shipbuilding Industry,
P.O. Box No. 117, 51001 Rijeka, Yugoslavia. Telephone: 617-111 (20 lines).
Telex: YU 24-137, 24-240, 24-338. Telefax: 611-411. Cable: 3.MAJ-RIJEKA.
(A member of the Association of Shipbuilding Industry "JADRANBROD", Zagreb, Yugoslavia)

Our customers know why

Circle 299 on Reader Service Card

ELECTRONICS UPDATE

Harris Announces New Digital HF-SSB Radio System

Harris Corporation's Long Range Radio Division has developed a new, extremely compact HF radio system designed with advanced, digital signal processing techniques. The RF-5000 was introduced at the 42nd AFCEA international exhibition held recently in Washington. Also introduced was Harris's full line of state-of-the-art military communications equipment.

In a unit weighing only 15 pounds, the RF-5000 Series digital radio system provides built-in high-speed data modem, adaptive HF (ALE) frequency management, ECCM (frequency hopping), digitized voice and burst transmission capabilities, at a greatly reduced cost. Near-term product improvement plans include embedded voice encryption.

The tactical 20, 125, or 400-watt vehicular or fixed-station system features a common receiver-transmitter with optional plug-in communications system upgrade modules. The receiver-transmitter is



The RF-5000 Series digital HF-SSB radio system from Harris Corporation.

just 7 inches wide, 5.5 inches high, and 12.1 inches deep.

The RF-5000 Series radios can provide adaptive HF (ALE), ECCM, and high-speed modem waveforms in MIL-STD 188 standards. The programmable digital modem allows co-resident, new high-performance waveforms along with existing waveforms (such as FSK). This simplifies conversion to new equipment while maintaining interoperability with existing assets, a key concern in military planning today.

A complete line of 20, 125, and 400-watt power amplifiers and fast-tuning antenna couplers are available for applications in tactical vehicular and fixed-station communications networks.

Standard features include 1.6 to 30-MHz frequency coverage in 10 Hz steps; 99 preset channels; channel scanning; over-the-air or keypad programming; built-in test to the module level; and ruggedized, submersible construction.

A detachable front panel allows remote control up to 50 meters away. Multiple transmission waveforms and Forward Error Correc-

tion (FEC) support 2400 baud operation for optimal performance in single-frequency or frequency-hopping mode. A Linear Predictive Code (LPC) module digitizes voice signals for transmission in an advanced ECCM environment.

Harris Corporation, Rochester, N.Y., is a \$2.1-billion supplier of information, communication and semiconductor systems, products and services to government and commercial markets worldwide.

For more information and free literature on the Harris HF-SSB Radio System,

Circle 102 on Reader Service Card

Jamesbury Expands Line Of Economical, Corrosion Resistant Vane Actuators

An expanded line of Jamesbury® vane actuators is now available for economical service for a wide range of automatic on-off valve applications. Addition of the V400 double-acting model and V100 SR spring-return unit extends the vane's torque output capacity to 500 ft./lbs. and 95 ft./lbs., respectively. The complete line now includes three double-acting models with torque output capabilities for operating Jamesbury Double-Seal® ball valves to 8 inches, and Wafer-Sphere® butterfly valves to 16 inches. Three spring-return models cover valve sizes up to 4 inches and 8 inches,

respectively.

According to Jamesbury, the thermoplastic polyester/stainless steel construction of these quarter-turn actuators make them especially well-suited for use in virtually any corrosive and acidic environment. Compact, lightweight design allows their use in locations where space or piping support is limited.

The actuator consists of top and bottom symmetric housing, molded shaft/vane, three O-ring seals, and fasteners. Units have broad pressure/temperature ratings: maximum supply pressures to 125 psi, temperature range -20 degrees F to +140 degrees F.

For more information and free literature on Jamesbury vane actuators,

Circle 56 on Reader Service Card

INTRODUCING THE EPOCH MARK II SERIES.

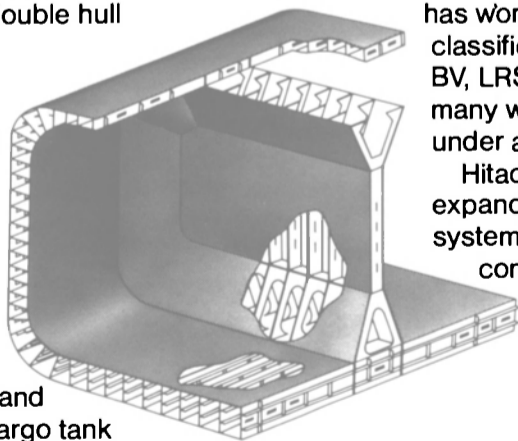
A new era in product oil carrier design.

Hitachi Zosen has developed the EPOCH MARK II series which has a unique structure not found on conventional ship designs.

Revolutionary in concept, the MARK II incorporates a unidirectional girder system combined with a complete double hull structure.

While a ship's hull is customarily designed with a grillage of longitudinal and transverse members for strength, this system uses only longitudinal members in a double hull to provide sufficient strength.

This unidirectional girder system results in unprecedented structural simplicity and completely flush surfaced cargo tank



interior. MARK II product oil carriers provide unrivaled advantages in performances over more conventional designs.

The EPOCH MARK II series is available in 40, 60 and 80 thousands dwt designs. And has won the approval of leading classification societies (ABS, BV, LRS, NK, DNV). At present many worldwide patents are under application.

Hitachi Zosen is also expanding this new structural system for the development of combination cargo carriers such as PROBO or OBO carriers other than oil tankers.

The Superior Performance of the EPOCH MARK II Series:

	Conventional	EPOCH MARK II
Tank configuration		
Cargo/ballast segregation	*	***
Unloading efficiency	*	***
Cargo tank cleaning	*	***
Gas free	*	***
Cargo tank heating	*	***
Cargo purity	*	***
Maintenance	*	***
Safety	*	***

*** Excellent * r Good * Normal

We build industries
Hitachi Zosen
HITACHI ZOSEN CORPORATION

HITACHI ZOSEN INTERNATIONAL, S.A.: London: 8th floor Winchester House, 77 London Wall, London EC2N 1BX, England Phone: 01-628-3891/8 Telex: 887873, 884009

HITACHI ZOSEN U.S.A. LTD.: New York: 150 East 52nd Street, 20th floor, New York, NY 10022, U.S.A. Phone: 212-355-5650 Telex: 126582, 232036

HITACHI ZOSEN CORPORATION: Tokyo: 1-1-1 Hitotsubashi, Chiyoda-ku, Tokyo 100, Japan Phone: 03-213-6611 Telex: J24490 OVERSEAS OFFICES & SUBSIDIARIES: Düsseldorf: Graf-Adolf-Strasse 24, D-4000 Düsseldorf 1, West Germany Phone: 0211-133011/4 Telex: 8587231 Beijing: Room No. 6087, Beijing Hotel, Dong Chang An Jie, Beijing, The People's Republic of China Phone: 513-8516 Telex: 22519 Jakarta: Wisma Antara, 14th floor, Jalan Medan Merdeka Selatan 17, Jakarta, Indonesia Phone: 021-345948, 345943 Telex: 44496 Hitachi Zosen Clearing Inc.: 6499 West 65th Street, Chicago, Illinois 60638, U.S.A. Phone: 312-767-8700 Telex: 254781 Hitachi Zosen Singapore (Pte.) Ltd.: No. 15, Benoi Road, Singapore 2262, Singapore Phone: 8616622/3 Telex: RS21213, RS21906 Hitachi Zosen Engineering Singapore (Pte.) Ltd.: UOB Building, 325 Boon Lay Place, Jurong, Singapore 2264, Singapore Phone: 2641344 Telex: RS21999 Hitachi Zosen Company (HK) Limited: Room No. 1009, Tak Shing House, 20 Des Voeux Road, Central, Hong Kong Phone: 5-220597, 5-246237 Telex: 73648 Hitachi Zosen Metalmeccanica, Ltda.: Rod. BR 101-Km 08 Carapina-Serra, Espirito Santo, Brazil Phone: 027-228-1555 Telex: 272287

Circle 210 on Reader Service Card

ARCO Alaska To Build Nine Huge Modules In Port Of Portland

The director of construction and logistics for ARCO Alaska, **Jack Purl**, recently said that ARCO Alaska will construct nine huge Alaskan oil field modules in the Port of Portland this fall as part of the company's "sealift" operation. The 1,500-ton modules will be built on a 240-acre site at the Port's shipyards on Swan Island.

Construction of the modules under the estimated \$20-million contract is expected to continue until July 1989, and the project is expected to generate between 400 and 500 jobs at its peak.

The modules will be about the size of 10- to 12-story buildings, Mr. Purl said—between 150 and 200 feet long, about 50 to 80 feet wide and between 80 and 100 feet tall.

The project is part of ARCO Alaska's annual sealift operation that has taken oil field equipment to Alaska's North Slope every year since 1975.

Marine Travelift Offers 50BFM Mobile Boat Hoist —Literature Available

Marine Travelift, Inc. recently announced the development of a Model 50BFM, 50-ton-capacity mobile boat hoist, designed to "fill the gap" between the company's 35- and 70-ton-capacity units.

The 50BFM features the "beam forward" design which allows forward sling adjustment behind the front beam and permits more clearance and faster boat handling. The concept also allows exact positioning of front and rear slings to achieve precise load balance.

Marine Travelift's 50BFM was engineered to permit marinas to handle the larger boats in the industry, faster. Greater usable lifting heights are possible with direct connection of slings to sling blocks.

For complete details, prices and delivery information on the 50BFM or for complete design details and specifications on the complete line of Marine Travelift Mobile Boat Hoists with capacities from 15 to 500 tons,

Circle 60 on Reader Service Card

MarineSafety Providing Simulator Training For Apprentice Pilots —Literature Available

In the first program of its kind in the U.S., the California State Board of Pilot Commissioners has contracted with MarineSafety International to provide visual shiphandling simulator training for all apprentice pilots.

The first apprentice pilot course for the State Board of Pilot Commissioners was held recently in the MarineSafety Shiphandling Simulator Training Complex in Newport, R.I. Five apprentice San Francisco pilots attended the eight-day course

which was specially designed to complement the pilot's apprentice program with the bar pilots. Ship maneuvers were conducted in a computer model of San Francisco Bay and the Oakland area and in a generic area especially designed to provide challenging maneuvering and docking problems.

The purpose of the simulator training is to accelerate the learning gained from "hands-on" experience. Using the simulators, the Marine

Safety instructors can control conditions such as weather and traffic and create emergency conditions which might occur only once in a pilot's lifetime.

The eight-day training program includes training modules (a module consists of instruction, simulator exercises and critique) such as entering a harbor, port approaches, piloting in restricted visibility, use of automated radar plotters, handling in narrow channels, working

with tugs, docking and emergencies.

MarineSafety, a wholly owned subsidiary of FlightSafety International, provides shiphandling training for the U.S. Navy and commercial shipping companies, using simulators at Kings Point, N.Y. and Newport, R.I.

For free literature giving complete information on courses offered by MarineSafety International,

Circle 41 on Reader Service Card

the Masters



Forty years ago we developed the oil-pressure concept for use in cylindrical shaft couplings and the first SKF OK Coupling was fitted to the M/S Skogaholm in 1945. To date, we have supplied more than 15,000 OK Couplings for marine and heavy engineering applications throughout the world.

Later, we developed the Supergrip bolt, a hydraulically tensioned, expandable fitted bolt which is also based on the oil-pressure concept. We have supplied more than 5,000 Supergrip bolts for marine and other applications where reliability and speed in demounting and refitting of flange couplings are at a premium.

There is always a risk that good products are copied. Unfortunately, many users have paid a high price to discover that copies do not always measure up to the performance of the genuine product. As a result, most shipowners, power stations and other users specify genuine OK Couplings and Supergrip bolts. Often, our service program is also a key factor in the decision to select our couplings and bolts. Whether your vessel is docked at Shanghai, Hamburg or San Francisco, we can be on the spot within 24 hours. We are represented by SKF's global sales and service network so, whatever your port of call, we are always near at hand.

Through the years, quality, experience and service have helped us become the masters of connection.

OVAKO STEEL Couplings AB

S-813 00 Hofors, Sweden. Tel +46 (290) 250 00. Telex 47 300. Telecopier +46 (290) 282 70.

**FOR SALE
AND SERVICE
IN THE USA**

**Contact: Ovako Steel Coupling Division
P.O. Box 745, Avon, CT 06001
Tel: (203) 677-4423
Fax: (203) 674-1537**

Circle 212 on Reader Service Card

Damaged Navy Frigate Transported From Gulf By Heavylift Ship

The mine-damaged U.S. Navy frigate USS Samuel B. Roberts (FFG-58) was recently loaded onto the heavylift vessel Mighty Servant 2 at Dubai, United Arab Emirates, for transport back to the U.S. for repairs.

According to Dutch company Wijsmuller Transport, who operates the Mighty Servant 2, the U.S. Navy selected dry transport of the frigate because of the method's safety and speed. Because of the severe hull damage sustained by the frigate when she struck a mine in the Persian Gulf, a wet tow would have been risky. On board the Mighty Servant 2, the keel of the USS Samuel B. Roberts is completely sup-

ported and she is not exposed to the battering forces of the sea.

Following her loading, welders secured the USS Samuel B. Roberts to the deck of the Mighty Servant 2 by seafastenings, so that the vessel would not shift during the 7,800 nautical mile voyage.

During the voyage, the Mighty Servant 2 will provide the frigate with water and electricity, so that the frigate's 40-man crew can per-

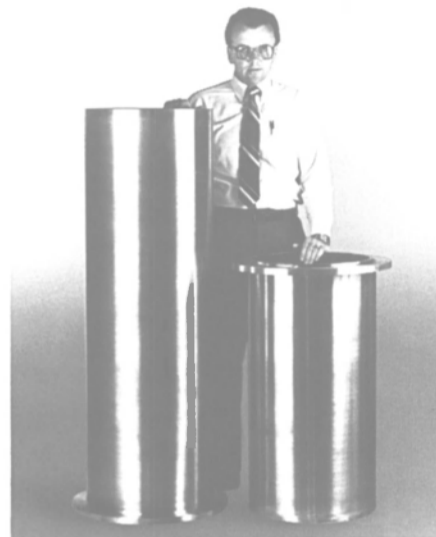
form some maintenance during the trip.

Wijsmuller operates a fleet of eight semisubmersible heavylift vessels and has extensive experience in transporting large, heavy and awkward cargoes such as drill rigs, dredging equipment, floating plants, etc.

For free literature detailing Wijsmuller's services,

Circle 63 on Reader Service Card

New BFGoodrich Plant Now Manufacturing Cutless Brand Bearings



LQMoffitt's Robert Gilson, director of sales and marketing, with 14-inch I.D. Cutless bearings produced at new BFGoodrich plant in Wilmington, N.C.

Cutless® brand bearings and related marine products marketed by LQMoffitt, Inc. are now in full production at the new BFGoodrich facility in Wilmington, N.C.

The manufacturing operations for these products were relocated from Akron, Ohio, to the Wilmington plant for improved service to LQMoffitt customers, advanced facility capabilities, and increased production area.

Among the Cutless bearings produced and shipped are 14-inch I/D full-molded brass-shell bearings slated for installation on a national and international oceangoing tugboat.

LQMoffitt is a subsidiary of BFGoodrich and the exclusive marketing arm for its marine industry products. Sales offices for LQMoffitt remain at the company's Akron headquarters.

For additional information and free literature,

Circle 28 on Reader Service Card

CRSA, Hyundai Sign Steamship Service Pact

The Columbia River Shippers Association (CRSA), Portland, Ore., and Hyundai Merchant Marine, Seoul, South Korea, have signed a steamship service contract that will bring containerized import cargoes from the Far East by ship to Portland at reduced rates for local businesses.

The contract is the first executed by the CRSA with a steamship line. The agreement provides for Hyundai to carry to Portland a minimum of 500 forty-foot containers between July 1, 1988 and February 28, 1989.

From Concept to Reality

RANGE 6 nm
RINGS 1 nm
CD-N.up

HR 2000 HR 3000

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

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

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

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

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

Kelvin Hughes Ltd.,
New North Road, Hainault, Ilford,
Essex, IG6 2UR, England.
Telephone: 01-500 1020 (National)
+44 1 500 1020 (International)
Telefax: 01-500 0837 (National)
+44 1 500 0837 (International)
Telex: 896401 KELHUE G.

VRM 4.25nm
KELVIN HUGHES
A subsidiary company of Smiths Industries plc.

Circle 201 on Reader Service Card

NAVAL TECHNOLOGY

& SHIPBUILDING

a special supplement to

**MARITIME
REPORTER**
AND
ENGINEERING NEWS

September 1988

REMOTE VALVE ACTUATION MADE SIMPLE

...AND COST EFFECTIVE

RMVA can reduce your material, installation, maintenance and life-cycle costs. Savings are significant compared with complex reach rod installations.

...AND EASY TO INSTALL

RMVA uses flexible conduit which makes even the most complicated routings easy to install. No complicated gear boxes or joints.

...AND CORROSION-RESISTANT

RMVA uses materials and SermeTel coatings which are extremely corrosion-resistant. All moving parts operate in a sealed environment.

...AND RELIABLE

Teleflex-RMVA is based on a simple tension-tension, closed-loop actuating concept. Helical cable, operating in a conduit, converts rotary to linear motion and then back to rotary.

...AND EASY TO MAINTAIN

RMVA is virtually trouble-free, due to design simplicity. No periodic maintenance. Shock and vibration resistant. Highly survivable.

- Approved for all U.S. Naval Surface Ships
- ABS approved

The Teleflex Remote Mechanical Valve Actuator (RMVA) has proven its dependability in cruel environments aboard naval vessels.

Specify RMVA by Teleflex. It's simple. It works. It's proven. Call or write for your complete RMVA Design Manual.

 **Teleflex**[®]
INCORPORATED
■ naval technologies division

771 First Avenue • King of Prussia, PA 19406-1401
(215) 265-0556 • Telex 90-2528 • TWX: 710-670-1122
Fax (215) 265-5359

Circle 159 on Reader Service Card



U.S. NAVY SHIP REPAIR AND MODERNIZATION

Review of a Major Forecast and Appraisal of Business Opportunities Available to Equipment Manufacturers and Ship Repair Firms

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

Over the next ten years the U.S. Navy will spend more than \$50 billion on ship repair and modernization. Logical concerns are where these dollars will be spent, what portion will be earmarked for specific geographical areas, how much will flow through commercial shipyards, how much will be spent on equipment replacement and upgrade, etc.

A new IMA study addresses these issues and provides a ten-year forecast (1989-1998) of scheduled ship maintenance, overhauls and emergent repairs. Also in the report is a five-year (1984-1988) analysis of market share for firms involved in Navy ship and equipment repair.

The guided-missile frigate USS Curtis (FFG-38). US Navy Photo.

Navy Maintenance Practices

Forecasting ship maintenance and modernization requires an understanding of the Navy's four basic ship maintenance strategies: regular overhaul cycle, engineered/extended operating cycle, phased maintenance and progressive maintenance.

Regular overhaul cycle—Traditional Navy maintenance strategy has been to schedule periodic, lengthy ship overhauls during which repairs and planned alterations are accomplished. A typical cycle is approximately 36 months between major overhauls. The overhaul takes 8 to 12 months.

Of the 505 active ships in the fleet as of December 1987, only 21 continue to adhere to this traditional maintenance strategy. The Navy plans to completely drop this pat-

tern of maintenance once the 21 ships are retired.

Engineered operating cycle—This strategy was introduced in 1974 for ballistic missile submarines. The objective was to match submarine overhaul intervals to a length compatible with new long life reactor cores. Finding it successful, the EOC concept was extended to surface ships in the late 1970's. Under EOC maintenance, overhauls are scheduled at intervals as great as 15 years. Between overhauls, intermittent depot level availabilities are scheduled which last 2 to 4 months' duration.

As of December 1987, 283 of the 505 active Navy ships were placed in an EOC maintenance cycle.

Phased maintenance—This maintenance strategy was first employed in the late 1970's. Initially it

was used for the Atlantic fleet combat stores ships. The concept has now been extended to additional classes and as of December 1987 covered 141 of the 505 active ships in the fleet.

The general idea of phased maintenance is to perform short, frequent phased maintenance availabilities (PMAs) in place of regular lengthy overhauls. Ships are generally scheduled for PMAs of 2 to 4 months' duration of 15- to 18-month intervals. The work is generally ac-

(continued)



U.S. NAVY

(continued)

completed under multiship, multiyear contracts where one contractor is responsible for a particular group of ships.

Progressive maintenance—In the 1970s the Navy initiated a new ship logistics concept which emphasizes performing maintenance and repair at intermediate and depot level activities. The guided missile frigate (FFG 7), hydrofoil patrol boat (PHM 1) and Trident submarine (SSBN 726) have been designed with this maintenance concept as an objective. Crew size has been minimized and equipment is designed for component removal and replacement.

For the FFG 7 class, a prescribed set of maintenance actions are to be

performed at intermediate maintenance availabilities (IMAs) and selected restricted availabilities (SRAs). IMAs are scheduled at six-month intervals, with three weeks planned for maintenance work. SRAs are to be scheduled every two years, lasting about four weeks. Every ten years a major modernization is scheduled.

Spending Pattern for Maintenance and Modernization

Navy spending for ship maintenance and modernization has increased from about \$1.6 billion in 1975 to \$5.6 billion in 1987. Taking into account the growth in fleet size, average maintenance expenditure per ship has grown from \$2.3 million per year to \$7.8 million per year

during this period. Average modernization expenditure has increased from \$0.9 million to \$2.5 million per ship/year.

Budget pressures have recently created a buildup in deferred maintenance. The clearest evidence is the decline in maintenance and modernization expenditure per ship over the past four years. In 1985 the Navy spent an average of \$11.4 million per ship for maintenance and modernization. This figure is projected to be \$8.5 million in 1988 and \$8.7 million in 1989.

Exhibit 1 gives the details for maintenance and modernization expenditures from 1975 through 1989.

Despite the recent dip, the long-term trend in ship maintenance and modernization expenditures is clearly upward. Deferred maintenance

can only be deferred so long. Eventually ships and/or equipment will fail in operation. There is no doubt that Navy ship maintenance and modernization is a long-term growth market—which should interest many firms.

Forecast Procedure

IMA's new report segregates work into captive and regional markets. Captive work includes scheduled availabilities and emergent jobs which the Navy generally restricts to performance in the homeport area. This includes most short term availabilities lasting less than six months. Regional work includes overhauls and other availabilities exceeding six months' duration which are generally bid coastwide.

To project the size of individual markets, IMA first projected the number of ships in each class to be homeported at specific locations over each of the next ten years. Then using the scheduled maintenance pattern for each ship, IMA projected the number of short- and long-term maintenance availabilities during the ten-year forecast period. These availabilities were then converted to revenues based on a history of completed contract prices for various types of work. Various assumptions were tested in the forecast procedure.

Illustrative Results

Exhibit 2 shows IMA's projection of the number of ships to be homeported in an illustrative major East Coast location. The figures for 1988 are the number of ships actually at the location as of July 1988. Future figures take into account the number of ships to be added or deleted from the homeport over the next ten years. Some deletions are ships scheduled for retirement. Other deletions are ships scheduled for transfer to other homeports as part of the strategic homeport concept. In estimating the ships to be added, IMA took into account the delivery schedule for ships now on order and ships planned for funding over the next five years.

Captive business—Exhibit 3 shows the number of scheduled job starts attributable to the ships at this location. As shown, we estimate a total of 61 SRAs, 11 PMAs, 33 DSRA and 3 DPMA to be generated by the ships in this homeport. This work is generally captive to the local area—provided there is sufficient competition for the contracts. In addition there is a base of emergent work—also captive to the local area—which has been estimated in the report.

Regional business—Overhauls of Navy ships are open to coastwide competition. This regional market has been estimated for both the Atlantic/Gulf and Pacific coasts. Both a projection of overhaul job starts and revenues associated with this work are provided in IMA's report.

Other business—Separate from the above, IMA has projected the number of job starts and associated revenues over the period

Exhibit 1—Trend in Maintenance & Modernization Budget (\$ in millions)

	MAINT.	MOD.	TOTAL	# of SHIPS	Average per Ship		
					MAINT.	MOD.	TOTAL
FY75	\$1,140.5	\$ 434.5	\$1,575.0	496	\$2,299	\$0.876	\$ 3,175
FY76	1,490.5	569.8	2,060.3	484	3,080	1.177	4,257
FY77	1,903.4	669.2	2,572.6	477	3,990	1.403	5,393
FY78	2,563.5	545.2	3,108.7	468	5,478	1.165	6,643
FY79	2,508.9	772.3	3,281.2	473	5,304	1.633	6,937
FY80	2,642.5	763.1	3,405.6	479	5,517	1.593	7,110
FY81	3,195.0	952.7	4,147.7	491	6,507	1.940	8,448
FY82	3,632.3	932.8	4,565.1	513	7,081	1.818	8,899
FY83	4,201.2	896.6	5,097.8	513	8,189	1.748	9,937
FY84	4,214.7	1,086.5	5,301.2	523	8,059	2.077	10,136
FY85	4,779.6	1,397.7	6,177.3	542	8,818	2,579	11,397
FY86	4,179.7	1,398.6	5,578.3	540	7,740	2,590	10,330
FY87	4,244.4	1,344.7	5,589.1	546	7,774	2,463	10,236
FY88 (est)	3,632.0	1,024.4	4,656.4	545	6,660	1,880	8,544
FY89 (est)	3,747.4	1,077.0	4,824.4	553	6,776	1,950	8,724

Exhibit 2—Projected Number of Ships in an Illustrative Homeport

Year	88	89	90	91	92	93	94	95	96	97	98
Ship Type											
AD	1	1	1	1	1	1	1	1	1	1	1
CG 16/26	1	1	1	1	—	—	—	—	—	—	—
CG-47	2	3	3	3	3	3	3	3	3	3	3
CV	1	1	1	1	1	1	1	1	—	—	—
CVN	—	—	—	—	—	1	1	1	1	1	1
DD-963	2	2	2	2	2	2	2	2	2	2	2
DDG 2/37	4	4	4	3	3	3	3	3	2	1	—
DDG-51	—	—	—	1	1	1	1	2	3	4	4
FF-1037	3	—	—	—	—	—	—	—	—	—	—
FF-1052	4	4	4	4	4	4	4	4	4	4	4
FFG-1	1	—	—	—	—	—	—	—	—	—	—
FFG-7	12	12	12	9	9	9	9	9	9	9	9
MCM	—	—	1	1	1	1	1	1	1	1	1
MHC	—	—	—	—	2	2	2	2	2	2	2
MSO	3	3	3	2	2	—	—	—	—	—	—
Total—	33	31	29	27	29	28	28	29	28	28	27

Exhibit 3—Projected Work Starts for Ships Stationed at the Illustrative Homeport

Ship Type	Work	SRA	PMA	DSRA	DPMA	ROH	EDSRA
AD	—	—	—	1	—	1	—
CG 16/26	1	—	—	—	—	—	—
CG-47	8	—	—	3	—	3	—
CV	1	—	—	—	—	1	—
CVN	1	—	—	1	—	—	—
DD-963	6	—	—	2	—	2	—
DDG 2/37	—	8	—	—	3	—	—
DDG-51	4	—	—	1	—	1	—
FF-1037	—	3	—	—	—	—	—
FF-1052	12	—	—	4	—	4	—
FFG-1	—	—	—	—	—	—	—
FFG-7	21	—	—	18	—	—	9
MCM	2	—	—	1	—	1	—
MHC	2	—	—	2	—	2	—
MSO	3	—	—	—	—	—	—
Total—		61	11	33	3	15	9

1989-1998 from overhaul and repair of MSC ships, the RRF fleet and Navy service craft. Both MSC and RRF work tend to be regionally competitive. Navy service craft maintenance and repair tend to be captive to a local area.

Market Share

IMA's report provides a complete tabulation of Navy ship repair and marine equipment repair contracts over the past five years. The data are arranged by contractor and show the value of the initial contract and subsequent modifications/change orders. Market share percentages are calculated for each of the five years—showing each contractor's percentage of the market.

Significance of the Information

The ten-year forecast will be useful in long-term business planning. Ship repair firms can identify future business for which there will be only local competition vs. business for which competition will be coast-wide. Equipment manufacturers can identify the number of maintenance and modernization availabilities by ship type. Both ship repair firms and equipment manufacturers can assess their market share over the past five years.

The full report is available for \$550. It can be ordered by contacting International Maritime Associates, Inc., 835 New Hampshire Ave., NW, Washington, DC 20037, telephone (202) 333-8501; fax (202) 333-8504. Telephone orders will be accepted.

Major Navy Contracts

The following special section highlights the latest U.S. Navy contract awards for shipbuilding, ship repair and maintenance, shipboard communications, weapons, etc. The section covers contracts awarded between the dates of June 6 and July 7, 1988. For contracts prior to these dates, refer to the Naval Technology & Shipbuilding Supplement in the July issue of MR/EN.

June 6

General Ship Corporation, East Boston, Mass., was awarded a **\$7,487,452** firm-fixed-price contract for Extending Drydocking Phase Maintenance Fixed (EDPMF) availability for USS Glover (FF-1098). Work will be completed in April 1989. The Naval Sea Systems Command, Washington D.C., is the contracting activity (N00024-85-H-8157).

June 9

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a **\$26,573,880** modification to a previously awarded contract for the AN/BSY-1(V) combat system and the retractable bow planes on SSNs 754, 755 and 757. Work will be completed February 28, 1990. The Supervisor of Shipbuilding, Conversion and Repair, Groton, Conn., is the contracting activity (N00024-84-C-2063).

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a **\$55,826,120** modification to a previously awarded contract for the AN/BSY-1(V) combat system and the retractable bow planes on SSNs 751 and 752. Work will be

completed February 28, 1990. The Supervisor of Shipbuilding, Conversion and Repair, Groton, Conn., is the contracting activity (N00024-83-C-2039).

June 10

Newport News Shipbuilding, Newport News, Va., was awarded a **\$612,000,000** fixed-price-incentive contract for two SSN-688 class submarines. Work will be completed in August 1993. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2195).

Northwest Marine Iron Works, Portland,

Ore., was awarded a **\$4,775,510** firm-fixed-price contract for the overhaul and dry-docking of USNS Kawishiwi (T-AO-146), a Military Sealift Command oiler. The Military Sealift Command, Pacific, is the contracting authority (N00033-85-H-0307).

Halter Marine Incorporated, New Orleans, La., was awarded a **\$20,879,116** contract for one (AGOR-23) oceanographic research ship. Work will be performed in Escatawpa, Miss., and is expected to be completed December 1, 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-

2223).

June 13

Atlantic Dry Dock Corporation, Fort George Island, Fla., was awarded a **\$8,747,000** firm-fixed-price contract for Extended Drydocking Selected Restricted Availability (EDSRA) for USS Samuel Eliot Morison (FFG-13). Work will be completed May 1, 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting

(continued)

TIOGA STOCKS MIL-SPEC PIPE & TUBING

We know what you need.

At Tioga, we offer immediate stock delivery on the most diversified range of pipe and tubing in the U.S.A. We also stock stainless, carbon and alloy steel pipe, fittings and flanges for any application.

Tioga is qualified to provide:

- LEVEL 1 material from stock.
- ABS inspection.
- All forms of supplemental testing, including ultrasonic, liquid-dye penetrant, and hydro-testing.
- Government source inspection.

Tioga has an inspection system in compliance with MIL-I-45208A. We stock and provide the following MIL specs:

MIL-P-1144	MIL-T-8504	MIL-T-16420	MIL-T-23226
MIL-P-24338	MIL-T-8506	MIL-T-18165	WW-P-404D
MIL-T-1368	MIL-T-15005	MIL-T-20155	WW-P-406D
MIL-T-5066	MIL-T-16286	MIL-T-20157	
MIL-T-6736	MIL-T-16343	MIL-T-22555	

TIOGA   QSC 467
PIPE SUPPLY COMPANY INC

2450 Wheatshaf Lane, P.O. Box 5997, Phila., PA 19137
(215)831-0700 TELEX: 83-4650
TELECOPIER: 215-533-1645
Toll Free National Wats Number 800-523-3678



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

(As of July 1988)

SHIPYARD Navy Designation	NAME	APPROX. CONTRACT \$	EST. DELIVERY	SHIPYARD Navy Designation	NAME	APPROX. CONTRACT \$	EST. DELIVERY
Avondale Shipyards				Lockheed-Gulfport			
I-AO-193	Walter S. Diehl	116,000,000	8/88	LHD-2	Essex	402,494,000	4/92
T-AO-194	John Ericsson	97,500,000	2/90	LHD-3	Kearsage	378,685,000 ⁴	1/93
T-AO-196	Kanawha	95,025,000	11/90	DD-963 & DDG-993 Class	—	14,100,000 ¹	3/93
T-AO-195	Leroy Grumman	101,000,000	5/89	Intermarine USA			
T-AO-197	Pecos	100,633,789	3/90	MHC-51	Osprey	20,926,936	4/91
T-AO-187 Class	unnamed	109,600,000	9/91 ⁸	Lockheed-Seattle			
LSD-44	Gunston Hall	166,000,000	8/88	LCAC (2)	unnamed	24,800,000	88
LSD-45	Comstock	153,400,000	2/89	LCAC (7)	unnamed	115,586,281	—
LSD-46	Tortuga	153,400,000	4/89	LCAC	—	31,759,154 ⁶	90
LSD-47	unnamed	150,000,000	11/89	Lockheed-Savannah			
LSD-48	unnamed	150,000,000	5/90	LCUs (Army-7)	unnamed	115,586,251	6/91
LSD-49	unnamed	157,400,000	11/93	LCU (Army-7)	unnamed	26,000,000	—
Bath Iron Works				Lockheed-Savannah			
CG-58	Philippine Sea	252,800,000	1/89	LCUs (Army-12)	unnamed	—	7/88-11/89
CG-60	Normandy	191,800,000	9/89	Marinette Marine			
CG-61	Monterrey	191,800,000	12/89	MCM-2	Defender	46,000,000	8/88
CG-63	Cowpens	193,300,000	4/90	MCM-4	Champion	42,000,000	12/88
CG-64	Gettysburg	193,300,000	11/90	MCM-7	Patriot	51,848,816	10/89
CG-67	unnamed	236,041,276	4/92	McDermott Inc.			
CG-70	unnamed	226,123,977	6/93	SWATH T-AGOS-19	Victorious	25,424,347	2/90
DDG-51	Arleigh Burke	321,000,000	7/90	YTT 8 & 9	unnamed	21,700,000	—
DDG-53	John Paul Jones	189,900,000	7/92	YTT 10	unnamed	10,913,817	5/90
DDG-51 Class	—	22,600,000 ¹	5/92	NASSCO			
DDG-51 Class	—	23,100,000 ¹	5/89	AOE-6	Supply	290,097,944	4/91
Bethlehem-Sparrows Point				Newport News Shipbuilding			
T-AGS-39	Maury	66,000,000	8/88	CVN-72	Abraham Lincoln	1,550,000,000	12/89
T-AGS-40	Tanner	66,000,000	2/89	CVN-73	George Washington	1,550,000,000	12/91
Bollinger Shipyard				CVN-74	John C. Stennis	3,700,000,000	96
WPB (16)	unnamed	99,306,516	2/90	CVN-75	unnamed	—	98
General Dynamics-Electric Boat				SSN-688 Class	—	22,000,000 ¹	10/88
SSN-752	Pasadena	280,100,000	10/88	SSN-723	Oklahoma City	225,100,000	5/88
SSN-754	Topeka	324,500,000	2/89	SSN-750	Newport News	278,000,000	8/88
SSN-755	Miami	324,500,000	6/89	SSN-753	Albany	319,000,000	7/89
SSN-757	Alexandria	283,000,000	10/89	SSN-756	Scranton	259,833,000	9/89
SSN-760	unnamed	258,166,750	2/90	SSN-758	Asheville	259,833,333	1/90
SSN-761	unnamed	258,166,750	6/90	SSN-759	unnamed	259,833,333	6/90
SSN-762	unnamed	258,166,750	10/90	SSN-760	unnamed	55,000,000 ⁶	—
SSN-763	unnamed	258,166,750	2/91	SSN-764	unnamed	257,118,500	2/91
SSN-688 Class	unnamed	347,400,000	4/93	SSN-765	unnamed	257,118,500	5/91
SSBN-738-740	—	42,000,000	12/93 ³	SSN-766	unnamed	257,118,500	8/91
SSN-21 Class	—	28,900,000 ³	—	SSN-767	unnamed	257,118,500	11/91
SSBN-734	Tennessee	523,700,000	12/88	SSN-688 Class (2)	unnamed	612,000	—
SSBN-735	Pennsylvania	531,600,000	8/89	SSN-21 Class	—	325,000,000 ⁷	2/94
SSBN-736	unnamed	500,870,000	4/90	SSN-21 Class	—	28,900,003 ³	—
SSBN-737	unnamed	616,400,000	12/90	Pennsylvania Shipbuilding			
SSBN-738	unnamed	674,100,000	12/91	T-AO-191	Benjamin Isherwood	111,000,000	10/88
SSBN-739	unnamed	615,000,000	12/92	T-AO-192	Henry Eckford	111,000,000	5/89
SSBN-734 Class	—	48,400,000 ³	12/88	Peterson Builders			
SSBN-740	unnamed	644,000,000	7/94	MCM-3	Sentry	57,900,000	7/88
Halter Marine				MCM-5	Guardian	57,900,000	6/89
T-AGOS-13	Adventurous	14,250,000	8/88	MCM-6	Devastator	48,287,461	8/89
T-AGOS-14	Worthy	14,250,000	12/88	MCM-8	Scout	48,287,461	6/90
T-AGOS-15	Titan	13,844,067	3/89	Robert E. Derektor Shipyard			
T-AGOS-16	Capable	14,031,914	7/89	WMEC-911	Forward	30,160,000	9/88
T-AGOS-17	Intrepid	14,031,914	11/89	WMEC-912	Legare	30,160,000	5/89
T-AGOS-18	Relentless	14,031,914	3/90	WMEC-913	Mohawk	30,160,000	5/89
T-AGOR-23	unnamed	20,900,000	—	TB (Army-2)	unnamed	16,500,000	89
Ingalls Shipbuilding				Tacoma Boatbuilding			
CG-57	Lake Champlain	—	8/88	T-AGOS-11	Audacious	9,295,000	6/89
CG-59	Princeton	325,500,000	10/88	T-AGOS-12	Bold	9,295,000	10/89
CG-62	Chancellorsville	238,600,000	6/89	Textron Marine			
CG-65	Chosin	242,600,000	11/90	LCAC-13-24 (12)	unnamed	187,000,000	89/-6/91
CG-66	Hue City	193,980,662	10/91	LCAC	—	4,760,374 ²	9/88
CG-68	Anzio	163,980,664	4/92	Todd Pacific-San Pedro			
CG-69, 71, 72 & 73	unnamed	769,142,667	1/94	FFG-61	Ingraham	96,100,000	11/88
CG-47 Class	—	215,982,000 ⁶	1/94				
CG-47 Class	—	44,128,775 ⁵	—				
CG-47 Class	—	3,608,809 ⁶	10/89				
DDG-52	John Barry	162,149,000	9/91				
LHD-1	Wasp	1,365,700,000	3/89				

Footnotes: 1. Lead yard services contract; 2. Engineering and technical services contract. 3. Design contract; 4. Contains \$26 million for advanced procurement of material for LHD-4; 5. Yard planning services; 6. Long lead procurement; 7. Detail design contract; 8. Contains options for one T-AO in FYs 89, 90 & 91.

KEY TO NAVY DESIGNATIONS

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

*Assigned to Military Sealift Command
†Coast Guard



OKABE

MANUFACTURER & DISTRIBUTOR OF STANDARD & CUSTOM FASTENERS

DIRECT MILL SHIPMENTS IN STANDARDS AND SPECIALS

MATERIALS

CARBON & ALLOY STEEL
 NICKEL-COPPER
 NICKEL-COPPER-ALUMINUM
 STAINLESS STEEL
 SILICON BRONZE
 NAVAL BRASS
 BRASS
 TITANIUM
 ALUMINUM

PARTIAL LISTING OF FASTENER SPECIFICATIONS

MIL-S-1222
 MIL-B-1357
 FF-S-86
 ANSI B18.2.1
 ANSI B18.2.2
 ASTM F 593
 ASTM F 594

QUALITY ASSURANCE PROGRAM
 IN ACCORDANCE WITH

MIL-I-45208
 MIL-STD-45662
 MIC LEVEL 1

NICKEL-COPPER FASTENER STOCK PROGRAM

HEX HEAD CAP SCREWS									
Diameter Length	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
1/2	*	*							
5/8	*	*	*						
3/4	*	*	*	*	*				
7/8	*	*	*		*				
1	*	*	*	*	*	*	*		
1 1/4	*	*	*	*	*	*	*		
1 1/2	*	*	*	*	*	*	*		
1 3/4	*	*	*	*	*	*	*		
2	*	*	*	*	*	*	*	*	
2 1/4	*	*	*	*	*	*	*	*	*
2 1/2	*	*	*	*	*	*	*	*	*
2 3/4		*	*		*	*	*	*	*
3	*	*	*	*	*	*	*	*	*
3 1/4						*	*	*	
3 1/2			*	*	*	*	*	*	*
3 3/4						*	*	*	
4			*	*	*	*	*	*	*
4 1/2						*	*		
5						*	*	*	*
5 1/2						*	*		
6						*	*	*	*
FINISH NUTS	*	*	*	*	*	*	*	*	*
THREADED ROD	*	*	*	*	*	*	*	*	*
FLAT WASHERS	*	*	*	*	*	*	*	*	*
LOCK WASHERS	*	*	*	*	*	*	*	*	*
SOCKET CAP SCREWS	*	*	*	*	*	*	*		

CHEMICAL AND PHYSICAL CERTIFICATIONS AVAILABLE. LOT TRACEABILITY MAINTAINED

OKABE CO INC

175 LIVELY BOULEVARD
 ELK GROVE VILLAGE, IL, 60007
 PHONE (312) 364-1702
 FAX (312) 364-0791
 Circle 343 on Reader Service Card



CURRENT NAVY, COAST GUARD & MARAD OVERHAUL, REPAIR & CONVERSION CONTRACTS AT U.S. SHIPYARDS (As of July 1988)

SHIPYARD	SHIP	TYPE OF WORK	\$VALUE	COMP	SHIPYARD	SHIP	TYPE OF WORK	\$VALUE	COMP
Alabama Dry Dock	USS Lexington (AVT-16)	PM	10,131,466	8/90	Southwest Marine	USS Dubuque (LPD-8)	OH	10,000,000	—
Atlantic Dry Dock	USS Underwood (LSD-36)	DSRA	7,466,000	8/88		USS O'Brien (DD-975)	REP & UPG	2,300,000	11/89
Avondale Shipyards	USS Boone (FFG-28)	SRA	9,998,452	7/88		USS Jarrett (FFG-33)	EDSRA	12,900,000	10/89
	USS John J. Hall (FFG-32)	DSRA	11,170,581	9/88		USS George Philip (FFG-12)	EDSRA	10,758,483	4/89
Bath Iron Works	USS Radford (DD-968)	ROH	20,700,000	5/89		USS Tripoli (LPH-10)	PMA	3,036,390	7/88
	4 USCG cutters	ROH	117,452,000	89		USS Wichita (AOR-1) & USS Kansas (AOR-3)	REP	41,600,000	—
Bender Shipbuilding & Repair	USS Koelsch (FF-1049)	OH	12,000,000	8/88		USS Pluck (MSO-464) & 1191	SRA	1,041,000	—
Braswell Shipyards	USS Redstone (T-AGM-20)	DD & OH	5,429,704	9/88		LST-1185, -1186	OH	35,000,000	87-89
	USNS Neosho (T-AO-143)	DD & OH	7,366,392	8/88		USS Okinawa (LPH-3)	ROH	16,114,285	7/88
Charleston Naval Shipyard	USNS Vega (T-AK-286)	REP	1,500,000	9/88		USS Durham (LKA-114)	DD	7,611,149	7/88
	USS Andrew Jackson (SSBN-619)	OH	112,058,684	3/90		USS Anchorage (LSD-36)	ROH	15,048,870	11/88
	USS Woodrow Wilson (SSBN-624)	OH	120,928,007	3/89	Tacoma Boatbuilding	USS Stein (FF-1065)	ROH	9,148,194	10/88
	USS Henry L. Stimson (SSBN-655) & USS Mariano J. Vallejo (SSBN-658)	REF	19,673,812	8/89	Tampa Shipyards	USNS Hayes (T-AG-195)	CONV	33,878,232	3/90
Colonna's Shipyards	USS Richard E. Byrd (DDG-23)	DSRA	4,280,000	7/88	Todd-Seattle	T-ACS-7 & 8	CONV	43,158,333	10/88
	Continental Maritime	USS Lang (FF-1060)	PMA	3,200,000	10/88	USS Camden (AOE-2)	REP	12,643,642	7/88
	USS Hoel (DDG-13)	PM	4,500,000	9/88		8 WHECs	OH	234,903,000	2/91
	USS Rentsz (FFG-46)	DSRA	4,400,000	12/88	Todd-San Pedro	USS Crommelin (FFG-37)	REP & DD	4,200,000	9/88
DMI Shipyard	MSB-1	ROH	41,057,000	—	USCG-Curtis Bay	14 buoy tenders	SLEP	8,500,000	—
General Ship Corporation	USS Stephen W. Groves (FFG-29)	EDSRA	10,969,490	7/88		16 WMECs	MAINT	—	—
Houston Ship Repair	Mount Washington (NDRF)	REP	549,000	5/88					
Ingalls Shipbuilding	USS Stark (FFG-31)	REP	28,700,000	8/88					
	USS Wisconsin (BB-64)	MOD	221,768,170	10/88					
	USS Richmond K. Turner (CG-20)	ROH	28,780,830	8/88					
	USS San Jacinto (CG-56)	PSA	7,000,000	10/88					
Jonathan Shipyard	USS Saginaw	PM	9,900,000	6/90					
Long Beach Naval Yard	LPH Class Ships	PM	8,096,132	10/90					
Metro Machine	Atlantic Fleet LPDs	PM	5,334,400	8/91					
	USS Bowen (FF-1079)	OH	6,900,000	—					
	USS John King (DDG-3)	DSRA	3,089,604	9/88					
	USS Claude V. Ricketts (DDG-5)	DSRA	4,100,000	10/88					
	USS Conynham (DDG-17)	REP	1,484,444	—					
Moon Engineering	4 LSTs	PM	3,500,000	90					
NASSCO	3 LSTs	MAINT	5,858,543	—					
	USS Elliott (DD-967)	ROH	27,779,349	9/88					
Newport News Shipbuilding	USS Pittsburgh (SSN-720)	SRA	7,055,300	7/88					
	USS Enterprise (CVN-65)	OH	34,277,751	9/88					
	USS Newport News (SSN-750)	PSA	3,400,000	1/89					
	Surface Ship Support Barge	REP	48,095,123	7/89					
	USS Oklahoma City (SSN-723)	PSA	3,367,692	—					
	USS Key West (SSN-722)	PSA	38,000,000	12/88					
	USS George C. Marshall (SSBN-654)	REF	11,172,200	10/88					
	USS Lewis & Clark (SSBN-644)	REF	10,751,500	7/88					
Norfolk Naval Yard	USS Jacksonville (SSN-699)	TEST	8,000,000	8/88					
	USS Baton Rouge (SSN-689)	SRA	5,462,494	10/88					
	USS Memphis (SSN-691)	SRA	8,486,562	10/88					
	AO-178, 179 & 186	PM	38,900,000	—					
Norfolk Shipbuilding	USS Lawrence (DDG-4)	REP	4,966,666	—					
	Mormacsea & Mormacsaga (RRF)	UPG	7,973,482	—					
	USS Anchorage (LSD-36)	ROH	15,300,000	11/88					
Northwest Marine Iron Works	USNS Kawashiwi (T-AO-146)	DD & OH	4,775,510	—					
	USS Okinawa (LPH-3)	ROH	14,091,106	1/89					
	USS Patterson (FF-1061)	PM	5-10 mil/yr.	91					
Pennsylvania Shipbuilding	USS Independence (CV-62)	SLEP	240,000,000	—					
Philadelphia Navy Yard	USS Kamehameha (SSBN-642)	ROH	112,100,000	11/88					
	USS Albuquerque (SSN-706) & USS Philadelphia (SSN-690)	SRA	11,416,336	11/88					
Puget Sound Naval Yard	USS Nimitz (CVN-68)	REP & OH	—	89					
	USS Alexander Hamilton (SSBN-617)	ROH	110,713,798	11/88					
Robert E. Derecktor	USS Conrole (FFG-12)	ROH	2,500,000	—					
Service Engineering	USNS Spica (T-AFS-9)	OH	10,700,000	—					
	AE-29, -32-34	PM	4,154,000	89					

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

Ingalls Shipbuilding Christens U.S. Navy Cruiser Chancellorsville

The Aegis guided missile cruiser USS Chancellorsville (CG-62) was recently christened at ceremonies at the Pascagoula, Miss., shipyard of the Ingalls Shipbuilding division of Litton Industries.

Principal speaker for the ceremony was the Hon. Trent Lott, U.S. Representative from Pascagoula, Mississippi's Fifth Congressional District. Mrs. Edward H. Martin was chosen by the Navy as the ship's sponsor.

The 567-foot, 9,500-ton Aegis cruiser is powered by four GE LM2500 marine gas turbines and is equipped with Aegis combat equipment, the most advanced surface ship air defense system in the world.

The Chancellorsville is equipped with the MK 41 vertical launching

system, a multiwarfare missile launching system capable of firing missiles against air, surface and underwater threats.

Currently in its 50th year of shipbuilding, Ingalls was chosen as the lead builder for five of the latest classes of Navy surface combatants.

Since 1975, Ingalls has delivered 50 major warships into the Navy's fleet, including eight Aegis cruisers. As lead shipbuilder of the Aegis cruiser program, Ingalls has been contracted to build a total of 19 of the 27 cruisers Congress has authorized for construction since 1978.

For free literature detailing the shipbuilding facilities and services of Ingalls,

Circle 109 on Reader Service Card



The USS Chancellorsville (CG-62) is guided to an outfitting berth at Ingalls Shipbuilding, Pascagoula, Miss. The amphibious assault ship USS Wasp (LHD-1), the lead ship of a new class being built by Ingalls, is in the background.

Major Navy Contracts

(continued)

activity (N00024-85-H-8111).

E.R. Paul Company, Walnut, Calif., was awarded a **\$5,641,731** firm-fixed-price contract to purchase and install two package type steam boilers for use in testing steam-driven naval shipboard machinery and devices. The contract also contains provisions for training. Work will be performed in Puget Sound, Wash. (75 percent), and Pearl Harbor, Hawaii (25 percent), and is expected to be completed late in 1989. The Naval Regional Contracting Center, Washington, D.C., is the contracting activity (N00600-88-C-0366).

June 17

Avondale Industries Incorporated, Shipyards Division, New Orleans, La., was awarded a **\$157,411,537** fixed-price-incentive contract for design and construction of LSD-49, the lead ship of the LSD-41 (cargo variant) class, and the associated technical manuals, training, Coordinated Ships Allowance List (COSAL) material, studies, services and drawings. Work will be completed in November 1993. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2048).

MagneTek ALS, Anaheim, Calif., was awarded a **\$28,626,300** firm-fixed-price contract for the MK-84 solid state frequen-

cy converter production program for CG-69, CG-70, CG-71, CG-72 and CG-73. Work will be completed in December 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-5141).

Automar I Corporation, Washington, D.C., was awarded a **\$43,154,906** firm-fixed-price contract including options for the charter of MV American Eagle, a roll-on/roll-off dry cargo ship that will be used to transport Department of Defense cargo. The contract performance period is 17 months with two 17-month options. The ship will be delivered at a mutually agreeable date on or before November 3, 1988. The Military Sealift Command, Washington, D.C., is the contracting activity (N00033-88-C-1117).

June 20

Avondale Industries Incorporated, Shipyards Division, New Orleans, La., was awarded a **\$109,646,935** fixed-price contract for one T-AO-187 class ship with options for one ship per year in fiscal years 1989, 1990 and 1991. Work will be completed in September 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2050).

June 21

Alaska Tug and Salvage Incorporated, (continued on page 47)

Hampton Roads SNAME Discusses Improving Producibility Of American Fast Attack Submarines

At a recent dinner meeting of the Hampton Roads Section of The Society of Naval Architects and Marine Engineers, Lt. Comdr. **Blaine R. Brucker** presented a talk on "Seawolf Producibility" to members and guests gathered at Fisherman's Wharf in Hampton, Va.

Commander **Brucker**, USN, currently serves as Producibility Manager of PMS350, the Seawolf Advanced Submarine Acquisition Program Office at NavSea. In this position, he is responsible for coordinating the deliverable product of the design yards participating in the detail design of the Seawolf.

The U.S. Navy's Seawolf Advanced Submarine Program is vitally interested in improving the producibility of the next generation of American attack submarines. This program is an important milestone

on the road to modernization of the shipbuilding industry through the infusion of new technology. The Seawolf Program has accepted the role of providing leadership in the drive to produce affordable submarines into the 21st century. Newport News Shipbuilding, Electric Boat Division, and NavSea have teamed to improve the efficiency of construction through new technology.


The Seawolf design approach includes putting forth a major effort to present a design that supports the implementation of technology and captures the necessary attributes for efficient construction of this new class of attack submarine. Commander **Brucker** provided an overview of these challenges in the implementation of a producibility program for the next class of fast attack submarines.



Meet Your Maker...Buy Direct!

Non-Ferrous Bolt & Mfg. Co. has made quality a number one priority and has accelerated its programs to encompass some of the most stringent standards in quality assurance. With our MIL-I-45208 certification, mercury free certification, our domestic raw material sources and our LEVEL I/SUBSAFE approval, we feel that our product carries an additional "seal of approval". We will continue to strive for new and better ways to achieve high quality, good service and reliability our customers depend on.

Non-Ferrous Bolt & Mfg. Co. specializes in producing standard and non-standard fasteners in high temperature and corrosion resistant metals. With 20 years of experience in the fastener industry, we have become one of the nation's foremost producers of domestically manufactured fastener "specials". We are capable of producing hex heads, nuts, sockets, slots, carriage bolts, T-head bolts, square heads, penta heads, special studs and many more styles from over 100 grades of stainless steel and exotic metals.




non ferrous
BOLT & MFG. CO.
Formerly
NEVADA BOLT & MFG. CO., INC.

TOLL FREE 1 (800) 742-0044 • FAX NO. (702) 362-9446 • PHONE (702) 368-2707
4085-M NEVSO DRIVE, SUITE C • LAS VEGAS, NEVADA 89103

Circle 266 on Reader Service Card

September, 1988



TIME FOR A SWITCH

After 20,000 cycles, when most mechanical switches are through, ELDEC solid-state switches are just beginning.

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

ELDEC non-contacting switches can stand up to the sea.

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

Two wire AC and three wire DC switches for direct mechanical replacement.

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

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



COMMITTED TO PERFORMANCE

Eldec Corporation, Lynnwood, Washington USA
Tel. 206-487-4000 • TWX: 910-449-0873



Copyright 1988 Eldec Corporation

Circle 164 on Reader Service Card

39

THE LATEST ADVANCEMENTS IN PROPULSION SYSTEMS FOR TODAY'S NAVIES

Some of the most powerful, technologically advanced propulsion systems ever assembled are the driving hearts of today's fast, sleek, maneuverable naval combatants and support vessels. Many new classes of cruisers, destroyers, frigates, corvettes and other warships and support craft of the United States Navy, as well as the world's navies, are equipped with improved main and cruise engines, propellers and gears. Major naval equipment manufacturers are constantly improving their propulsion system products and components in an effort to provide the international naval market with the most durable, quietest, most powerful and most fuel-efficient propulsion systems.

This article offers a brief review of some of the latest propulsion systems that are in use by the world's naval fleets.

Technical reports, product literature and brochures are available free of charge from the manufacturers included in this review. If you would like additional information, just circle the appropriate Reader Service Number(s) on the postpaid card bound into the back of this issue. See the table at the end of this review for the proper Reader Service Number for each manufacturer.

ENGINES

When the Ticonderoga Class Aegis guided-missile cruiser USS Leyte Gulf was recently commissioned, she became the 100th U.S. Navy ship to be powered by GE LM2500 marine gas turbine engines. Powered by four LM2500s, the Leyte Gulf (CG-55) is capable of speeds in excess of 30 knots.

The LM2500 has been selected by the U.S. Navy and 16 other navies around the world for propulsion applications aboard such vessels as patrol hydrofoil missileships, guided-missile frigates, Spruance (DDG-963) and Kidd (DDG-993) Class destroyers and the new Arleigh Burke (DDG-51) Class destroyers.

During the first quarter of this year, GE's Marine & Industrial Engines & Services Division, Cincinnati, Ohio, received an order for 12 LM2500 marine modules for the next group of Canadian Patrol Frigates. There were naval orders for 22 LM2500s in 1987.

One of the division's latest orders is from the Naval Sea Systems Command on behalf of the Portuguese Navy for six LM2500 marine gas turbines.

The turbines will be used in con-

junction with MTU diesel engines in a CODOG (Combined Diesel or Gas Turbine) machinery arrangement to provide power for three MEKO 200 frigates of the Vasco da Gama Class.

The Marine & Industrial Division of GE also recently celebrated the launching of the first LM500-powered naval ship—a Standard Flex 300 fiberglass multipurpose surveillance/minesweeping craft christened by the Royal Danish Navy.

Called the Flyvenfisken, the 177-foot ship is powered by an LM500 CODAG (Combined Diesel and Gas Turbine) arrangement, which couples the 6,000-shp LM500 with two 2,700-bhp MTU 16V396 diesel engines driving three propellers.

The Allison Gas Turbines Division of GM is another large supplier of marine gas turbine engines to international navies. Allison 570-KF marine gas turbines were selected in a COGOG (Combined Gas Turbine or Gas Turbine) by the Royal Canadian Navy for cruise power for their 5,000-ton Tribal Class destroyers. Allison's 570-KF's are also being used to boost propulsion aboard the Swedish Navy's Spica III Stockholm Class fast patrol boats. In this application, the drive system uses a singular stage epicyclic reduction gear and a 15-degree V-drive to turn a CP propeller. The 320-ton ghp hull vessel has a boost speed of 38 knots.

The British Royal Navy selected Paxman Valenta 12RP200CZ power modules, each having a continuous power output of 1.3 MW 440/600 V, three-phase, 60Hz at 1,200 rpm, to provide power for the propulsion systems for their antisubmarine frigate. The units will be utilized in a CODLAG (Combined Diesel Electric and Gas Turbine) propulsion system.

A CODOG (Combined Diesel or Gas Turbine) plant featuring twin Rolls-Royce Spey SM1C turbines will be used in the Royal Dutch Navy's new M-Class frigates.

In addition, the Japanese Navy's Dawn Mist, the lead ship in a new class of 4,200-ton full load destroyers, will be powered by a Spey COGAG system consisting of four Kawasaki-RR Spey turbines with a total power output of 54,000 shp.

Stewart & Stevenson Services, Inc., Houston, Texas, was awarded a \$21.2-million U.S. Navy contract to supply fifteen 2,500-kw gas turbine-powered generator sets. The equipment will provide ship's service power for five Ticonderoga Class (CG-47) Class Aegis cruisers being built for the Navy.

Previously, Stewart & Stevenson Services had been awarded the con-



tract to deliver 66 generator sets for the first 22 Aegis cruisers.

Steam turbines, widely used in nuclear propulsion applications, such as in the case of the Nimitz Class aircraft carriers, can be found in use aboard the U.S. Navy's 58,000-ton Iowa Class battleships. Both the battleships Iowa and Missouri are powered by a propulsion plant consisting of eight boilers and four GE geared steam turbines. GE Naval & Drive Turbine Systems supplies advanced steam propulsion and ships service turbine generator systems to U.S. Navy vessels ranging in size from the largest aircraft carriers to the smallest auxiliary ships.

The USS Wasp (LHD-1), the lead ship of the Navy's newest amphibious assault ship, has a power plant which uses two Westinghouse steam turbines, developing a combined 70,000 shp, with two Combustion Engineering boilers, to drive the ship at speeds of more than 20 knots.

Two of U.S. Navy's newest classes of ships feature Colt-Pielstick diesel engine propulsion. Landing Ship Dock (LSD) vessels, with full load displacements of 15,745 tons, are equipped with four medium-speed Colt-Pielstick diesel engines for a total ship's horsepower of 33,000. Additionally, each of the Navy's Henry J. Kaiser Class (T-AO-187) oilers are powered by two 10-cylinder PC4.2 Colt-Pielstick diesel engines manufactured by the Fairbanks Morse Division of Colt Industries Inc. The big diesels are capable

Photo: USS Oliver H. Perry FFG-7, built by Bath Iron Works.

of burning heavy fuels up to 3,500 sec Redwood at 100 degrees F. The fuel rate guarantee is 136 grams/metric horsepower hour.

On board another U.S. Navy support vessel, the new AOE-6 Class Fast Combat Support Ship, five Caterpillar 3608 diesel generator sets will provide 2,500 kw each, totaling 12,500 kw. Caterpillar has a 20-engine contract with National Steel Shipbuilding Company (NASCO), which is building the lead ship of the class. Caterpillar will deliver the first five gensets for the lead ship in early 1989.

The recently launched mine countermeasure ship USS Devastator (MCM-6) is powered by four 600-hp Isotta Fraschini diesel engines and is fitted with two 200-hp Hansome Electric motors. For maneuverability, the Devastator is equipped with a 350-hp Omnithruster bowthruster, which is connected to a GE drive motor. Her electric power is furnished by three 60-Hz, 375-kw Tech Systems generators.

With their acquisition of Isotta Fraschini, Fincantieri's Engine Division can now offer a power range of engines which extends from 200 hp to 40,000 hp.

Fincantieri's GMT model A230-20 diesels, rated at 3,900 hp at 1,200 rpm, are used aboard the Italian Navy's Lupo Class frigates for cruis-

(continued)



NOT EVERY VESSEL NEEDS CHEVRON MARINE LUBRICANTS.

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

You see, at Chevron we're behind you all the way. Pushing, pulling, pumping, dredging... working the waterways of America, rivermen from coast to coast count on us. For our full line of fine marine products. For expert advice and

service at over 100 ports across the U.S. For the kind of commitment you'd expect from an industry leader like Chevron.

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

• Chevron DELO Marine Oils 471, 473 and 194—premium, extra-performance diesel oils for severe-duty service in main

and auxiliary engines.

• Chevron AW Hydraulic Oils for gears, compressors, and hydraulic systems.

• Chevron NL Gear Compounds for heavily loaded reverse and reduction gears.

• Chevron Marine Oil 220X for stern tube bearings and open cranks on steam engines.

• Chevron Ultra-Duty, Pinion Grease MS, Dura-Lith Grease EP, and Polyurea EP Greases for bearings, couplings, gears, and deck hardware.



“We make Navy gears weighing over 20 tons with tooth accuracy down to 50 millionths of an inch. The finest Swiss watches don’t come anywhere near that.”

John Mezakowski
Finish Lathe Operator
Lynn, Massachusetts



Fifty millionths of an inch. That’s 1/60th the diameter of a human hair. That’s the kind of precise tolerance dedicated GE people like John meet daily in the manufacture of advanced gears for the U.S. Navy. High power density hardened and ground gears that are smaller, lighter and quieter than conventional units. Gears for GE propulsion systems that power sophisticated submarines, aircraft carriers, destroyers and other vessels. This dedication to accuracy is the reason GE has been the principal supplier of fully integrated propulsion systems to the U.S. Navy for over 75 years. It’s the reason we’re aboard nearly every class of ship from the smallest auxiliary to the largest super carrier. Our superior quality gives America’s fleet the technical edge to move faster, run quieter, perform more efficiently and cruise longer between overhauls.

Propulsion quality is very real to John. He depended on it while in the Navy, and now his son does aboard a GE powered sub. Of quality, John says, “We make the best gears and propulsion systems because we have the right people and equipment to do the job. While many of the people who work at Gear Plant today



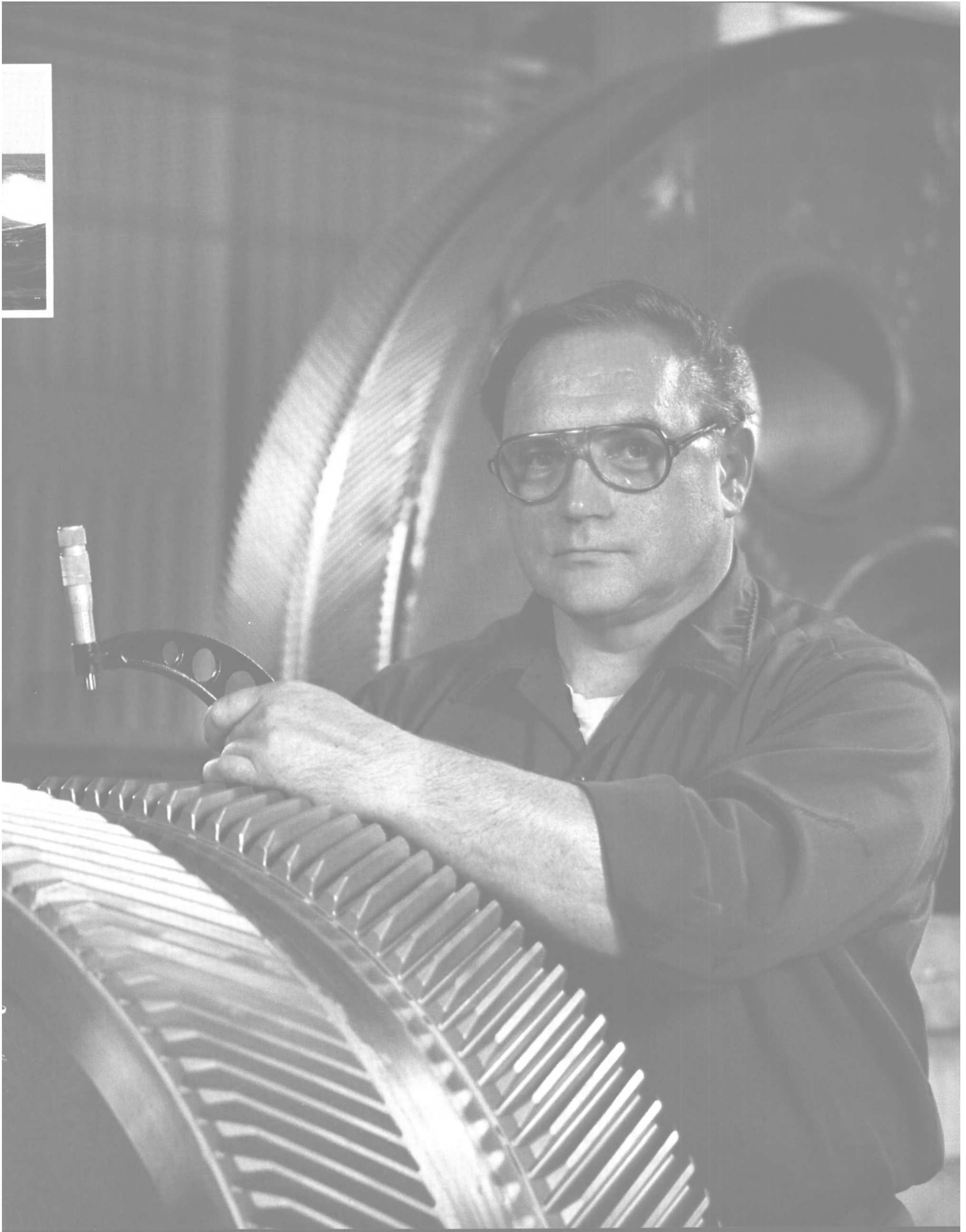
grew up hearing about GE from their dads who worked here, others were drawn by our reputation. Most of them have around 15 years of experience, too. That’s what makes this place work. Besides, the Company spent over \$25 million so we would have the best manufacturing and test equipment here in Lynn. And that’s not just my opinion. Customers tell us our plant is the best equipped in the world. That really means something!”

Committed GE men and women like John work hard to give the Navy the most advanced technology, the highest quality, the lowest cost and on-time delivery. They intend to carry-on this Proud Tradition of leadership as they work to advance the U.S. Navy mission into the 21st Century.

GE People:
Qualified, Committed, Proud

GE Naval & Drive Turbine Systems

Circle 30 on Reader Service Card



Naval Propulsion Systems

(continued)

ing power. GMT engines have also been used for cruise propulsion in Italian Maestrale Class frigates and Animoso Class destroyers.

Sulzer Brothers engines are on a wide variety of naval auxiliary vessels and research ships. For example, Argentina's naval auxiliary ves-

sel Cabo San Antonio is equipped with four Sulzer 6ZH40 diesel engines.

Additionally, 5RTA76 series engines with PTO were installed on the 615-foot T-5 tankers built by Tampa Shipyards.

Bombardier Inc. of Montreal, which purchased Alco Power Inc. in 1984, supplied 42 Paxman Valenta engines to Bollinger Machine Shop & Shipyard Inc., for installation

aboard Island Class patrol boats for the U.S. Coast Guard. The engines, which develop 2,880 bhp each at 1,500 rpm, will be used as main propulsion on the patrol boats. The engines will drive through ZF reverse/reduction gears. Electrical power for each craft is provided by two 99-kw generators driven by Caterpillar 3304T diesels.

Deutz MWM has begun delivering 24 self-contained generating sets

of 850 kw each to the Canadian Navy for their new patrol frigates. Deutz MWM sold 32 sets of an almost identical configuration to the German Navy for use aboard their F-122 Bremen Class frigates.

Diesel engine manufacturer Krupp MaK, which has more than 100 years' experience in naval equipment, offers a number of medium-speed, four-stroke heavy fuel engines in the output range from 740 to 9,900 kw (1,000-13,500 hp).

For example, Krupp MaK offers the heavy-fuel engines M453C and the M332, both of which boost low fuel consumption. The company reports that both engines feature excellent ratio of maximum to mean piston pressures, but moderate, and therefore, safe, operational values.

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

EMD propulsion was also selected to power the U.S. Army's newest logistic support vessels (LSVs). Each 273-foot LSV is powered by two EMD 16-1645-E2 diesel engines to speeds of about 12 knots.

The 270-foot Medium Endurance Coast Guard Cutters under construction at Robert E. Derektor Shipyards in Middletown, R.I., are each powered by a pair of 3,500-hp Alco diesel engines to speeds of about 19.5 knots. The ship's service electricity is provided by two 475-kw Caterpillar gensets.

Want to Simplify Main Engine Power Tests?

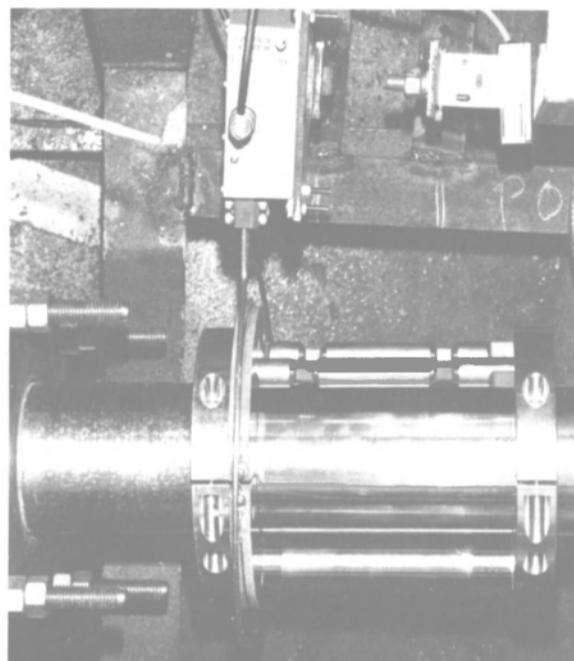
Specify Acurex Universal Sea Trials Measurement Systems!
And Obtain Acurex Quality and Expertise as a Bonus.



- ▶ Bolt-on torque sensor—2½" to 30" shafts
- ▶ No critical clearances or locations
- ▶ Sealed sensor—patented design
- ▶ Installs complete in less than 4 hours
- ▶ Portable—hand carried aboard
- ▶ Not affected by diesel vibrations
- ▶ Monitors torsional vibrations
- ▶ All power and RPM ranges

ACUREX Corporation

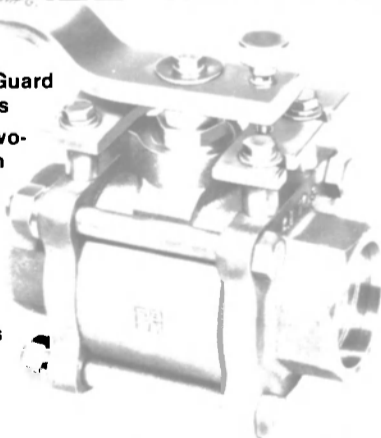
Autodata Division
555 Clyde Ave. P.O. Box 7042
Mountain View, CA 94039
(415) 967-9100 TELEX: 34-6391
FAX: (415) 967-5778



Circle 142 on Reader Service Card

SEA-GOING Line of BALL VALVES

- Made to U.S. Coast Guard & Navy Specifications
- Complete range of two-way Bronze Valves in choice of alloys with any type of trim, including Monel
- Featuring sil-braze ends, Navy flanges, detenting handles, blow-out proof stems
- Shock & vibration tested
- Sizes: ¼" thru 4"
- Pressures to 700 psig; temps to 450°F.
- Also available in Flush Tank, Multi-Port and Manifolder Valves



FREE CATALOG

Fully describes the line and includes Marine system applications. No obligation.

EST
1899



PBM, INC.

R.D. 6, Box 387-A
Sandy Hill Rd., Irwin, PA 15642
412/863-0550 • FAX 412/864-9255

Circle 152 on Reader Service Card

GAYLORD

GALLEY EXHAUST HOODS

The first choice in
Galley Ventilation



- EXTRACTS 95% OF GREASE FROM AIR STREAM
- GREASE REMOVED BY AUTOMATIC WATER-WASH
- FAIL-SAFE FIRE DAMPER PROTECTING HOOD & DUCT
- MODELS FOR EVERY GALLEY APPLICATION
- ENERGY SAVING LOW AIR VOLUME DESIGN
- NO MESSY FILTERS TO REMOVE & CLEAN
- WORLDWIDE SALES, ENGINEERING & SERVICE

With over 40 years experience in galley ventilation, Gaylord continues to meet the demands of the industry with advanced engineering and service.

Please write or call for a complete
Gaylord Engineering Catalog

GAYLORD INDUSTRIES, INC.

A SUBSIDIARY OF GAYLORD INTERNATIONAL, INC.
P.O. BOX 1149 • 10900 S.W. AVERY STREET • TUALATIN, OR 97062-1149 USA
TLX/RCA 200462 G1W UR • FAX 503-692-6048
PHONE 503-691-0142 • 800-547-9696

Circle 235 on Reader Service Card

Smaller Military Vessels

Within the past year, each of a series of seven Spanish Customs Service patrol boats were fitted with a pair of Deutz MWM TBD 234 V-12 diesel engines. Rated at 1,000 hp each, the engines directly drive Riva Calzoni IRC 41 DL waterjets to propel the 47-foot craft to speeds of about 54 knots. The engines extremely low fuel consumption allows the vessels to operate for long periods of time and in greater sea radius.

Cummins 4BT3.9-M turbo-charged four-cylinder diesel engines power Zodiac Hurricane rigid inflatable boats (RIBs) employed by the Canadian Coast Guard. Each of the 3.9-liter Cummins B Series diesels develop 100 horsepower at 2,500 rpm. The boats, which cruise at a speed of 14 knots, are propelled by a Parker waterjet propulsion system. The U.S. Coast Guard and Navy are both testing Cummins 6BT- and 4BT-powered Hurricane RIB demonstrators and a prototype.

MonArk Boat delivered a 28-foot search/rescue patrol boat to the U.S. Coast Guard, which is powered by twin Volvo Diesel AQAD41/290 engines, each rated for 200 hp at 3,800 rpm. The all-aluminum craft, which features a semi-V planing hull, can obtain speeds in excess of 38 knots.

The U.S. Navy's 135-foot landing craft utility (LCU) vessels, which

displace about 404 tons at full load, are powered by two Detroit Diesel 12V71TI diesel engines that develop a total of 850 shp.

Detroit Diesel engines also power two Halter Marine-built Ecuadorian Navy patrol boats. The 44-foot drug interdiction boats are each fitted with two military rated Detroit Diesel 8V71TI diesels driving through Twin Disc 509 down angle gears which give the boats a service speed of 26 knots.

Danish Osprey 55 Class fast offshore patrol boats delivered last year by Danyard, are each powered by two MAN B&W Diesel 12V 23/50 diesel engines, supplied by Alpha Diesel of Frederikshavn, Denmark, with 23VO20 reduction gears, controllable-pitch propeller equipment and Alphatronic remote control. The craft can reach speeds of more than 20 knots.

Twin MAN B&W D2840 LE diesel engines rated at 635 hp at 2,300 rpm power PT Class patrol boats built by Singapore Shipbuilding and Engineering for the Government of Brunei Darussalam for the Royal Brunei Police Force. The 48-foot craft can obtain speeds of about 33 knots.

Tempest Marine-built USCG fast coastal interceptors are powered by a pair of turbocharged and after-cooled Caterpillar 3208T diesel engines, which produce a combined 750 hp at 2,800 rpm. The craft are fitted with Twin Disc reduction gearing and Record propellers and can obtain speeds in excess of 43 knots.

PROPELLERS, THRUSTERS & WATERJETS

One of the leading suppliers of controllable-pitch propellers to the U.S. Navy is the Bird-Johnson Company, Walpole, Mass. Bird-Johnson propellers have been selected for the Arleigh Burke, the lead ship of the new class of Navy Aegis destroyers, aboard Ticonderoga Class cruisers, Henry J. Kaiser Class oilers, Landing Ship Dock vessels and Mine Countermeasure Ships.

Last year, Bird-Johnson was selected to supply two 23-foot, six-bladed propellers for the lead ship of the AOE-6 Class Fast Combat Support Ships.

West Germany's Schaffran Propeller Lehne & Co. manufactures CP and monobloc propellers of 3,000 to 7,000 mm to their own designs for all kinds of vessels. One example of a military installation is aboard the FRG Coast Guard patrol boat Falshoft, which is equipped with a three-bladed, 1,200-mm Schaffran CP propeller.

A number of international navies, including the Italian, Venezuelan, Peruvian and Iraqi, use Lips CP and reverse pitch propellers. One of the latest U.S. Navy installations is on the Wasp (LHD-1), the lead ship of the amphibious assault class.

Schottel propulsion systems—rudderpropellers, thrusters and jets—are in use in naval fleets all over the world. The firm manufac-

tures over 20 different types of Schottel Rudderpropellers, a combined steering/propulsion unit, covering a power range of 15-5,000 kw (20-7,000 hp). The units are rotatable through a full 360 degrees, proving propulsive steering in any direction. Over 19,000 Schottel propulsion units are in use worldwide.

Another new U.S. Navy class ship, the MHC-51 coastal minehunter Osprey, will reportedly feature Voith-Schneider propulsion

equipment. The vessel is under construction at Intermarine USA's Savannah, Ga., yard.

Sulzer-Escher Wyss five-bladed CP and reverse pitch propellers are featured on the FRG's Bremen Class frigates, as well as on a number of Canadian, Indonesian, Saudi Arabian and South Korean naval ships.

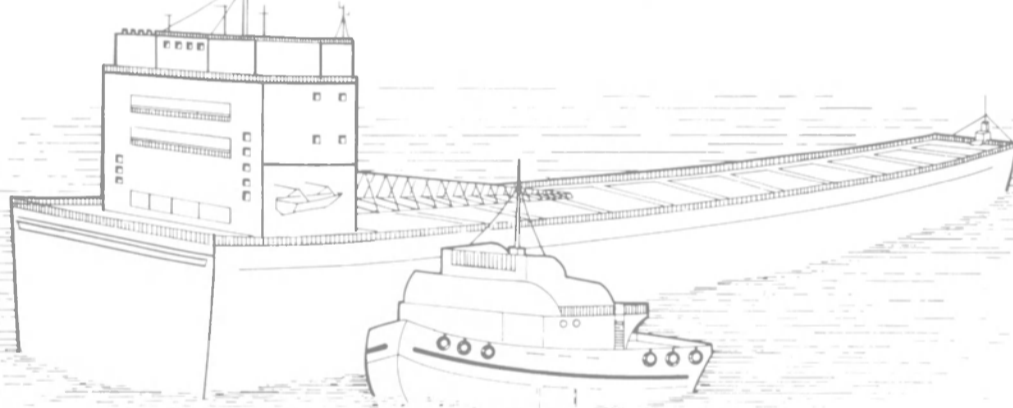
Three new U.S. Navy Torpedo Test Craft being built by McDermott Shipyard, Amelia, La., will be

equipped with Omnithruster hydrojet maneuvering and propulsion systems. The YTTs, -9, -10 and -11, will be fitted with 350-hp Omnithruster Mark II hydrojet Model JT 700TDs. The hydrojet units will offer the craft precise handling, position keeping and automatic heading.

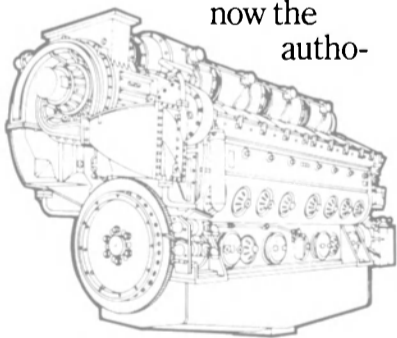
In addition, the recently launched USS Devastator (MCM-6) is fur-

(continued)

Authorized The #1 Source for EMD Diesel Engines on the East Coast and the Caribbean



Morrison-Knudsen,
Power Systems Division is
now the
autho-



rized East Coast distributor
of EMD Diesel Engine Power
Products manufactured
by General Motors Electro-
Motive Division.

You can depend on us for

parts, service, quality assurance, quality control, and custom installation of diesel engines for use in power generation systems and marine propulsion.



- Maine
- Vermont
- New Hampshire
- Massachusetts
- Rhode Island
- Connecticut
- New York
- New Jersey
- Pennsylvania
- Delaware
- Maryland
- Washington, DC
- Virginia
- West Virginia
- North Carolina
- South Carolina
- Georgia
- Florida

Puerto Rico, The Bahamas,
The Virgin Islands, The
Dominican Republic and the
entire Caribbean.



Our service team is on call 24 hours a day and stands ready to assist you with emergency repairs, routine maintenance and anything in between.

In short, we are the #1 source on the East Coast and the Caribbean for EMD Diesel Power. Call (919) 977-2720 for the power of EMD from Morrison-Knudsen.



MORRISON-KNUDSEN COMPANY, INC.
POWER SYSTEMS DIVISION

P.O. Box 1928, Rocky Mount, NC 27801
(919) 977-2720, FAX: (919) 446-3830

Naval Propulsion Systems

(continued)

nished with a 350-hp Omnithruster bowthruster for precise handling and maneuverability.

Michigan Wheel's Towmaster Nozzle/Rudder System, with its triple-rudder design, offers excellent maneuverability and turning efficiency. The Towmaster System has been proven in over 100 applications.

Ulstein Trading Ltd. A/S of Norway has developed the High Lift Rudder, with a bulbous leading edge, active flap and vane elements, offers excellent steering ability at high-speed ship operation.

South Korean Donghae Class corvettes are equipped with KaMeWa CP and reverse-pitch propellers.

GEARS

Cincinnati Gear Company, Cin-

cinnati, Ohio, supplied huge carburized and hardened and precision ground gears for the U.S. Navy's T-AO-187 Class oiler program, as well as supplying Textron Marine Systems with eight gas turbine-powered gearboxes and 24 couplings and clutches for the LCAC program underway at the yard. The lead ship of the AOE-6 Class will also feature Cincinnati Gear equipment—two dual input locked train reduction gears incorporating a hydraulic reversing coupling.

Four Inhauma Class corvettes built for the Brazilian Navy by A.M.R.J. Rio de Janeiro are equipped with Renk reduction gears. Renk also supplied the reduction gearing for some of the FRG's Bremen Class F122 frigates.

Another Navy supplier, Falk, offers the RW Series of marine drives. The series features high-efficiency gears, long bearing life and simplified maintenance.

The COGAG propulsion system aboard the destroyer Arleigh Burke includes GE reduction gearing. Over the past few years, GE has invested more than \$25.5 million in its advanced hardened and ground gear facility at Lynn, Mass., and now has one of the world's finest gear facilities in the world. The complex is dedicated to the design, manufacture and test of superior and hardened and ground Navy gears.

Two other major suppliers of reduction gearing to the international naval market are Westinghouse and Western Gear. Westinghouse reduction gears are aboard the amphibious assault ship Wasp, as well as Spruance and Kidd Class destroyers and Ticonderoga Class cruisers.

Western Gear has supplied reduction gears for both the Oliver Hazard Perry Class (FFG-7) and Adelaide Class (Australian) frigates.



The last thing on your passengers' minds is wastewater treatment.

Fortunately, it's the first thing on ours.

Wastewater treatment systems are the last thing that you should have to worry about.

Now, thanks to Omnipure; you can concentrate on more important things; like your passengers.

Omnipure's space saving, lightweight fully automatic units serve the purpose with trouble-free performance.

With our revolutionary electrocatalytic process, it now takes just seconds to produce a quality, odor free effluent, acceptable in any port. There's no chemical additives, no sludge removal and virtually no maintenance.

With models to accommodate up to 4,000 people, Omnipure can pro-

vide the correct configuration for your vessel's requirements.

For more information, write for a FREE product brochure or contact us for your nearest EES Corporation representative.

Wastewater Treatment...
Our problem, not yours.



EUTECH

EES Corporation

An ELTECH Systems Company
12850 Bournewood Drive
Sugar Land, Texas 77478
(713) 240-6770
Telex # 795459
FAX: (713) 240-6762

OMNIPURE

WASTEWATER TREATMENT
Sales and service centers located in most major parts of the world.

Circle 216 on Reader Service Card

JUDGE US BY THE COMPANIES WE KEEP

SULZER

NAPIER TURBOCHARGERS

Waukesha

MESSER



MAK

SEMT PIELSTICK

Fairbanks Morse

AKASAKA DIESELS

MAN B&W

KOBE DIESEL

MITSUBISHI U.E.

YANMAR

ISOTTA FRASCHINI, S.p.A.

GOTAVERKEN

BERGEN DIESEL

WARTSILA

TCU TURBOCHARGERS



GOLTENS

THE DIESEL REPAIR EXPERTS.

GOLTEN MARINE CO. INC.

HEADQUARTERS: 160 Van Brunt St.,
Brooklyn, NY 11231 Phone: (718) 855-7200
Telex: 22-2916 Cable: GOLTENS

BRANCHES: Wilmington, Calif. • Miami, Fla.
Fairhaven, Mass. • Rotterdam, Holland • Kowloon, Hong Kong
Oslo, Norway • Singapore



Circle 230 on Reader Service Card

'FOWL' WEATHER GOT YOU DOWN?



WHY NOT TRY SUNNY CURACAO.

THE BEST WEATHER.
THE BEST DRYDOCK.
THE BEST CHOICE.

ANY OTHER DRYDOCK
IS FOR THE BIRDS.

CURACAO DRYDOCK CO.

YARD:

P.O. BOX 3012

CURACAO,

NETHERLANDS ANTILLES

TEL: (599-9) 78333

TLX: 1107, 3443 CDM NA

FAX: (599-9) 79950

U.S./CANADIAN AGENT:

CURACAO DRYDOCK (USA) INC.

26 BROADWAY

NEW YORK, N.Y. 10004

TEL: (212) 943-0122

TLX: 420355, 640394

FAX: (212) 422-1102

Circle 229 on Reader Service Card

Reader Service Numbers For Manufacturers In This Review

Manufacturers **Reader Service #**

Engines

Alco/Bombardier	66
Allison Gas Turbines	67
Caterpillar	68
Colt-Pielstick (FM)	69
Combustion Engineering	70
Cummins	71
Detroit Diesel	72
Deutz MWM	73
EMD (GM)	74
GE Gas Turbines	75
GE Steam Turbines	76
GMT	77
Isotta Fraschini	78
Krupp MaK	79
MAN B&W	80
MTU	81
Rolls-Royce	82
Stewart & Stevenson	83
Sulzer	84
Volvo Penta	85
Westinghouse Steam Turbines	86

Propellers & Thrusters

Bird-Johnson	87
KaMeWa	88
Lips	89
Michigan Wheel	90
Omnithruster	91
Record	92
Riva Calzoni	93
Schaffran	94
Schottel	95
Sulzer-Escher Wyss	96
Ulstein	97
Voith-Schneider	98

Gears

Cincinnati Gear	99
Falk	1
GE Gear	2
Renk	3
Twin Disc	4
Western Gear	5
Westinghouse Gear	6
ZF	7

Maritime Reporter/Engineering News

Major Navy Contracts

(continued)

Tukwila, Wash., was awarded a **\$7,455,559** firm-fixed-rate, indefinite quantity, indefinite delivery contract for intermodal transportation of containerized and bulkbreak cargo between Seattle, Wash., and the Naval Air Station, Adak, Alaska. The contract performance period is 24 months and will begin July 1, 1988, and end June 30, 1990. The Military Sealift Command, Washington, D.C., is the contracting authority (N00033-88-D-8503).

Amclyde Engineering Products, Saint Paul, Minn., was awarded a **\$9,281,467** firm-fixed-price contract to construct a refueling crane at Portsmouth Naval Shipyard, Kittery, Maine. Work is expected to be completed in February 1991. The Naval Facilities Engineering Command, Northern Division, Philadelphia, Pa., is the contracting activity (N62472-85-C-1460).

Charleston Naval Shipyard, Charleston, S.C., was the successful offeror in a competitive program between public and private sector shipyards for the Extended Refit Period (ERP) for USS James Madison (SSBN-627). The ERP is being assigned on a firm-fixed-price basis. The price for this effort is **\$10,128,650**. Work will be completed in December 1989. The Naval Sea Systems Command, Washington, D.C., is the requiring activity.

June 22

General Electric Company, Government Electronic Systems Division, Syracuse, N.Y., was awarded a **\$33,300,000** modification to a previously awarded cost-plus-incentive-fee contract for MK-116 Mod 7 antisubmarine warfare control system computer software for DDG-52, DDG-53, DDG-54, CG-65, CG-66, CG-67 and CG-68. Work will be completed in February 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-84-C-6362).

Sealift Tankships Incorporated, Oyster Bay, N.Y., was awarded a **\$24,443,030** firm-fixed-price contract including options for the time charter of the MV Noble Star, a multipurpose breakbulk ship. The contract performance period is 17 months with two 17-month options. The ship will be delivered at a mutually agreeable date between January 9th and 13th, 1989. The Military Sealift Command, Washington, D.C., is the contracting authority (N00033-88-R-1102).

June 27

Unisys Corporation, Great Neck, N.Y., was awarded a **\$9,288,170** fixed-price contract for refurbishment services for AN/SPG-55B radars. Work will be completed in May 1989. The Naval Sea Systems Command, Washington, D.C., is the contracting authority (N000024-88-C-5648).

Martin Marietta Aero and Naval Systems, Baltimore, Maryland, was awarded a **\$6,650,000** modification to a previously awarded cost-plus-fixed-fee contract for technical engineering services in support of the MK-41 vertical launching system. Work will be completed October 31, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-5417).

June 30

Newport News Shipbuilding and Dry Dock Company, Newport News, Va., was awarded a **\$2,949,631,605** modification to existing contract N00024-88-C-2055 to provide for the construction of CVN-74 and CVN-75. The new total target price of this fixed-price incentive contract is **\$3,674,000,000**. Work will be completed in June 1998. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a **\$347,400,000** fixed-price-incentive contract for one SSN-688 class submarine. Work will be completed in April 1993. The

Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2196).

The General Instrument Corporation, Government Systems Division, N.Y., New York, is being awarded a **\$3,600,000** contract to upgrade two existing sonar systems aboard USNS Silas Bent and USNS Kane. The contract also provides for a shore-based system for improved communications and data processing. Work will be performed in Westwood, Mass. (80 percent), and Narragansett, R.I. (20 percent), and is expected to be completed in 1989. The

Office of Naval Research, Washington, D.C., is the contracting activity (N00014-88-C-6020).


July 1

General Electric Company, Syracuse, N.Y., was awarded a **\$278,161,093** firm-fixed-price contract for 14 AN/SQQ-89 surface ASW combat systems for CG, DD and FFG class ships. Work will be performed in Syracuse, N.Y. (56 percent); Portsmouth, R.I. (13 percent); Glen Burnie, Md. (12 percent); Baltimore, Md. (5 percent); Moorestown, N.J. (5 percent); Minneapolis, Minn.

(5 percent); Glendale, Calif. (2 percent); and Boston, Mass. (2 percent), and is expected to be completed in December 1991. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-6219).

General Dynamics Corporation, Valley Systems Division, Rancho Cucamonga, Calif., was awarded a **\$40,838,750** modification to a previously awarded cost-plus-incentive-fee contract for final acceptance

(continued)



The Engine.

KRUPP Mak Diesel, Inc. (Toronto)
226 Britannia Road East
Mississauga, Ontario
L47 1S6

Telephone No. (416) 890-0955
Telefax No. (416) 890-0895
Telex No. 06-965587

Krupp Mak Diesel, Inc. (Chicago)
323 Vesta Court
Ridewood, New Jersey 07450
U.S.A.

Telephone No. (201) 445-6676
Telefax No. (201) 445-2994

Circle 273 on Reader Service Card →

Major Navy Contracts

(continued)

test equipment for the rolling airframe missile. Work will be completed November 30, 1990. This contract combines purchases for the U.S. Navy (50 percent) and for the Federal Republic of Germany (50 percent) under the existing Memorandum of Understanding. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-85-C-5350).

Loral Systems Group, Goodyear Aerospace Division, Akron, Ohio, was awarded a \$21,626,225 modification to a previously awarded firm-fixed-price contract for ordnance alteration (ORDALT) Mod 0/1 kits for MK 60 CAPTOR underwater mines. Work will be completed in December 1990. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-6097).

Martin Marietta Aero and Naval Systems, Baltimore, Md., was awarded a \$3,367,884 modification to a previously awarded cost-plus-fixed-fee contract for materials and services for the MK 41 Vertical Launching System (VLS) life cycle support facility. Work will be performed in Ventura, Calif., and is expected to be completed September 30, 1988. The Naval Sea Systems Com-

mand, Washington, D.C., is the contracting activity (N00024-85-5526).

FMC Corporation, Naval Systems Division, Minneapolis, Minn., was awarded a \$5,049,986 modification to a previously awarded cost-plus-fixed-fee contract for material and engineering services in support of the MK 41 Vertical Launch System. Work will be completed September 30, 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-86-C-5442).

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was awarded a \$41,970,000 cost-plus-fixed-fee contract for design agent services for SSBNs 738, 739 and 740. Work will be completed in December 1993. The Naval Sea Systems Command, Washington, D.C., is the contracting activity (N00024-88-C-2148).

July 6

National Projects Incorporated, Boise, Idaho, was awarded a \$33,012,777 firm-fixed-price contract for the construction of a ship support complex at the Naval Station, Pascagoula, Miss. Work is expected to be completed in September 1990. The Naval Facilities Engineering Command, Southern Division, Charleston, S.C., is the contracting activity (N62467-86-C-0292).

July 7

Vessel Charters Incorporated, New York,

N.Y., was awarded a \$22,237,611 firm-fixed-price contract with options for the time charter of SS American Trojan. The ship will be used as part of the Navy's Afloat Prepositioning Force. The contract period is 17 months with two 17-month options and will be delivered between January 9th and 13th, 1989. The Military Sealift Command, Washington, D.C., is the contracting authority (N00033-88-C-1142).

Ryan Marine Delivers Towed Array Barge To U.S. Navy

Ryan Marine, Inc. of Port Bienville, Miss., recently delivered to the U.S. Navy a Towed Array Support Barge to be utilized at the Trident Refit facility at Kingsbay, Ga.

Ryan Marine has been in operation for over two years in the Pearlington, Miss., area performing repair work on both government and commercial vessels.

The Navy-Trident project represents the first government new construction job performed by Ryan.

The 40-acre shipyard is conveniently located adjacent to the Gulf Intracoastal Waterway as well as being in close proximity to both the Port of New Orleans and the Port of Gulfport, Miss.

For free literature giving full details on Ryan Marine,

Circle 43 on Reader Service Card

U.S. Navy Torpedo Boats To Use Omnithruster Hydrojet Systems

According to Omnithruster Inc. president **Charles M. Aker**, three new U.S. Navy YTT Class torpedo and mine testing vessels will be equipped with Omnithruster hydrojet maneuvering and propulsion systems.

McDermott Shipyard, Amelia, La., has contracted for Omnithruster Mark II hydrojet Model JT700TDs for YTTs -9, -10 and -11, which are under construction at the yard. The 350-hp units are equipped

PHOENIX LAUNCHES NEW LINE-UP WITH RUSSELLSTOLL LIGHTS.

Thanks to the acquisition of **Russellstoll** marine and industrial lights, Phoenix can now equip any vessel with a full line of rugged, weather-resistant deck and search lighting. As well as an excellent selection of interior operational lighting.

So now we can outfit your vessel with interior and exterior fluorescent, some with hazardous and explosion proof ratings, plus navigation, HID and exterior quartz lights. All thoroughly tested to withstand a punishing life at sea.

And all from Phoenix, a company with a shining record on land for fast service and dependable delivery

From fishing boats to aircraft carriers, Phoenix has the light that's right for your vessel. For a **free brochure**, contact: PHOENIX PRODUCTS CO., 4785 N. 27th St., Milwaukee, WI 53209; Phone 414-445-4100; TELEX 910-262-3389; FAX 414-445-0289.

PHOENIX

PX-6-7



Circle 330 on Reader Service Card

SAFEGUARD™ Marine Fenders

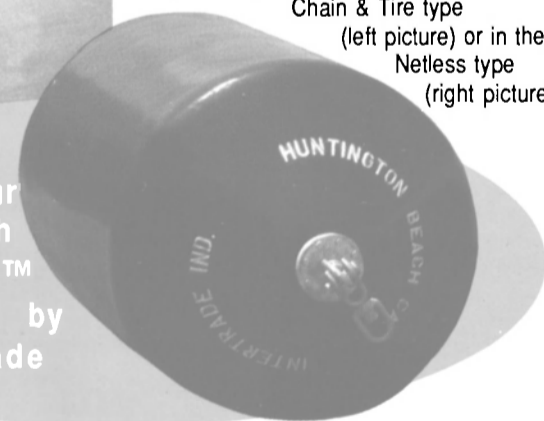
Ten years of Marine Fender experience – protecting Naval, and Commercial Vessels as well as Piers, from collision damage.

InterTrade serves the Navy's needs whether it requires small (5" x 24") Air-Filled, Vinyl, Boat Fenders (MIL-F-23788-SHIPS), small shipboard Foam-Filled Fenders (i.e. NSN 1H 2040-00-807-4197 size 24" x 36") or large Foam-Filled Fenders (MIL-F-29248 YD) in sizes up to 10' x 20' and any size in between.

SAFEGUARD™ Fenders are high energy absorbing elastomeric marine systems, used for protection of ships, harbor craft, wharves and piers from damage between interface of vessel or to pier. they may be furnished in either Chain & Tire type

(left picture) or in the Netless type (right picture)

Safeguard your Investment with SAFEGUARD™ Marine Fenders by InterTrade



InterTrade

MARINE PRODUCTS DIVISION TELEX 277709 / TIUR • FAX (714) 894-3927

15301 Transistor Lane • Huntington Beach, California 92649 • (714) 894-5566

These products are available in various degrees of stiffness and sizes.

SAFEGUARD™ Fenders are in use around the U.S. and abroad at various U.S. Navy Bases, as well as by shipyards, towing companies, municipal harbors and ship operators.

Circle 197 on Reader Service Card

Maritime Reporter/Engineering News

with a microprocessor-based 1200A control system.

YTTs, which have a length of 185 feet, 45-foot beam and draft of 12 feet, are used to test underwater ordnance at the Naval Undersea Test Facilities and recover the spent torpedoes for further testing.

"A prime necessity for this application is precise maneuvering, position keeping and automatic heading control," stated Mr. Aker.

As an industry leader, Omnithruster has created a number of innovative and future-oriented designs and products to improve the overall efficiency and reliability of marine transportation, including lower-acoustical noise systems for both military and non-tactical commercial vessels. Omnithruster also produces specialized ice management systems for polar class high-performance ships.

Omnithruster hydrojet maneuvering and propulsion systems operate efficiently whether the vessel is in light ship conditions or deep-drafted and while underway or when station-keeping. Systems are currently installed in many vessel types from tugs, barges and fishing boats to icebreakers, large cruise liners, minesweepers, tankers, research, seismic, and hydrographic vessels.

For free literature detailing the features and applications of Omnithruster systems,

Circle 12 on Reader Service Card

Moss Point Delivers Third Of Four Logistic Support Vessels To U.S. Army

Moss Point Marine, Inc., Escatawpa, Miss., has delivered the General Brehon B. Somervell, the third of four 273-foot logistic support vessels (LSV) being built for the U.S. Army in a \$40.8-million contract.

The Army contract is being administered by the U.S. Navy and its Supervisor of Shipbuilding, Conversion, and Repair (SUPSHIPS) in Pascagoula, Miss.

Speaking at the ship's christening, **James B. Emahiser**, the Army's first program executive officer for troop support said: "This new generation of logistics support vessel will enable the Army to fulfill its logistics-over-the-shore (LOTS) mission by providing a ship which is not dependent upon external cranes nor port facilities. ... Its ramps, fore and aft, will provide drive-through capabilities, facilitating the transport of containerized, bulkbreak, and roll-on/roll-off cargoes from ship-to-shore at ... the world's ports and unimproved beaches."

The all-steel Somervell is 273 feet long, with a 60-foot beam, and 16-foot 5-inch depth. Her two General Motors EMD-16-645-E2 diesel engines can propel the ship at approximately 12 knots, and she can transport between 900 and 2,000 short tons of cargo with a range of over 5,500 nautical miles. Crews will consist of six officers and 24 enlisted men.

The supply ship is named in honor of Army General **Brehon B.**

Somervell, who was head of the Army Service Forces during World War II which provided most of the logistics support for troops overseas. While on detached service, he served as chief of the Works Progress Administration (WPA) in New York City, and supervised various projects, including the construction of La Guardia Airport. Another of his construction projects included the building of the Pentagon in 1940.

Mr. **Emahiser** said the General

Somervell will be assigned to the 604th Transportation Detachment, Washington Army National Guard in Tacoma. The ship will be used throughout the Northwest Pacific to support the 9th Infantry Division (motorized), I Corps, and the Washington and Alaskan National Guard. The vessel will also participate in joint exercises with British and Canadian forces.

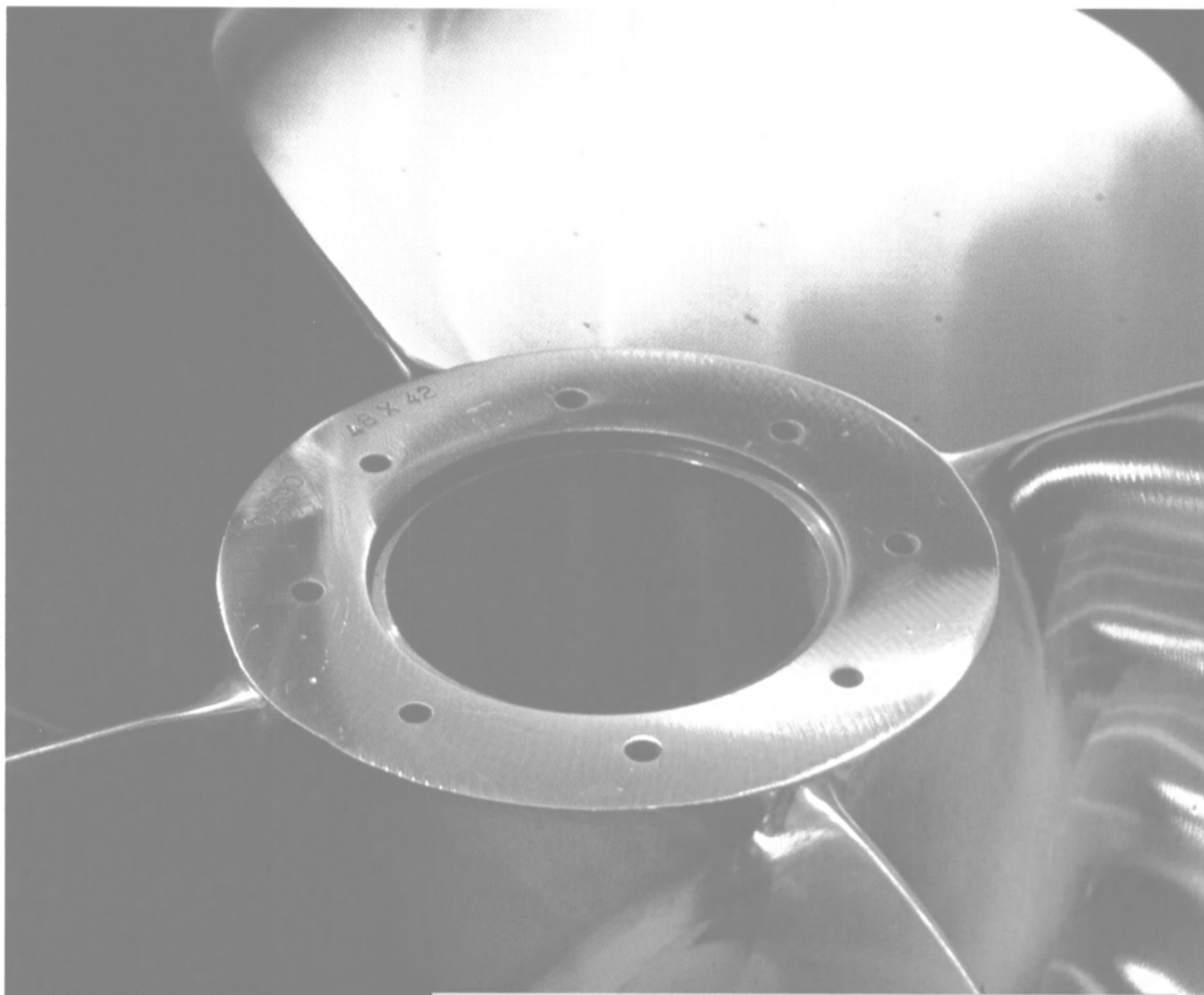
Moss Point Marine, Inc. is part of the Trinity Marine Group which is

owned by Trinity Industries, Inc. of Dallas, Texas. Other members of the shipbuilding group are Halter Marine, Inc., with shipyards in Moss Point, Miss., and Lockport, La., Equitable Shipyards, Inc., with facilities in New Orleans, and Madisonville, La., and Gretna Machine and Iron Works, Inc., Harvey, La.

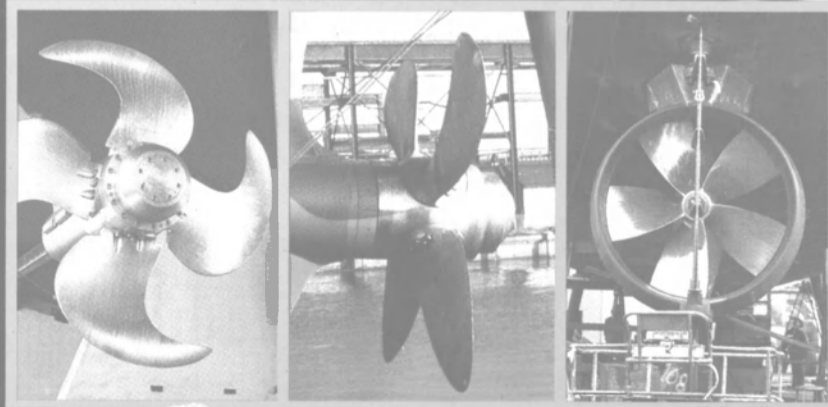
For free literature giving full information of the facilities and capabilities of Moss Point Marine,

Circle 57 on Reader Service Card

YOUR BEST SOURCE



Bird-Johnson Company is your best source for *any propeller*—fixed pitch or controllable pitch. We manufacture propeller systems of *any size and any horsepower*—designed to meet your individual requirements. New construction or retrofit, no other U.S. manufacturer offers you the experience, skill, quality and product support that is a part of every Bird-Johnson propeller. Bird-Johnson—the best source for the best propellers.



BIRD-JOHNSON COMPANY



110 Norfolk Street • Walpole, MA 02081 • 617/668-9610 • Telex 6817294 • Telefax 617/668-5638 • Other operations in Seattle, WA: 206/782-9190 & Pascagoula, MS: 601/762-0728

Circle 131 on Reader Service Card



ADVERTISE TO THOUSANDS MORE BUYERS—PLUS—

**MARITIME RE
BIG
ANNU
NOVEME
ISS**

**WITH EXTRA BONUS
AT FOUR BIG**

IN NEW YORK

**7th S.N.A.M.E. IN
MARITIME EX**

S.N.A.M.E. ANNUAL SYMPOSIUM & SHOW

PLUS

IN NEW YORK

THE WORK I

"OUTSTANDING WORKBOAT"

**PLUS
IN SEATTLE AT
PACIFIC MARINE
EXPO
November 17-19**

WITH **ONE** ADVERTISEMENT . . . AT **ONE** COST . . . you **can be** there, selling at **four** important marine industry events in November.

Plus . . . only Maritime Reporter backs your advertising with the sales power of the **world's largest total marine industry circulation.**

With features covering both the deep draft and shallow draft sectors of the market . . . and the four-show extra distribution . . . this November '88 Annual issue will be the best read in years . . . and the most productive for advertisers.

The S.N.A.M.E. Annual Meeting and Show in New York (Society of

**RESERVE ADVERTISING SPACE NOW . . .
TAKE ADVANTAGE OF THE TREMENDOUS READER IN**

ET BONUS DISTRIBUTION AT FOUR BIG SHOWS IN

PORTER'S

G

JAL
BER '88
UE

DISTRIBUTION
SHOWS

NEW YORK CITY

INTERNATIONAL
EXHIBITION

FEATURE ARTICLE (November 9-12)

NEW

ORLEANS

BOAT SHOW

FEATURE ARTICLE

PLUS

IN NEWFOUNDLAND AT

WORLD SYMPOSIUM ON FISHING
GEAR AND FISHING VESSEL DESIGN

November 21-24

Naval Architects and Marine Engineers) has always been a premier event... for decades, one of the world's most important industry meetings.

The "Outstanding Workboats of 1988" feature article... with extra distribution in New Orleans, at Pacific Marine Expo in Seattle (workboats and commercial fishing) and at the Fishing Symposium in Newfoundland... adds an extra shallow-draft dimension to this year's November Annual.

Only Maritime Reporter will give your advertising **maximum** exposure in November... for **maximum sales results** for you.

INTEREST THIS NOVEMBER SPECIAL WILL GENERATE

Advertising Closing Date for November is October 5.

ONLY
MARITIME REPORTER
GIVES YOUR ADVERTISING
THESE POWERFUL
SALES-BUILDING
ADVANTAGES

- **WORLD'S LARGEST** TOTAL MARINE INDUSTRY CIRCULATION
- **U.S. CIRCULATION** THOUSANDS LARGER THAN ANY OTHER MARINE MAGAZINE
- **THOUSANDS** MORE BUYING INFLUENCE READERS
- **THOUSANDS** MORE U.S. NAVY BUYERS
- **"NAVY TECHNOLOGY & SHIPBUILDING"** SIX SPECIAL PULL-OUT MAGAZINE SUPPLEMENTS
- **100% REQUESTED CIRCULATION** ...in writing... by each individual reader
- **100% ADDRESSED TO INDIVIDUAL PEOPLE** ...by name and title
- **BEST READ AND MOST WANTED**—MR is asked for, requested, by thousands more marine industry readers than other marine magazine in the world.
- **UNEQUALLED PASS-ALONG READERSHIP** ...5.5 readers per copy... over 138,000 monthly readership.

**MOST SALES LEADS
FOR ADVERTISERS**

Advertisers report MARITIME REPORTER produces more sales leads than any other marine magazine in the entire world... two times to five times more sales leads than the next nearest marine publication.

MARITIME
REPORTER
AND
ENGINEERING NEWS

MARITIME REPORTER/Engineering News
118 East 25th Street, New York, NY 10010
(212) 477-6700

ITT TELEX: 424768 MARINTI
TELEFAX: (212) 254-6271

THE ADVERTISING LEADER in 1987, a larger number of advertisers placed more pages of advertising in Maritime Reporter than in the No. 2 magazine.



Harold M. Thibodeaux (left), president, Con-Tech Power Systems, Inc., and Gerry Thomas, sales engineer, Siemens Energy & Automation, Inc., dockside of the U.S. Army's LSV-4, built by Moss Point Marine, Inc., New Orleans, La.

Con-Tech Supplies Siemens Electrical Control Components For Logistic Support Vessels

Con-Tech Power Systems of Pearlington, Miss., marked a significant milestone, when it was selected to supply the entire list of electrical control components required for the Logistic Support Vessel (LSV) construction program at Moss Point Marine, Inc., New Orleans, La.

The selection of Con-Tech as the sole supplier of the entire electrical component package is significant because it is rare that one manufacturer produces the wide variety of controls necessary to outfit a ship of an LSV's size, 274 feet overall length, and then be able to supply the equipment at a competitive price.

Similar in design to World War II landing craft, LSVs have RO/RO cargo capability with a wide variety of systems powered and operated electrically—from the bow loading

ramp to the steering gear at the stern.

Michael Roberts, president of MTR Design Consultants, Metairie, La., was assigned the critical job of designing the major electrical and control systems on board the LSVs. Mr. Roberts put together a package consisting of the electrical I-inline diagrams and load specifications for the main and auxiliary generators, electrical distribution panels and the various horsepower ratings of the servo control motors on the board the vessel. The package was then sent out for bids to certain suppliers who are familiar with this kind of project. After reviewing the bids, Moss Point and MTR selected Con-Tech.

"When we reviewed the bids," said Mr. Roberts, "we decided to go with Con-Tech because they of-

fered the low bid and all the switching, distribution and control components were specified from a single, well-known manufacturer—Siemens."

Harold Thibodeaux, president of Con-Tech, said, "Working with MTR to develop the necessary circuitry and controls diagrams came first. The next step was to procure the equipment from Siemens, then assemble the equipment within our facility. We then apply our expertise and technology to the already existing Siemens technology and put together a marine package."

Con-Tech was contracted to develop and supply materials and equipment in three general categories—a ship service switchboard design, a complete listing of components, as well as the components themselves.

Generator control consists of a main generator motor control panel with a manual paralleling capability, and a distribution switchboard with over 40 molded case circuit breakers. A separate control panel and switchboard for the emergency generator was also constructed by Con-Tech.

A five-section motor control center handles power and reduced-voltage distribution to the various individual motor starter controls. Approximately 20 reduced-voltage, single- and three-phase starters activate the steering gear, ventilation equipment, air compressors and many other systems on board the vessels.

Mr. Thibodeaux said the success of this project was due in part to the benefits realized from sourcing controls from a single supplier. "First of all, our bid situation was greatly enhanced because we were able to source from one supplier. Secondly, the cooperation from Gerry Thomas, Siemens sales engineer, also went a long way in pro-

viding us with the numbers we needed to win the contract."

For free literature detailing the full line of Siemens electrical control components offered by Con-Tech Power Systems,

Circle 108 on Reader Service Card

Pacific Ship Awarded Maintenance Contract For Aircraft Carriers

Pacific Ship Repair & Fabrication, Inc., a San Diego ship repair company, has been awarded a one-year contract to provide maintenance, upkeep and repair for aircraft carriers homeported in San Diego, Calif.

The indefinite quality contract will initially be funded by the Naval Sea Systems Command for \$1,416,429, which is 5 percent of the firm's winning proposal price of \$28,328,585.

Technology Applications Awarded \$10-Million HM&E Contract

Technology Applications, Inc. (TAI), Norfolk, Va., a professional and technical services firm, has been awarded a \$10-million, three-year contract by the Naval Supply Center in Norfolk to provide engineering and technical support services for Hull, Mechanical, and Electrical (HM&E) systems/equipment on Atlantic Fleet ships for the Naval Sea Support Center, Atlantic (CENLANT). TAI's Engineering and Industrial Support Division has provided similar services to the Navy since 1985.

GEARS

HIGH PERFORMANCE, HARDENED AND PRECISION GROUND

Custom designed, manufactured and tested drives offer:

- High power density
- Smaller and lighter than conventional systems
- Low noise signatures
- Reduced structureborne vibration

Epicyclic and parallel shaft drive systems using our high performance gears are in daily use throughout the world, above and below the ocean surfaces.

For more information about high performance gears, just ask...

The **Cincinnati Gear** Company

5657 Wooster Pike • Cincinnati, Ohio 45227
513/271-7700 telex 21-4568



Circle 195 on Reader Service Card

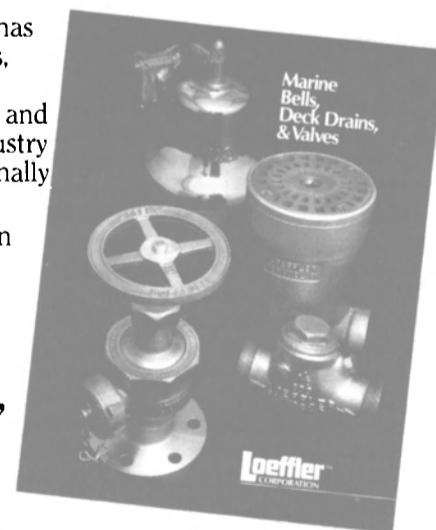
Have you heard?

Loeffler Corporation, which has been supplying *quality* valves, deck drains and bells to the U.S. Navy, U.S. Coast Guard, and the general shipbuilding industry for more than 35 years, has finally let the secret out!

To find out how your ship can benefit, ask for your FREE CATALOG today.

CALL 800-752-7595.

Quality Products,
Fast Delivery,
Good Prices.



LoefflerTM
CORPORATION

FORMERLY LOEFFLER MACHINE CORPORATION

201 East Lincoln Hwy, Penndel, PA 19047-4097
CALL 215-757-2404 • FAX 215-757-7105

Circle 261 on Reader Service Card

Maritime Reporter/Engineering News

ANOTHER POWERFUL IDEA:

**WE'RE USING WASTE
HEAT TO MAKE THE
OCEAN DRINKABLE.**



Reliable Combustion Engineering waste heat recovery boilers are helping the Navy cut the cost of turning seawater into drinking water aboard the *Ticonderoga* (CG-47) class guided missile cruisers.

And that's not all our waste heat recovery boilers do. They generate high-quality saturated steam for ship's heating as well as steam for the galley, laundry and de-icing system.

Annual projected fuel savings for a CG-47 class ship is estimated at more than \$200,000.

(Based on three waste heat boilers per ship, operating an average of 5,000 hours a year, with a steam usage of 7,000 pounds per hour; fuel at \$20 per barrel.)

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

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

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

For more information, write:
Combustion Engineering, Inc.
Dept. CEP1-MR
PO. Box 500
Windsor, CT 06095-6052

COMBUSTION ENGINEERING

Circle 206 on Reader Service Card



THE NEW NAVAL TECHNOLOGY PROGRAM



**A Detailed Guide to \$9.5 Billion in New Annual Sales
for Manufacturers, Engineering Firms and Suppliers**

Price \$550.00 per copy

IMA has just published a 220 page detailed guide to the new Navy technology program. It provides details for 204 specific development areas—giving past and future funding levels, current contractors, future direction, etc. A four year directory of major engineering and development contracts is provided. Names and phone numbers for key technical personnel in 13 Navy activities are included.

1. OVERVIEW—(4 pages)

- Technology Funding Growth
- Range of Technology Development
- Program Structure
- Business Strategy
- Organization of Report

2. SPECIFIC R&D PROGRAM—(151 pages)

- Highlights
- Ship Design:
 - Surface Ship Design & Engineering
 - Ship Subsystem & Component Development
 - Catapults & Weapon Elevators
 - Gas Turbine Technology
 - Electric Drive
 - Electromagnetic Interference (EMI) Control
 - SSN 21 Engineering
 - Attack Submarine Development
 - Trident Submarine Improvement
 - Nuclear Propulsion Technology

Weapons:

- D-5 Ballistic Missile (Trident II)
- Standard Missile (SM-2)
- Tomahawk Cruise Missile
- Air Defense Missiles
- SSN 688 Vertical Launch System
- Sea Lance ASW Standoff Weapon
- Vertical Launch ASROC (VLA)
- MK 48 Advanced Capability Torpedo (ADCAP)
- MD 50 Advanced Lightweight Torpedo
- Acoustic Torpedo Targets
- Mine Development
- Close In Weapon System (CIWS Phalanx gun)

Ship Defensive Systems:

- Electronic Warfare
- Defensive Weapons & Surveillance
- SSBN Survivability
- Ship Combat Survivability
- Mine Countermeasures
- Surface Ship Torpedo Defense
- Submarine Stealth

Sensors And Combat Systems:

- Aegis AAW System
- Search Radar Improvement
- Surface Ship Combat Systems Improvement
- Surface Ship ASW Systems
- ASW Combat System Integration
- Infrared Search & Target Designation System
- Submarine Sonar Development
- AN/BSY-1 Submarine Combat System
- AN/BSY-2 Submarine Combat System
- Attack Submarine Combat System Integration
- Surface Ship Bow Sonar

Area ASW Surveillance:

- Underwater Sound Surveillance Systems
- ASW Surveillance Test and Evaluation
- ASW Data Collection
- Nonacoustic ASW

Command Control & Communication (C³):

- Basic C³ Technology
- Warfare Support Systems
- Tactical Command Systems
- Communications Systems
- C² Reconnaissance/Surveillance Support
- Submarine Communications
- C² Requirements and Integration

Shipboard Computers:

- Enhanced Modular Signal Processor (EMSP)
- Standard Embedded Computer

Basic Research:

- Mathematical and Physical Sciences
- Engineering Sciences
- Environmental Sciences
- Life Sciences
- Other Sciences

Manufacturing Technology:

- Manufacturing Technology Development

Other:

- Special Naval Warfare Equipment
- Sealift Support Equipment
- Surface Warfare Training Devices
- Training & Test Range Systems
- Weapons Security
- Environmental Protection

3. MAJOR NAVY DEVELOPMENT AND ENGINEERING CONTRACTS—(43 pages)

4. KEY PERSONNEL—(24 pages)

- Office of Naval Research
- Naval Research Laboratory
- Office of Naval Technology
- David Taylor Naval Ship R&D Center
- Naval Undersea Warfare Engineering Station
- Naval Oceanographic Office
- Naval Coastal Systems Center
- Naval Ocean Systems Center
- Space & Naval Warfare Systems Command
- Naval Underwater Systems Center
- Naval Surface Weapons Center
- Naval Weapons Supply Center
- Naval Sea Systems Commands

To order please call or write:

**International Maritime Associates, Inc.—
835 New Hampshire Ave., N.W.
Washington, DC 20037**

Telephone; (202) 333-8501—Telex: 64325 IMA—Telefax: (202) 333-8504.

Mackay Communications Wins U.S. Navy YTT-9 Electronic Package

Mackay Communications, Inc. of Raleigh, N.C., has been awarded a subcontract to supply the electronic equipment and perform a turn-key installation on the U.S. Navy Torpedo Test Craft (YTT-9) to be delivered to the Naval Undersea Weapons Engineering Station.

Mackay has contracted with McDermott Inc., shipyard operations of Amelia, La., to provide and install the communication/navigation/positioning system. They will also perform a complete EMI survey and control plan.

Mackay's Military Maintenance and Repair Group, based in Jacksonville, Fla., will be the installing activity, managed from the Elizabeth, N.J., headquarters.

For free literature giving information on Mackay Communications,

Circle 44 on Reader Service Card

Blohm & Voss Yard Wins \$26.4-Million Contract To Lengthen Ferry

The Hamburg yard of Blohm & Voss has been awarded a \$26.4-million contract to lengthen and convert the 6,800-grt ferry Peter Wessel for Larvik Line.

Under the contract, Blohm & Voss will lengthen the ferry by about 74 feet, as well as modernize the entire vessel.

Jamesbury Corp. Acquires Hammel Dahl, Inc. —Literature Available

Jamesbury Corp. recently announced that it has purchased all the outstanding shares of Hammel Dahl, Inc., of Warwick, R.I. Hammel Dahl is a manufacturer of process control valves for the chemical processing, power, air separation, and related industries. It employs approximately 130 people.

In a joint statement, officials of both companies stated that Jamesbury, which has owned 30 percent of the shares in Hammel Dahl for the past five years, plans to expand the business through its worldwide sales and marketing network. The acquisition also broadens the product lines Jamesbury presently offers to its diverse markets.

A Jamesbury spokesman stated that the acquisition is not expected to have any impact on employment levels in its Worcester and Shrewsbury plants.

Jamesbury, a subsidiary of Combustion Engineering, Inc. of Stamford, Conn., is a leading manufacturer of valves, actuators and associated controls.

For more information and free literature,

Circle 117 on Reader Service Card

Circle 295 on Reader Service Card →

MMA Seeks Executive Secretary

The Marine Machinery Association (MMA), Washington, D.C., has announced that the organization has reluctantly accepted the resignation of Mr. **Dan Marangiello**, executive director. Mr. **Marangiello** is leaving MMA to devote full time to his own business interests. He was the founding executive

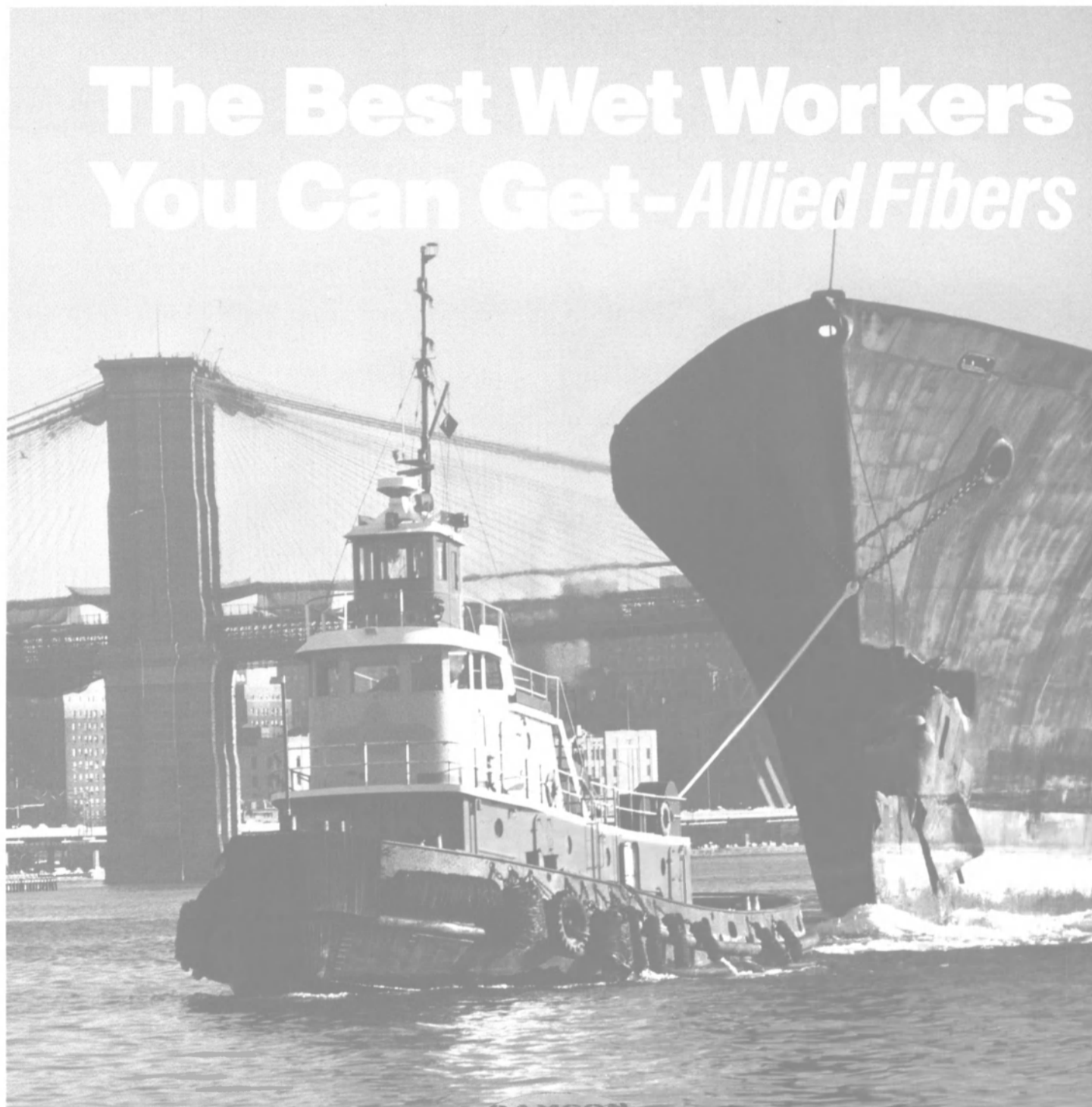
director of MMA and an officer since the organization's inception in 1984.

The MMA membership now consists of 70 of the world's leading and largest manufacturers of marine equipment. All are major long-time suppliers to the U.S. Navy, as well as the Coast Guard, Military Sealift Command, the Corps of Engineers and the commercial marine sector.

The group works closely with the Navy to insure the continuing sup-

ply of dependable, quality equipment and spare parts, and to effect economies and help resolve supply, maintenance and repair problems whenever possible.

Those interested in the part-time position of executive secretary of the MMA or in more information regarding membership in the MMA may contact: Marine Machinery Association, 1700 K Street, N.W., Suite 903, Washington, D.C. 20006.



Marine ropes get wet. It's expected. And if they lose some strength underwater, well that's expected too.

What's not expected is that ropes manufactured with Allied Fibers keep working strong *even* when soaking wet.

Select **Caprolan® 2000 SeaGard™ Nylon**—advanced nylon with the proprietary SeaGard™ finish that offers optimum wet strength. Choose new improved, lightweight, high strength **A.C.E. polyester with Seagard™** for higher abrasion resistance than ever before.



Allied Signal wishes to acknowledge the leading manufacturers that utilize these Allied Fibers in their rope manufacturing.

New England Ropes
Samson Ocean Systems, Inc.
Yale Cordage Inc.

For optimum marine performance characteristics, select **Spectra™**—lighter than water, ten times stronger than steel with the lowest moisture absorption and highest abrasion resistance of any high modulus fiber.

Allied Fibers stand up to the most punishing abuse in every marine rope application: fishing, towing, mooring, docking and anchoring.

Expect the unexpected from Allied Fibers—the best wet workers you can get.

**Allied
Signal**

Allied Fibers

New Product Tanker Group Formed By Norwegians

A new product tanker shipping group has been formed in Norway by the shipping company Erling H. Samuelsen Rederi A/S of Koppang, and Oslo-based Fearnley Finans (Prosjekt) A/S.

Two ships have been purchased by the group, the Wind Spirit and Wind Splendour, for a price of \$11

million to \$13 million each. The vessels were built in Finland in 1977.

The new shipping group will be managed by Wind Tankers A/S. Wind Product Tankers A/S, a new operating company, will be responsible for marketing the two vessels.

The new group plans to have as many as eight product tankers in its fleet by the end of this year. As part of the Norwegian International Ships Registry, the first two ships will fly the Norwegian flag.



Here's how SWAGELOK® Tube Fittings reduce costs in your hydraulic system

SWAGELOK Tube Fittings help you fight costs five ways by reducing your...

- **Hydraulic Fluid Index.** Reliable containment at every connection stops leakage.
- **System Construction Time.** Easy installation, with fewer connections throughout the system, lets your fitters move fast.
- **System Test Time.** Gageability assures sufficient pull-up, cutting time spent looking for leakers.
- **Maintenance Time.** Re-makeability speeds component replacement.
- **Repair Costs.** Resistance to hydraulic surges and vibration lowers the risk of blowout and fatigue failure.

SWAGELOK Tube Fittings are stocked by Authorized Sales and Service Representatives... always available during construction, operation and overhaul of your system.



SWAGELOK
TUBE FITTINGS

SWAGELOK Co.
Solon, Ohio 44139
SWAGELOK Canada Ltd., Ontario

© 1988 SWAGELOK Co., all rights reserved C-811a

Circle 296 on Reader Service Card

ELECTRONICS UPDATE

Sperry Marine's New Rascar Wins Wide Type-Approval Acceptance

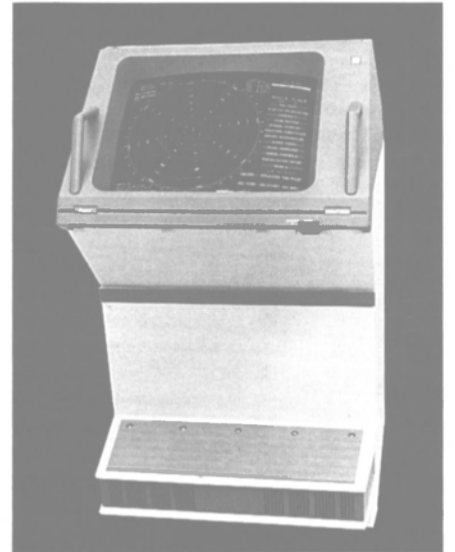
Sperry Marine's new Rascar series of rasterscan radar/ARPAs with touchscreen control have received type-approval certification from regulatory agencies in the United Kingdom (DOT), West Germany (DHI), the Netherlands (PTT), and the U.S. (FCC), Rascar product marketing manager **Bruce Angus** recently announced.

In addition to the main Rascar systems, the "soft" Interswitch control and the flexible Adaptive interface have also been type-approved. The latter permits a Rascar display with touchscreen control to operate as a stand-alone ARPA display when interfaced with another manufacturer's radar.

Sperry Marine, a subsidiary of Newport News Shipbuilding Company, has shipped more than 100 Rascar systems to date and, with an additional order-book in excess of 100 systems, the widest acceptance by users and regulatory agencies is being realized.

Rascar is currently undergoing type-approval tests in Italy (RINA), Poland (PRS), East Germany (DRSK), Romania (RNR), and Japan (JG). Further Rascar type-approvals are planned to suit the schedules of other national authorities.

Mr. Angus commented that the unsolicited favorable reaction to



According to Rascar product marketing manager **Bruce Angus**, Sperry Marine's new Rascar not only meets customers' wishes for aesthetics and ergonomics, it provides one of the best overall performances of any commercial radar available.

Rascar by approval agencies and by first-time Rascar users has demonstrated how simple it is to learn and operate this new radar with ARPA. For further information and free literature on Sperry Marine's new Rascar series of rasterscan radar/ARPAs,

Circle 103 on Reader Service Card

USCG Opens Door To Commercial Emergency Towing

In an action not necessarily connected with the recent Public Hearings on emergency towing, the Coast Guard's publishing of a Final Rule, effective September 15, 1988, states that anyone wanting to engage in towing of disabled boats for financial consideration will be able to do so. The only requirement is to have a Coast Guard license of any level, and an endorsement on that license for "Assistance Towing."

"Assistance Towing" is defined in the Code of Federal Regulations as "towing a disabled vessel for consideration."

This could mean using your own boat to bring in a disabled sailboat stuck on a sandbar, or a motorboat that ran out of gas, and charging for the service.

To qualify, one must hold a license (motorboat operator, Ocean operator, master or mate) and pass a written examination based on assistance towing safety, equipment and procedures.

In order to meet the demand for this endorsement, Sea School has announced a series of one-day (or

two evening) prep courses to cover this specialized towing exam. For more information on this Final Rule, call the License Information Hotline toll free at (1-800) 237-8663.

OMSA Chief Mayberry To Retire In October

Capt. **William Mayberry**, who directed the Offshore Marine Service Association (OMSA) for nearly 15 years, will retire from his post on October 31.

Richard Currence, chairman of the board of the national trade organization of offshore vessel operators and suppliers, said a search has begun for a successor to Captain **Mayberry**.

Captain **Mayberry** joined OMSA as its first executive director after having served 26 years in the U.S. Coast Guard. Last year, the board of directors changed his title to president.

OMSA promotes the goals and interests of companies providing support to all phases of offshore oil, mineral, construction, and pipelaying industries. Its offices are located at 1440 Canal Street, Suite 1709, New Orleans, La. 70112.

Seebeckwerft Receives \$38.9-Million Order To Build Rail Ferry

Seebeckwerft of Bremerhaven, West Germany, recently received a DM65-million (\$38.9-million) order from the Railship Group to build a 10,000-dwt rail/freight ferry. She is the third ferry of this type to be ordered by Railship from Seebeckwerft over the last few years.

The vessel, the Railship III, which is expected to be delivered in February 1990, will be powered by two Wartsila Diesel 9R46 engines rated at 8,145 kw at 450 rpm and will have two auxiliary 4R32 Wartsila diesel engines which produce 1,620 kw. The ferry will be about 622 feet long, with a molded breadth of 71 feet and service draft of 19 feet. She will be equipped with about 2,000 meters of rail track on three decks and will be of similar design as Railship II, which was built by Seebeckwerft and delivered in 1984 to the Railship Group. The lower decks of the vessel will be designed for carriage of dangerous cargoes.

The ferry will be used for service between Travemunde, West Germany, and Hanko, Finland.

For free literature on the shipbuilding, converting and repairing services of Seebeckwerft,

Circle 115 on Reader Service Card

GE Wins \$32.3-Million Addition To Navy Contract

A \$32.3-million addition to a Navy contract was recently announced by General Electric Co. The original contract was for Trident submarine communications equipment.

Autodata Division Of Acurex Expands Data Acquisition Capabilities

The MDAS 7000 Data Acquisition System, recently acquired by the Autodata Division of Acurex Corporation from TransEra Corporation of Provo, Utah, combines high-speed acquisition rates, large channel capacity, and extensive process analysis capability at an affordable price.

The MDAS 7000 is highly modular and can be configured for almost any application. There are over 30 I/O cards that include standard analog and digital plus anti-aliasing, thermocouple, RTD, bridge, relay outputs and stepper motor control. There are three standard communication interfaces, RS-232, RS-422 and GPIB (IEEE-488).

Using the Motorola 68000 M processor, operating at 10 MHz, and a high-speed D/A converter, scanning speeds of 200,000 samples/sec are possible, with a single channel burst mode of 625,000 samples/second.

The MDAS 7000 offers disk and tape drive options that store acquired data directly in a streaming mode. This allows uninterrupted acquisition of large quantities of data

Circle 304 on Reader Service Card →

at the fastest possible rates. The on-board mass storage of data can be in the form of DOS compatible floppy disks, up to 80 megabytes of hard disk, and/or digital tape. Two MBytes of on-board RAM is also available. The raw or reduced data can be directly sent to a graphic display, plotter or host computer.

A powerful software language, TBASIC, is available to simplify

data manipulation and signal analysis. This special engineering BASIC was developed for MDAS and is especially useful in developing custom application software. TBASIC offers extensive graphic routines and computational capabilities to make easy work of data analysis. TBASIC's integrated GPIB syntax makes intelligent instrument control easy. It also supports all the

popular 3rd party IEEE-488 controller cards.

The addition of this product line expands Autodata's current data acquisition capabilities into industrial testing laboratories as well as automotive, aerospace, and research testing environments.

For additional technical information and free literature,

Circle 116 on Reader Service Card

MARLIN
Ring Laser Inertial Navigator

PERISCOPE

Electronic Warfare System

Token Ring Network Ship Control System

Satcom

Autopilot

APN-59 Radar

RASCAR
Rasterscan Collision Avoidance Radar

Single and Dual Axis Speed Logs

Worldwide Product Support

MK-29 Inertial Navigation System

GPS/BATHAV

MK-37 Gyrocompass

Integrated Bridge

Marine systems technology leader for more than 75 years.

Still leading the way to greater benefits for our customers.

Learn more about our exciting new products and the economic advantages they offer you. Contact your nearest Sperry Marine representative or call us directly.

Sperry MarineTM

Sperry Marine Inc.
Charlottesville, VA 22903
Phone: 804-974-2000
Sperry Marine Inc.

Subsidiary of
Newport News Shipbuilding
A Tenneco Company
Building On QualityTM

TENNECO

Watercom Announces New And Expanded Subscriber Service

Representatives of Waterway Communications Systems, Inc. (Watercom®) and International Telecharge, Inc., Dallas, Texas, recently announced that a contract between the two organizations has been signed. ITI will provide

Watercom telephone subscribers with operator-assisted long distance services.

Watercom is the only direct-dialed Automatic Marine Telephone System (AMTS) serving the inland marine industry. Watercom already provides direct dial telecommunications services to commercial vessels operating along 4,000 miles of inland waterways, including the Ohio, Illinois, and Mis-

issippi rivers and the Gulf Intra-coastal Waterway. Other capabilities of the system include fax transmission and data services.

With the ITI service, Watercom subscribers will now be able to charge calls to all Bell calling cards, VISA, MasterCard, American Express, Discover, Carte Blanche, or Diners Club credit cards or call collect.

Watercom is a registered trade-

mark of Waterway Communications Systems, Inc.

For more information and free literature,

Circle 48 on Reader Service Card

Shipbuilding & Metal Fabrication Conference Set For October 4-5

The Shipbuilding and Metal Fabrication Technology Conference will be held on October 4-5, 1988 at the Radisson Hotel Hampton in Hampton, Va.

The conference, sponsored by the American Welding Society and their Tidewater Section, will focus on new materials and technologies in the shipbuilding and metal fabrication industries.

Geared for design engineers, materials specialists, welding and industrial engineers, tank fabricators, manufacturing supervisors, QA and QC personnel, marine engineers and naval personnel, the conference will address four major areas of change in shipbuilding and metal fabrication technology: new methods of construction/fabrication; new materials in shipbuilding and fabrication; process and control innovations in construction and fabrication; and future directions of welding and metal fabrication markets worldwide.

For further information, contact: the AWS Education Department, American Welding Society, 550 N.W. LeJeune, P.O. Box 351040, Miami, Fla. 33135; or telephone: 1-800-443-9353.

Matrix Desalination Offers Free Literature On 'Gold Series' Watermakers

Matrix Desalination, Inc. of Ft. Lauderdale, Fla., is offering free literature on their 'Gold Series'™ watermakers which are designed and built for applications where reliability is essential.

Matrix Gold Series watermakers are ideal for charter yachts, cruise ships, merchant and naval vessels, hotel resorts, basically wherever breakdowns and a lack of fresh water cannot be tolerated.

Matrix Desalination's technical staff in Florida is comprised of merchant and naval engineers, with the director of engineering being a licensed chief engineer who has in excess of 25 years of service in British nuclear submarines. The company's design and construction department knows firsthand what is required for producing potable water at sea.

For more information and a free copy of the literature on the Gold Series of watermakers from Matrix Desalination,

Circle 37 on Reader Service Card

MARINE TRAVELIFT MOBILE HOISTS



Lets You Get Your Share of Larger Work and Fish Boats!

Marine Travelift's 250 ton capacity Model 250AMO mobile hoists easily handle big boat haul outs. Excellent maneuverability...smooth, fast action hoisting regardless of tides...automatic load equalizing...all power adjustable sling adjustments for safe, easy lifting.

Details and specifications on the

250AMO unit or our complete line of mobile boat hoists with capacities from 15 to 500 tons, available from your local representative or Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235 USA • Phone 414-743-6202 • TELEX: LIFTS STGB 260056 • FAX: 414-743-1522.

"The No. 1 Hoist Supplier... Over 2,000 Units in Service Worldwide!"

MARINE  TRAVELIFT Inc.



Model 250AMO At
Davis Boatworks,
Newport News, VA

Circle 163 on Reader Service Card

**Sal Berté Forms
Saber Communications
—Literature Available**

Sal Berté recently announced the formation of Saber Communications, a Houston-based company that will specialize in the representation of high-quality products for marine dealers in both the commercial and pleasure-craft marketplaces. In addition, the company will offer marketing and technical consultant services on a national basis.

Saber Communications has already established a Telemarketing Division whose day-to-day operations are run by Mr. Berté's sons Carl and Sal Jr., offering automatic Telemarketing services, a product called Telehold which solves the customer-on-hold problems, and as a WaynePaging franchisee, offering Paging equipment with voice mail and toll-free 800 services.

Mr. Berté is presently vice president of NMEA, and on the board of directors of RTCM. He was formerly general sales manager with Radio-Holland USA, B.V., and director of marketing for the Communications Systems Division of North American Philips, and brings over 20 years of high-tech communications and marine electronic experience to Saber. He has successfully created and operated nationwide networks of over 200 dealers for both former companies.

For more information and free literature on Saber Communications,

Circle 50 on Reader Service Card

**Trinity Marine Expands
Ship-Repair Capabilities
With 2,000-Ton Drydock**

The Trinity Marine Group, New Orleans, La., has expanded its ship-repair and conversion capabilities with the addition of a 2,000-ton, 162-foot floating drydock.

John Dane III, president of the Trinity Marine Group, said the dock's length, and 59-1/2-foot distance between wingwalls, provide the capacity to accommodate a wide range of vessels up to 250 feet.

Trinity also operates a 4,000-ton, 160-foot drydock with 120 feet between wingwalls at its Equitable Shipyards, Inc., facility in New Orleans.

The latest drydock can be utilized at any of the group's six shipyards.

In addition to the Equitable/New Orleans facility, the Trinity Marine Group includes Equitable's Madisonville, La., yard; Halter Marine Inc., shipyards in Moss Point, Miss., and Lockport, Miss.; Moss Point Marine, Inc., Escatawpa, Miss.; and Gretna Machine & Iron Works, Inc., Harvey, La.

For free literature describing the shipbuilding, ship-repair and conversion services offered by the Trinity Marine Group,

Circle 11 on Reader Service Card

**\$40-Million Order Won
By AESA For 140,000-Dwt
Oil Tanker For CNN**

An option to build a second 140,000-dwt oil tanker at the Puerto Real yard of Astilleros Espanoles SA has been taken up by Nacionale de Navegacion (CNN), bringing to five the number of Suezmax tankers

on order at the state-owned facility in southern Spain.

The 899-foot-long by 141-foot vessel will be equipped with Burmeister & Wain main machinery developing 18,300 bhp and a service speed of 14 knots. Astilleros Espanoles said the engine room would be fully automated and the ship would operate with a crew of 18.

The price of the new tanker is expected to be upwards of \$40 mil-

lion

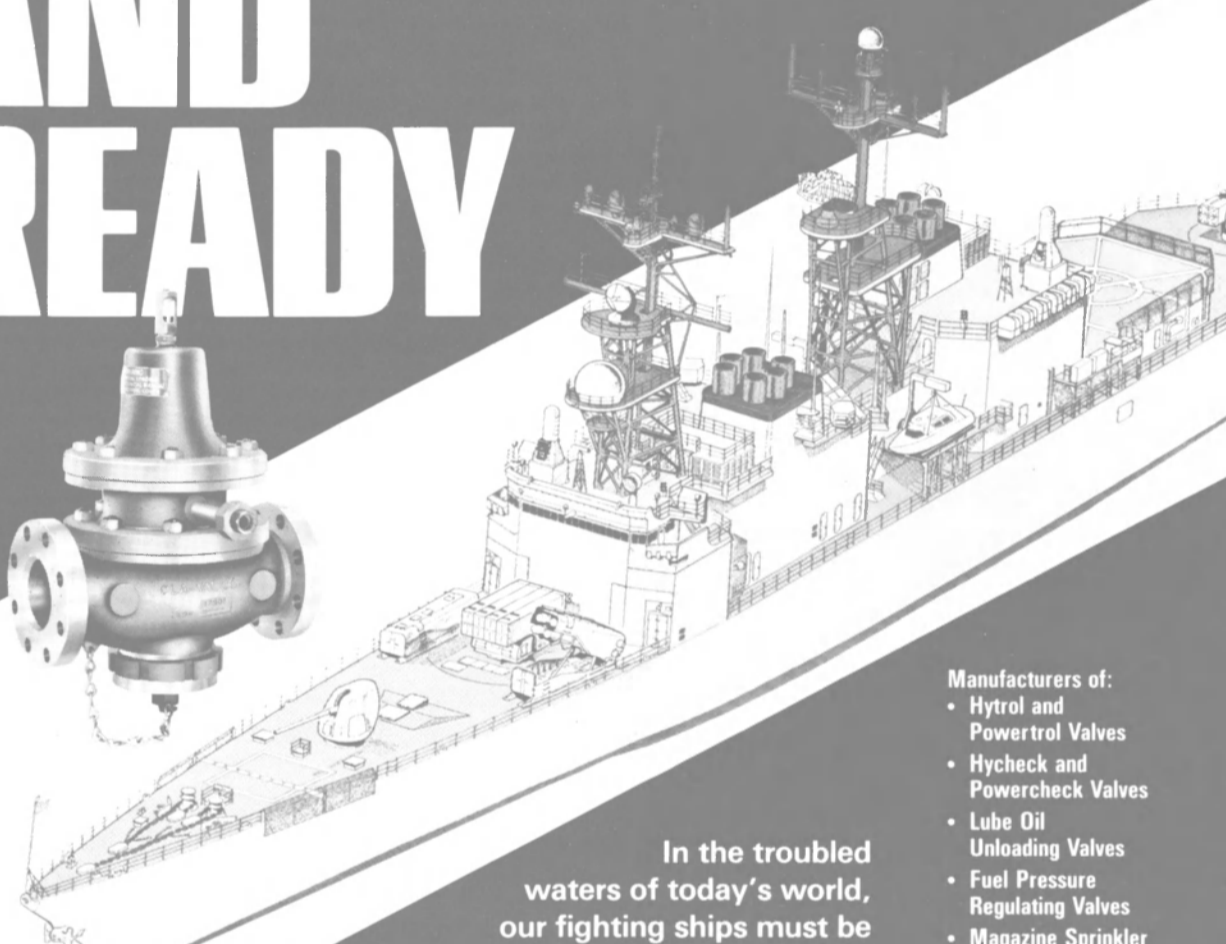
Construction of the new tanker provides a further 750,000 man-hours of work for Puerto Real, which will be working at full capacity by next year.

For free literature giving full information on the facilities and capabilities of Astilleros Espanoles,

Circle 33 on Reader Service Card

MANNED
AND
READY

Proven
in the Field



In the troubled waters of today's world, our fighting ships must be manned and ready for any emergency. That's why CLA-VAL equipment has been the consistent choice of shipbuilders for over 40 years. Reliability . . . durability . . . dependability—that's the CLA-VAL heritage. When you specify valves, remember CLA-VAL . . . we are always "manned and ready."


CLA-VAL

WESTERN DIVISION
CLA-VAL Co., P.O. Box 1325,
Newport Beach, CA 92663
(714) 548-2201 • Telex: 67-8429
FAX: 1-714-548-5441

EASTERN DIVISION
CLA-VAL Co., Airport Center, Suite 105
4250 Veterans Memorial Hwy.,
Holbrook, NY 11741
(516) 588-3900 • Telex: 12-6506
FAX: 1-516-588-8529

Manufacturers of:

- Hytrol and Powertrol Valves
- Hycheck and Powercheck Valves
- Lube Oil Unloading Valves
- Fuel Pressure Regulating Valves
- Magazine Sprinkler System Valves
- Hanger Deck Sprinkler System Valves
- Salt Water Pressure Regulating Valves
- Backflow Preventers
- Fuel/Defuel Control Valves
- AFFF System Control Valves
- Void Filling Valves
- Ballasting Valves



CLA-VAL CO™

Circle 151 on Reader Service Card

14-Page Leslie Catalog Features G-Series Valves, Regulators

The Super G-Series of pressure reducing valves and temperature regulators from Leslie Controls, Inc. is described in a new full-color 14-page catalog now available.

The Super G-Series is a family of valves combining the simplicity of a self-contained regulator with the

performance of more sophisticated control systems. Only two moving parts in the valve body assures minimum maintenance.

The literature features photos and schematic drawings, operational information, performance and material specifications and ordering information.

For more information and free copies of the 14-page catalog from Leslie Controls,

Circle 51 on Reader Service Card



The 564-foot by 78.7-foot Monterey will operate as a luxury cruise vessel in the interisland Hawaiian cruise market.

Wartsila Completes Conversion And Refurbishment Of S/S Monterey To Luxury-Class Cruise Liner

Wartsila Marine Industries has completed the conversion and refurbishment of the S/S Monterey at its Turku Repair Yard, and the vessel has been re-delivered to her owners, Aloha Pacific Cruises, Alexandria, Va.

The 564-foot-long Monterey will transit via Kristiansand, Norway, where it will be bunkered for the Atlantic crossing to Bethlehem Steel Corporation's Sparrows Point yard in Maryland, for installation of new stabilizers.

The Monterey was originally built by Bethlehem Steel at Sparrows Point in 1952 as the first of five Mariner-type cargo vessels.

As required by the Jones Act, structural steel work in connection with the conversion has been given to U.S. yards and the outfitting and interior work was done in Finland.

After the conversion, the vessel

will fulfill the present pollution prevention rules and regulations.

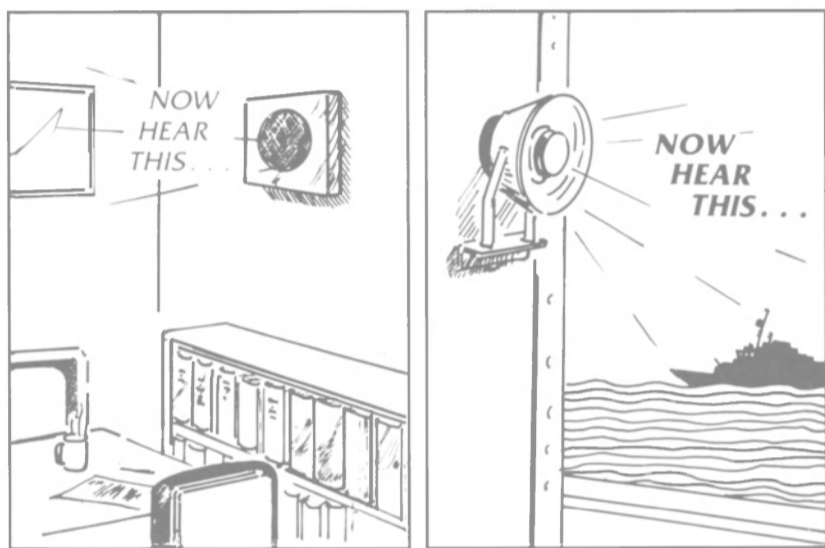
The work included refurbishing the old passenger cabins, addition of 127 new cabins and 22 crew cabins, and extension of public room and technical systems to serve the increased number of passengers. A new conference center, veranda lounge, pool area with jacuzzis, lounge and other amenities have been added, and other public rooms were completely renewed. Also, the latest navigation and communication equipment was installed.

After a cruise around the U.S. coast to Hawaii, the Monterey will start operating in the interisland Hawaiian cruise market.

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

Circle 100 on Reader Service Card

LIBERTY CALL OR... EMERGENCY ALERT



The Message is Loud and Clear.
with the advanced design

HENSCHEL® SHIPBOARD ANNOUNCING SYSTEM

You get:

- The loudspeaker output you need with no overload...
- Computer "shaped" voice output for sharp, clear messages...
- Synthesized emergency alarm signals...
- Pre-established priorities for announcements and alerts...
- Customized system control panels...
- Modular design for easy future changes, expansion or refit.

A UNIT OF GENERAL SIGNAL

HENSCHEL

HENSCHEL

9 Hoyt Drive • PO. Box 30
Newburyport, Massachusetts 01950
(617) 462-2400 Telex: (RCA) 294074

Circle 241 on Reader Service Card

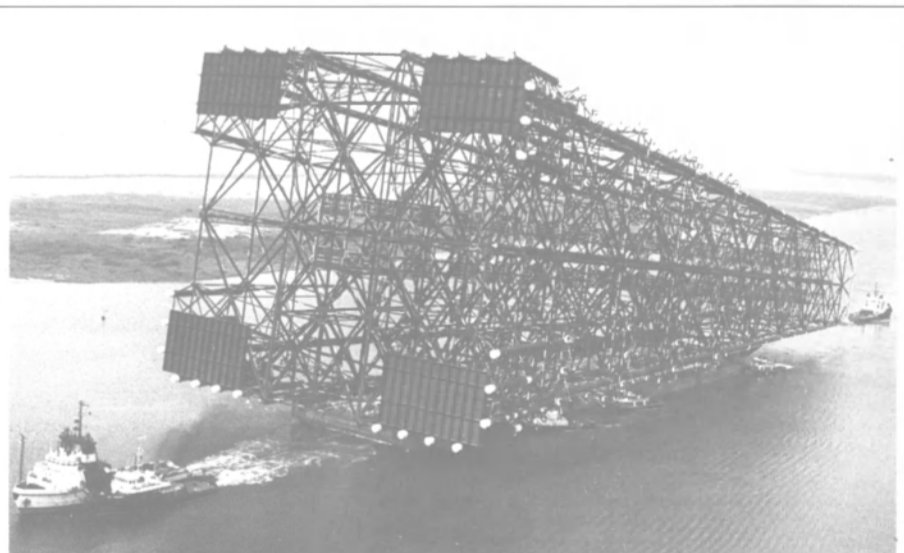
KOS Announces Corporate Changes

Thomas P. Tatham, managing director of Braspertise, Limited (Braspertise) a United Kingdom firm, and Joe W. Key, president of Key Ocean Services, Inc. (KOS), a Texas corporation, jointly announced recently that Braspertise

has become a major investor in KOS. KOS will own and lease storage tankers and floating production, storage and offloading (FFPSO) units and market their proprietary Uni-Turret Mooring System and High Pressure Multi-Product Fluid Swivel.

For more information and free literature,

Circle 39 on Reader Service Card



GULF MAMMOTH—The world's largest offshore drilling jacket, Bullwinkle, was recently launched and moved through the Port of Corpus Christi. When the deck and drilling units are installed, the 50,000-ton Bullwinkle will stand 1,615 feet above the seafloor—161 feet higher than the Sear's Tower in Chicago, the world's tallest building. She was built by Gulf Marine Fabricators, Corpus Christi, for Shell Offshore Inc. for use in the Green Canyon section of the Gulf of Mexico.

PROPULSION UPDATE

New Propeller Boss Cap Fins Provide Significant Improvement In Efficiency

A result of concentrated research effort for the past two years, Propeller Boss Cap Fins (PBCF) are said to show significant economic features for all vessels.

To date, research for improving propeller efficiency due to vortexes in the slipstream of the propeller has concentrated on the loss of efficiency due to the propeller tip vor-

tex. There have been many designs and devices tested for reducing this effect.

Until recently, very little research has concentrated on the efficiency loss due to the propeller hub or boss. Theoretical calculations for propeller performance which includes the influence of the hub have only recently become possible.

The result of joint research efforts by Mitsui OSK Lines Ltd., West Japan Fluid Engineering Laboratory Co. Ltd., and Mikado Propeller Co. Ltd. since September 1986, PBCF is designed to decrease the induced resistance due to the vortexes generated by the boss cap.

PBCF is a simple device, having the same number of fins attached to

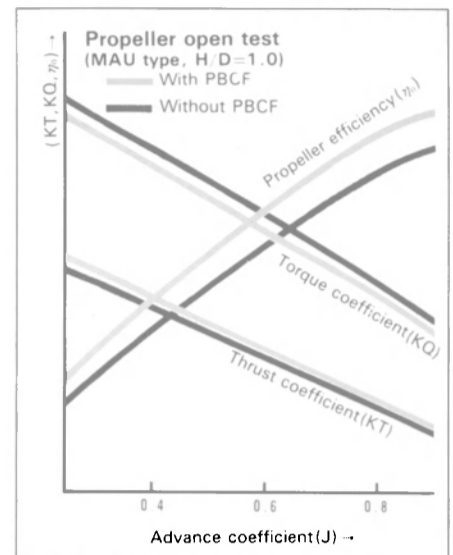


Photo showing the process of pouring visible chemical dyestuff.

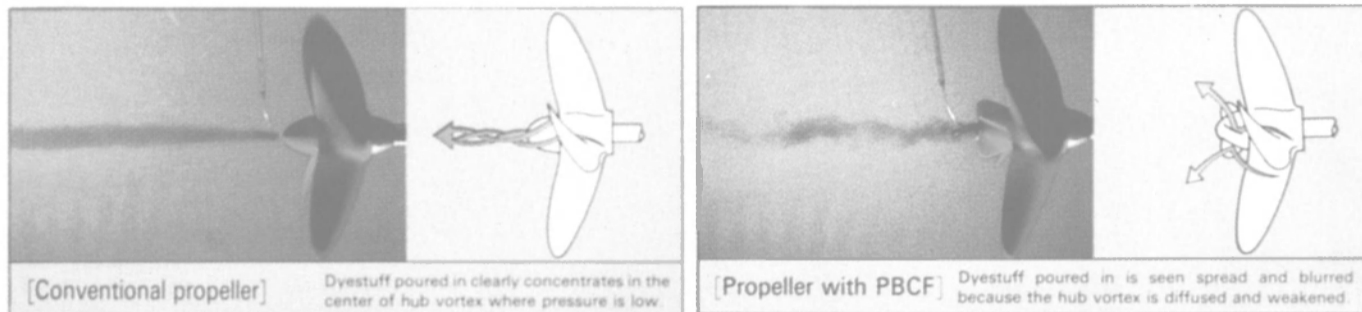
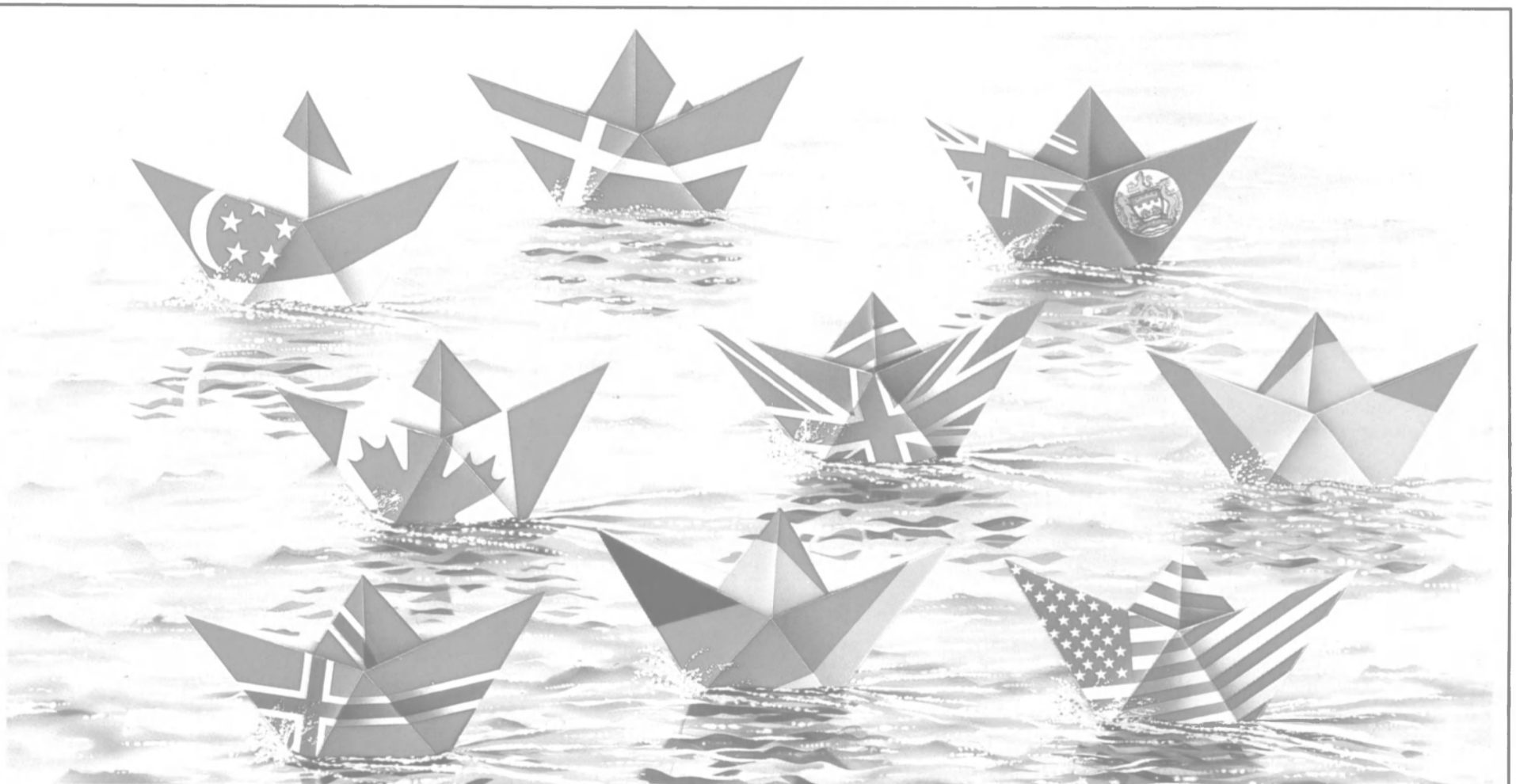


Figure 1

the boss cap as that of the ship's propeller. The fins serve to control the flow over the propeller hub, thus diffusing the vortexes created by the hub. This effect is seen clearly in the two photographs of the model tests, included with this article. Pro-

(continued)



WE REACH FURTHER THAN YOU THINK

With more than 130 years in the shipbuilding industry, the Ulstein Group today offers a wide range of marine equipment and services. Ship design, diesel engines, propulsion systems among other types of ships' equipment is our trade. All from one single supplier. Subsidiaries in 9 countries and representatives world-wide enable you to reach one of Ulstein's 2100 employees wherever you are in the world.

Good business relationship takes a long time to develop. Which is why we safeguard our reputation jealously.

ULSTEIN INTERNATIONAL A.S.
— SUPPLIERS TO THE MARINE INDUSTRY

SINGAPORE - HONG KONG - CANADA - USA - WEST GERMANY - SPAIN - DENMARK - UNITED KINGDOM - NORWAY

Telephone + 47 70 10 050. Telex + 0056 42 342.
Telefax + 47 70 11 442.

Propeller Boss Cap Fins

(continued)

propeller open water model tests have shown gains in efficiency of 3 percent to 7 percent and resistance/self-propulsion tests conducted on a 6-meter model indicated gains of 2 percent to 5 percent. A graphical summary of the model tests are shown in Fig. 1.

Speed trials conducted in September 1987 for the Mercury Ace, a 44,979-grt car carrier of Mitsui OSK Lines Ltd., fitted with PBCF, demonstrated a real ship efficiency improvement of 4 percent. Trials were conducted simultaneously with a like sister ship without PBCF. Fig. 2 shows the graphical results of these trials.

On-ship trials have also shown that installation of PBCF has no

effect on maneuverability.

As PBCF controls the flow behind the propeller—it has little dependence on the hull form like other energy-saving devices. As a result, PBCF is effective on ships of any type. PBCF is said to be especially effective for high-speed ships with a high propeller pitch ratio.

Smaller and lighter than conventional energy-saving devices set around the propeller, PBCF can

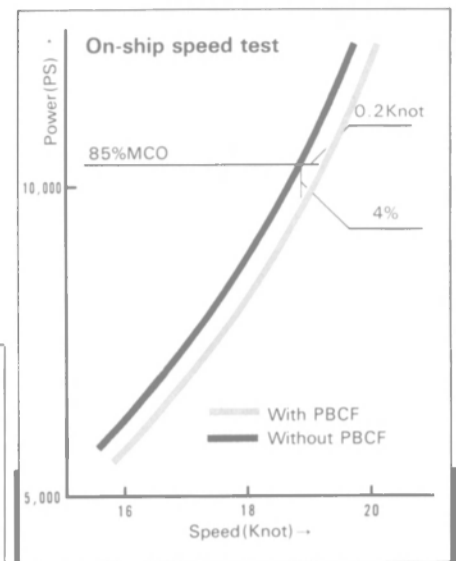


Figure 2

also be manufactured at low cost. The investment can be recovered in as little as one year.

An important feature is that installation of PBCF can be performed in a very short period of time for a new ship under construction or a ship in operation. Installation simply requires the removal and replacement of the propeller boss cap with PBCF. With a ship in drydock, this can be accomplished in only four to five hours. The added weight also has an insignificant effect on shaft alignment and bearing loads.



PBCF has the same number of fins attached to the boss cap as that of the ship's propeller. Installation simply requires the removal and replacement of the propeller boss cap with PBCF.

Since January of this year, PBCF has been fitted on over 23 ships of several types. All are said to have experienced significant increases in propulsion efficiency ranging from 3.2 percent to 6.7 percent. The average increase in efficiency has been 4.2 percent.

For more information and a copy of the technical paper on the development of PBCF,

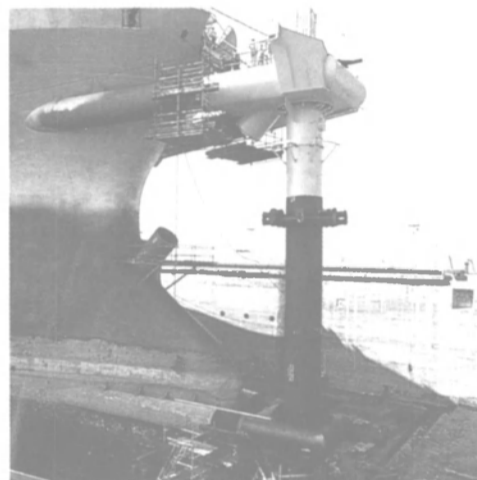
Circle 8 on Reader Service Card

AWO Reelects Knight Chairman Of The Board

The American Waterways Operators, an Arlington, Va.-based trade association, recently announced that **Arthur M. Knight**, executive director of Reinauer Industries of Newark, N.J., has been reelected chairman of the board of directors.

IRI GROUP

FINCANTIERI IS SHIPREPAIRS AND CONVERSIONS



20 graving docks for ships up to 400,000 tdw, 8 floating docks for ships up to 160,000 tdw 13 km of repair berths and the frontage of seven repair yards around the Italian coastline: the resources of Fincantieri's Shiprepairing Division are conveniently situated along the main and busiest Mediterranean shipping routes. The repair yards facilities and back-up resources are organized and equipped to cope with any shiprepair or ship conversion. Large or small merchant vessels and naval ships, offshore units and marine steam and diesel engines are repaired, modified or converted by the newest, most advanced techniques, developed over many years, to restore or improve performance. The Shiprepairing Division is also established in constructing offshore units to highest technological standards.

YARDS FOR SHIPREPAIRS AND CONVERSIONS:

- TRIESTE (A.T.S.M.) - Tel. (0) 40 7391
Tlx 460122 FINCAT I
- VENEZIA (C.N.O.M.V.) - Tel. (0) 41 798511
Tlx 410255 FINEVE I
- TARANTO - Tel. (0) 99 407134
Tlx 860020 FINCTA I
- PALERMO - Tel. (0) 91 545288
Tlx 910041 FINCPA I
- NAPOLI (S.E.B.M.) - Tel. (0) 81 7858111
Tlx 710040 FINCNA I
- GENOVA (O.A.R.N.) - Tel. (0) 10 59951
Tlx 270090 FINCOR I
- GENOVA WORKS (M.G.N.) - Tel. (0) 59951
Tlx 270370 FINCMG I
- LIVORNO - Tel. (0) 586 882121
Tlx 500071 FINCLI I

FINCANTIERI
Cantieri Navali Italiani S.p.A.

Shiprepairing Division
Genova/Italy via Cipro 11 tel (0) 10 59951
fax (0) 10 5995379 tlx 270168 FINCGE I

Circle 128 on Reader Service Card

folds are cooled by sea water. Engine compartments were insulated at the deck and bulkheads to reduce noise.

Electronics aboard the Phoenix III include a Regency Model 7200 VHF/ADF, Furuno FCV-661 depth finder, LC-90 loran, and FCR-904 radar; Si-Tex DT-2 depth sounder; and a Federal PA-300M siren.

One mission of the boat will be to speed rafts to passengers who evacuate downed airplanes into the water. The boat carries 20 MRP-10S Switlik rescue platform type inflatable rafts on forward and aft decks.

Munson designed and built a trailer capable of launching the boat in salt water. The three-axle trailer is galvanized and its bearings and brakes are salt-water corrosion resistant.

For free literature on the boat-building services offered by Munson,

Circle 111 on Reader Service Card

New Joint Venture Formed For China's International Maritime Exhibition

The Cahners Exposition Group (CEG) and the Seatrade Organisation recently announced the formation of a joint venture company to organize China's international maritime exhibition, "Marintec China" and "Marintec Offshore China," which has been held in Shanghai every two years since 1981. The event is held in cooperation with the Shanghai Society of Naval Architecture & Marine Engineering (SNAME).

CEG's and Seatrade's extensive worldwide network of offices and agents will combine to promote and develop the scope of the event internationally and in China.

A major international conference will take place at the same time as the exhibition, bringing together a wide range of sea transportation experts from the business as well as the technical communities.

The Seatrade Organisation has its own strong links with the People's Republic of China and publishes the Chinese language magazine "Maritime China" in association with the China Ocean Shipping Company, and with the support of the Ministry of Communications.

Marintec China and Marintec Offshore China will next be held at the Shanghai Exhibition Centre, People's Republic of China, from November 28 to December 2, 1989.

For further information, contact **Tony Nash**, The Seatrade Organisation, Fairfax House, Causton Road, Colchester CO1 1RJ, United Kingdom, phone 0206 45121, telex 98517 DISOP G, fax (0206) 45190.

Nola Centurion Opens Fabrication Facility In Braithwaite, La.

With contracts totaling more than \$2.5 million, Nola Centurion

Fabricators, a division of Nola Fleet Management, Inc., recently announced the opening of its Braithwaite, La., fabrication facility.

From their 30-acre site at Mile 80.7 on the Mississippi River, Nola Centurion offers services ranging from sophisticated inspection techniques for repair to engineering and fabrication for commercial and industrial projects, and launching of vessels or offshore rig assemblies up to 250 feet.


One current contract includes the complete refurbishing of 112 barges of a 515-barge fleet operated by Forest Lines, Inc. of New Orleans. "Even though we're located on the river, we don't want people to think we're limited to marine construction," said **Joe Martin**, vice-president of operations. "We support a wide range of industries—petrochemical, marine, and commercial construction. We perform maintenance, fabrication and construction

projects throughout the river parishes. Our facilities allow us to transport by rail and truck as well as by the river."

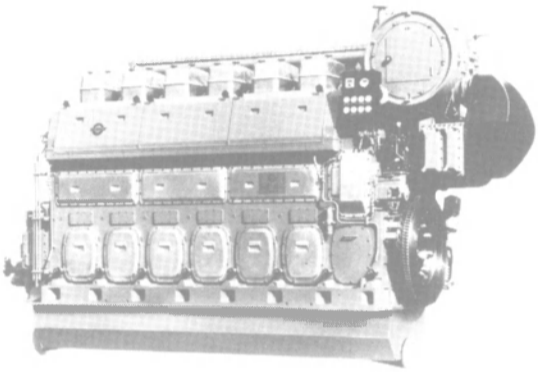
Past contracts for the petrochemical industry have included maintenance, fabrication and construction work.

For free literature describing the complete services offered by Nola Fleet Management,

Circle 45 on Reader Service Card



Developed for Marine Service




The B-Type

**Unusually
Robust
Design**

**High Load
Low Wear**

**Low
Maintenance
Costs**

**Competitive
Operating
Economy**



P.O. Box 924 Tel: (+475) 190000
 N-5002 Bergen Teletax: (+475) 190405
 Norway Telex: 42735 bmvh n

Circle 191 on Reader Service Card

Crandall

CONSULTING SERVICES & DESIGN FOR:

**MARINE RAILWAYS
 FLOATING DRY DOCKS
 WATERFRONT STRUCTURES**

- INSPECTION
- CERTIFICATION
- DIVING SERVICES
- DRY DOCK HARDWARE

Since 1854

CRANDALL DRY DOCK ENGINEERS, INC.

21 Pottery Lane

Dedham, Massachusetts 02026

Telephone (617) 329-3240 Telex 924406 (CRADOC•DEDM)

Circle 276 on Reader Service Card

MASTER PLANK

LAMINATED VENEER LUMBER

- STRONG
- LIGHTWEIGHT
- MEETS O.S.H.A. STANDARDS
- DOZENS OF USES
Scaffold Planks
Beams
Headers



Master Plank, an engineered wood product, is a continuous laminated veneer panel that can be cut into any required size for use as scaffold planks, beams and headers, etc. Available in standard widths. Master Plank, a wood laminate, provides strength properties superior to solid sawn wood. Warping, knotting and twisting are reduced, making the panel more consistently uniform.

For more information contact:



CAUSEY LUMBER CO.
 P.O. Box 46129 • 36325 Harper Avenue
 Mt. Clemens, MI 48046
 Telex 23-0300 • Telephone: (313) 792-3620
 Fax: (313) 792-3805

Circle 225 on Reader Service Card

ELECTRONICS UPDATE

New Low-Cost Weather Chart Recorder From Alden Doubles As Computer Printer

Alden Electronics, Inc., Westborough, Mass., recently announced the introduction of the Alden Faxmate™ Weather Chart Recorder. The Faxmate is one of the lowest-cost recorders of its type on the market.

According to **Armand Bouchard**, Faxmate product manager, "Alden is introducing the Faxmate to provide an economical means for all mariners to be able to acquire vital weather and oceanographic charts while underway. As an added bonus, the Faxmate can double as a printer for an IBM PC or compatible computer, since it features a standard Centronics interface."

Designed to operate with any HF or ham radio, the Faxmate provides mariners with surface analyses charts which show current locations of storms as well as prognoses which predict the indicated speed and direction of these storms. Many transmit sites now broadcast sea surface temperature, mixed layer depth and the location of warm and cold water eddies which are so helpful in locating various species of fish.

The Faxmate complements Alden's current line of Marinefax recorders which have won the coveted National Marine Electronics Association Award for reliability and



The low-cost Alden Faxmate Weather Chart Recorder doubles as a printer for onboard computer.

performance for the last eight consecutive years.

For further information and free literature on Alden's Marinefax recorders,

Circle 9 on Reader Service Card

Northwest Marine Gets \$4.8-Million Contract To Drydock MSC Oiler

Northwest Marine Iron Works, Portland, Ore., was recently awarded a \$4,775,510 contract by the U.S. Navy's Military Sealift Command (MSC) to perform the drydocking and maintenance overhaul of the fleet oiler USNS Kawihiwi (T-AO-146).

Raytheon Marine Introduces A Combination Loran With Raster Scan Plotter

Raytheon has introduced a combination Loran with Raster Scan Plotter. According to the company, Raytheon's new Rayplot 700 and 700L Raster Scan Loran/Plotters make it easy to plot and track a vessel's location and route on ultra-bright, 7-inch electronic charts. And, the company reports, Rayplot's high-capacity memory cards enhance its electronic charts with land areas "shaded" to clearly differentiate between land and water.

The credit-card-sized ROM or RAM cards (Read Only Memory/Random Access Memory) slip into the front of the Rayplot display units. ROM Chart Cards (4,000 points of memory) provide electronic charts digitized from NOAA charts. Readily available for all areas having Loran-C coverage, they show shorelines, landmarks, and navigation aids. The RAM Store/Recall Cards (4,100 point memory capacity) let operators modify and save charts which are customized with event marks, waypoints, and other important navigation data. In addition, an internal memory of 4,100 points consists of four groups of event/destination marks with up to 500 points each, plus 100 points for waypoint memory. Five-year lithium batteries provide memory backup.

The Rayplot is available as a plotter only (Rayplot 70000 or plotter with built-in Loran-C receiver (Rayplot 700L).

Raytheon's Rayplot 700 and 700L have passed Raytheon's tough environmental tests for shock, vibration,



Raytheon Rayplot 700L Raster Scan Loran/Plotter.

temperature extremes, and resistance to corrosion. Installation of these compact units is simple. They can be mounted on table-top, bulkhead or overhead, in any protected area not exposed to rain or water spray. Raytheon offers a two year limited parts warranty with one year free labor from its worldwide service network.

For more information and free literature from Raytheon Marine Company,

Circle 106 on Reader Service Card

Houston Marine Services Acquires Economy Boat's Gulf Coast Operation

Houston Marine Services, Inc. (HMS) of Houston, Texas, recently announced it has purchased the operating assets of Economy Boat

HARD-LINER.
SUPER-HARD SHAFT SLEEVE COMBATS WEAR AND TEAR!

Take a hard line on protecting shafts and CUTLESS® bearings. The Moffitt hard-coated sleeve has a **nickel-chrome-boron** finish for super-smooth, tough resistance to abrasion and corrosion.

Cut wear problems, extend shaft-assembly life. Get the inside story now:

LUCIAN Q. MOFFITT, INC.
A subsidiary of BFGoodrich
P.O. Box 1415, Akron, Ohio 44309—(216) 733-9955
Registered trademark BFGoodrich ©1987 LQMoffitt

Circle 226 on Reader Service Card

pump it dry! **VME ductors**
MULTI-PURPOSE PUMPING EFFICIENCY

**NO MOVING PARTS
NO MAINTENANCE
NO PRIMING, CANNOT LOSE SUCTION
PUMPS BILGES, TANKS AND HOLDS DRY**

VM BILGEMATE
Ideal for pumping bilges—stripping ballast, etc. Peripheral jet design handles liquids, solids, air. 2½" to 6" sizes available.

VM DECK EDUCTORS
Only the hose goes into tank to vacuum liquids at rate of 10-15 gpm at suction lifts up to 70' or more.

VM PORTABLE EDUCTORS
Handy auxiliary pump for regular or emergency pumping of liquids from ballast, bilge, cargo spaces and tanks. Just attach hose from fire main and lower-educator into space to pump large quantities of liquid quickly and easily.

VITA MOTIVATOR COMPANY
Phone: (516) 568-8830
Intel Telex: 226000 ETLXUR
Cable VME DUCTOR

99 W. Hawthorne Ave., Suite 622 • Valley Stream, NY 11580

- ITALY: Bozzano S.R.L. via Ferrara 80/82, 16127 Genoa, Italy Tel: (010) 267-259
- SPAIN: Fedisa—Puertos Y Manutencion, S.A., O'Donnell 8.3rd Floor, 28009 Madrid, Spain Telex: 22454 FEDIS E
- NETHERLANDS: B.V. Bureau Inspector, P.O. Box 228, Vlaardinggen, Tel: 010-348-155
- UNITED KINGDOM: Ferguson & Timpson Ltd, Thistle House, Seinas Lane, Dagenham, Essex RM8 1TB Tel: (1) 593-7611
- NORWAY: Fred F. Zimmer A.S., Meltzersgt. 9 Oslo 2, Tel 567459
- SINGAPORE: Kenson Enterprise PTE Ltd., 123 Kitchener Road 0820 Singapore Telex: RS 24814 SSH

Circle 317 on Reader Service Card

MASTER ORDINANCE REPAIR PROGRAM (MOR)

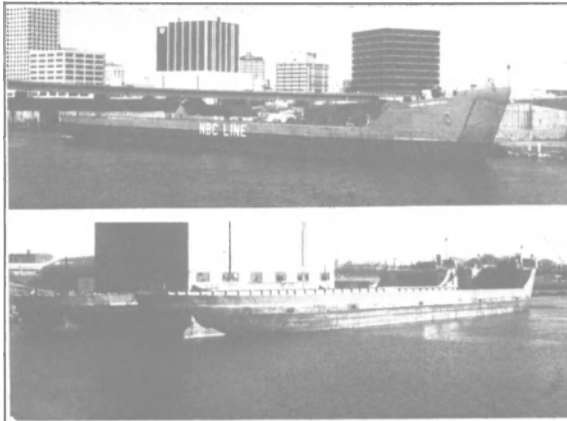
PROJECT MANAGER
TEST MANAGER
COMBAT SYSTEM SUPERVISORS
COMBAT SYSTEMS SHIP SUPERINTENDENTS

SOUTHWEST MARINE INC., SAN DIEGO DIVISION, AN EQUAL OPPORTUNITY EMPLOYER, IS SEEKING QUALIFIED OR QUALIFIABLE PERSONNEL. INTERESTED PARTIES SEND RESUMES TO:



SOUTHWEST MARINE, INC.
SPECIALISTS IN THE REPAIR, MODERNIZATION & MAINTENANCE OF SEAGOING VESSELS

SWM MOR PROGRAM MANAGER
P.O. BOX 13308
SAN DIEGO, CA 92113-0308
1-800-327-5162 EX-221



L.S.T. BARGES
1 @ \$90,000—1 @ \$75,000
Located: Norfolk, VA.
Contact: George Flanagan, 804/627-3651

For Barge Rentals or a Complete Marine Package

Call the Barge People.

Our experience and knowledge in serving a wide variety of industries enables us to provide the right size and type of barge and tow to make your marine operations profitable.

- Large, diversified fleet for inland, oceans and speciality service.
- Experience in arranging and managing marine packages
- 20 convenient floating locations along Gulf Coast and upper river.

Rentals - Sales - Service

New Orleans
(504) 949-7586
Telex 58-4393
Fax (504) 945-5513
2300 Surekote Rd.
N.O. LA 70117

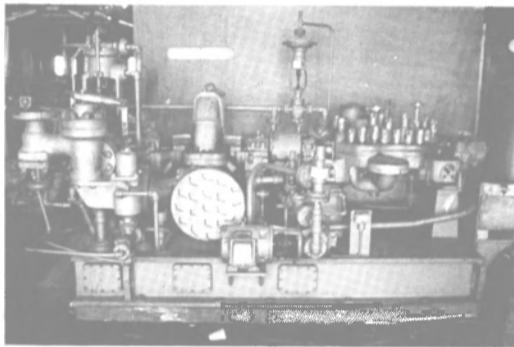
Houston
(713) 452-5887

Parkersburg
(304) 485-4494

St. Louis
(314) 469-0510



NEW EQUIPMENT ... AT OLD TIME PRICES



NEW FEED PUMPS

Feed Turbine — Turbodyne — Frame: 284SWK CCW rotation 1070hp 1370# 750°F 40# Exh. 287° Exh. Temp 7350 RPM Order #U-19964 Ser. #33533

Pump - Ingersoll Rand Size 3DM-4 700 @ 4350' 7000RPM 2700# Hydro Ser. #0475-78

New Price: \$235,000 **OUR PRICE: \$29,000**

BRAND NEW VERTICAL MOTORS

	Unit Price
(2) 75HP 1750RPM 30,60z 460v U.S. 365JVP BBTEFC	\$935.
(5) 50HP 1750RPM 30,60z 460v U.S. 365LP BBTEFC	\$750
(4) 30HP 1750RPM 30,60z 230/460v U.S. 286JVP	\$600
(2) 30HP 1750RPM 30,60z 230/460v U.S. 286TCF	\$600
(3) 20HP 1750RPM 30,60z 230/460v U.S. 256JVP	\$500
(3) 20HP 1750RPM 30,60z 230/460v U.S. 256VOH	\$400
(2) 15HP 1750RPM 30,60z 230/460v U.S. 254JMV BBTEFC	\$350
(3) 15HP 1750RPM 30,60z 230/460v U.S. 254VPH	\$250
(2) 15HP 1750RPM 30,60z 460v 254VP	\$250
(12) 7 1/2 HP 1750RPM 30,60z 230/460v U.S. 213TCV	\$200

NEW PUMPS — MARINE TYPE

- (2) Worthington Horizontal Centrifugal 1400 GPM at 110' head.
- (1) Worthington, 1200 GPM at 235' head.
- (3) Aurora, 2500 GPM at 155' head, Type 411
- (2) Ingersoll Rand Horizontal Centrifugal 300 GPM at 30' head.
- (2) Ingersoll Rand, 120 GPM at 185' head, Type 3x1 1/2x8.
- (2) Vertical Centrifugal, 60 GPM at 60' head, Type 1 1/2x1x6.
- (4) Delaval Type Positive Displacement 96 GPM at 400 PSI.
- (1) Krogh Vertical Centrifugal, Non-Clog 3000 GPM at 40' head.
- (4) Ingersoll Rand, 500 GPM at 100' head, Type 3x7 ALS.
- (2) Worthington Horizontal Centrifugal 1200 GPM at 70' head, Type 500LZ.
- (2) Orricon Pumps, 150 GPM at 235' head, Type 3x1 1/2.
- (2) DLurimet Pumps, 20 GPM at 20' head.
- (3) Goulds Pumps, 570 GPM at 160' head.

NEW BUTTERFLY VALVES

- (2) Steel 36" Pratt Triton XL year 181 Serial #7-05911-2 50# Rubber Seat 134°F Body A-36 Seat A-240 w/316 edge service - PCP suction isolation 46" Flange 12" F/F 42-3/4" B/C 2 1/2" Flange (32) 1-5/8" Bolts
- ACTUATOR: Limitorque Type H Size 280 Order 3A3067B Serial 318630 Rat-100.0 Valve B47257 batchel 1.25 Pos A .33HP 230/460V
- (3) Bronze BIF waffer-type 28" Model 0652 Design 120# 150°F Ser #N-50919-3 1980 32 1/2" Flange 8-1/8" F/F Limitorque Type SMB Size-00 Order 3D1124A #310482 Valves 90635-13 Rat-94.0 Type H Size 3BC 460 volt.
- (2) 24" Butterfly Bronze Waffer-type BIF Model 0652 Des 150# 150°F Serial #N-50902-5 1980 28" Flange 7" F/F Limitorque Type SMB Size-000 Rat-100.0 Order 3D1131A Valve 90642-13 Ser. #312777 460 volt.

NEW AXIAL FLOW FANS

- Joy Axivane Fans Series 1000 Model 23-17 3500/1750 RPM 460V 3-ph 60-cyl 20/5 HP 236/8-2 F1 Amps 9000 CFM 8.1 PT 4500 CFM 2.02 PT Reliance Fr. 256TCZ Class H 3490/1750 RPM 50° Amb. New Price: \$2,900 **OUR PRICE: \$1,200**

NEW — UNERRECTED — CRANES

- (2) NEW Appleton Electro Hydraulic Cranes ABS approved 18 tons at 54 feet; 30 tons at 25 feet 300 H.P. 440V Power Pack

New Price: \$295,000/each **OUR PRICE: \$39,000/ea.**

NEW FORCED DRAFT TURBINES

- Turbodyne Reduction Gear - Frame: 284SWVK 685HP 1370# 750°F 40# Exh. 5133/1780RPM Form D

New Price: \$135,000 **OUR PRICE: \$19,000**

NEW 65MM CHAIN Grade 3

New Price: \$4,500/Shot **OUR PRICE: \$3,500/Shot.**

BRAND NEW MARLO COOLING COILS — From 5-ton to 50 ton.

New Price: \$1,900 **OUR PRICE: \$900**

NEW SULZER PARTS

- New RND90 Sulzer Cylinder Heads
- New Price: \$11,000 **OUR PRICE: \$5,500**
- New Liners for Sulzer RD90
- New Price: \$12,000 **OUR PRICE: \$6,500**
- Buffalo Fans Size-6609 ADJUSTAX Diesel Gen Room Recirc. Fan 108000 @ 4.49 TP 1170 RPM 94.8 BHP 70°F .075 dens. Blade Sat-36 Max Set-47 Motor: West. Lite Line Fr. 445TCZ 460/3/60 hazardous location 125 Max. 144 HP 142/165 amps
- New Price: \$5,200 **OUR PRICE: \$3,700**

- NEW 25,000 HP General Electric High Pressure Steam Turbines, manufactured 1980, 1400# inlet pressure 950°, 85# discharge pressure 6900RPM. Brand New.
- New Price \$850,000/ea **OUR PRICE: \$95,000/each**

NEW 700 SQ. FT. CONDENSER

New Price: \$80,000 **OUR PRICE: \$19,000**

NEW HEAT EXCHANGERS

- Copper/Bronze Size: 1060 3/8" Tubes 3" Openings 10" Diameter 60" between tube sheets
- New Price: \$3,500 **OUR PRICE \$1,900**

NEW GENERAL ELECTRIC BAKE OVENS

- Model MN-60 6.2 KW 460V FAC-102208G803 CIR - 1-3ph 60-cyl SR-BCM5549
- New Price: \$2,900 **OUR PRICE: \$1,200**

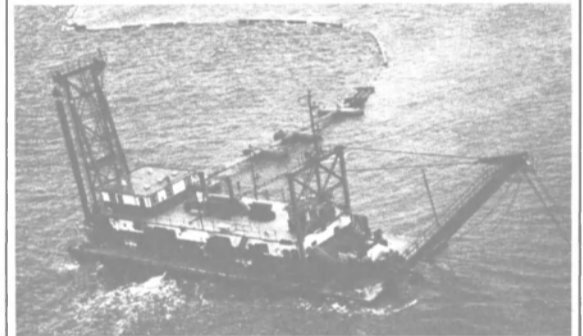
- NEW 25-TON Carrier Air Conditioning Units 5H40-149 Compressor Motor: Westinghouse 25HP 1750RPM Frame: 284T 460V 3-ph 60 cyl Complete with Condenser, Freon Receiver and Starter mounted as package.
- New Price: \$29,000 **OUR PRICE: \$14,000**

THOUSANDS OF OTHER MARINE ITEMS IN STOCK — CALL US — WE HAVE!
BRUCE — AL — IRV — MIKE — STEVE

MARITIME POWER CORPORATION

200 HENDERSON STREET ● JERSEY CITY, N.J. 07302 ● TELEPHONE: 201-433-0870
TELEX: 620533 MARPOW ● FAX: 201-433-1459

DREDGING & MARINE EQUIPMENT FOR IMMEDIATE SALE



Large Suction Dredge:

120' L X 40' W X 8' D with two spuds 90' L X 2.5' Dia., main pump drive ALCO 16 cyl. 251-E 3000 HP, main pump 20" X 24" model LSA-73 Georgia Iron Works, underwater pump 24" X 24" x 44" LHD Georgia Iron Works, etc. Dredge totally rebuilt 1983, 4000' Polyethylene Pipeline.

Tugs:

Two tugs approx. 1000 HP ea. 80' L X 20' W X 10' D. One GM and one B & W powered ready to work. Canadian Registered.

Work Boats:

Two twin screw work boats approx. 550 HP ea. 42' L X 13' W X 5' D, road transportable. One GM powered and one Cummings powered, fully rebuilt 1984. Canadian Registered.

Jack-Up Barge:

50' X 50' all hydraulic 3' dia. spuds capable of jacking up with 100 tons on deck in 60' of water, has drill hole in centre. U.S. Registered.

Deck Barges, Crane Barges, Spud Barges, Anchor Scows, Dump Scows, Cranes, Work Boats, etc. Canadian & U.S. Registered.

INTERNATIONAL TUG & BARGE LTD

Blair McKeil
Port of Hamilton, Ontario
(416) 522-8337
(416) 945-0813

DRY DOCKS or BARGES

For new construction, prefabrication, repairs, and conversions :
call for your special needs



CONRAD INDUSTRIES, INC.
504 384-3060, P.O. Box 790
Morgan City, LA 70381

High-Performance Ropes Described In New Catalog From Samson Ocean Systems

A new 16-page catalog and price list from Samson includes construction and technical data on 19 different high-performance ropes for use by utilities in various applications.

Major products include high-strength, low-stretch and enhanced abrasion-resistance ropes using the new high-modulus fibers, Samthane protective coatings and Parallay braid designs for maximum strength-to-weight ratios and cost efficiency.

In addition to complete specification tables for the various types of rope, the catalog contains a listing of the characteristics and recommended use for each

For more information and free literature from Samson Ocean Systems,

Circle 17 on Reader Service Card

SERVICE • REPAIR • PARTS CONSULTING • DESIGN

CUNNINGHAM MARINE HYDRAULICS CO., INC.

201 Harrison St. • Hoboken, N.J. 07030
(201) 792-0500 (212) 267-0328
FAX # (201) 792-7716

JACKSONVILLE, Florida 32202
(201) 792-0500
TWX 710-730-5224 CMH Hoboken, NJ



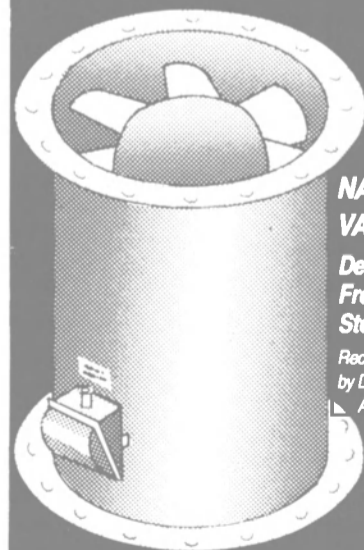
Gears

3-twin disc MG521 4.09X1 gears 1 remanufactured 2 cores. Lot price \$20,000.00 dealer inquiries invited.

N.E.P., INC.
P.O. BOX 951 • ALTON, IL 62002
TELE: 618-462-1074 • FAX: 618-462-1720

JON M. LISS ASSOCIATES, INC.

411 BOREL AVENUE, SUITE 505 • SAN MATEO, CALIFORNIA 94402



NAVY STANDARD VANEAXIAL FANS

Delivery
From
Stock

Reconditioning and Rewinding
by Dahl Beck Electric.
Available with Warranty.

(415) 573-9191

TELEX 17-2655 GOJON SMT
FAX (415) 572-8458

Devoe Marine And Devoe Napko Coatings Divisions Merge As Devoe Coatings Company

Grow Group, Inc. of New York, N.Y., recently announced the merger of Devoe Marine Coatings Co. Division and Devoe Napko Protective Coatings Division. The new company will be known as Devoe Coatings Company.

In making the announcement at a meeting of 150 Devoe sales representatives, **Joseph M. Quinn**, Group vice president of Grow Group and president and chief executive officer of Devoe Coatings Company, said: "As Devoe Coatings Company we will be better equipped to continue our growth in the supply of high-performance paints and coatings to the marine, industrial and offshore industries on a worldwide basis. The combined product line, sales force, technical service representation and distribution network will increase the high-quality service our customers have come to expect from Devoe." Making the launch of a dynamic growth program targeted at the industrial maintenance

market, Mr. Quinn told the audience that Devoe industrial coatings will soon be made available through Devoe retail stores in selected geographical areas across the country.

Robert H. Osmer has been appointed executive vice president and chief operating officer for Devoe Coatings Company. **Andrew R. House**, formerly vice president and general manager of Devoe Napko Protective Coatings Division, has been promoted to vice president-marketing for Devoe Coatings Company.

Devoe Coatings Company is a division of Grow Group, Inc., one of the nation's leading producers of specialty chemical coatings and paints.

For more information and free literature,

Circle 21 on Reader Service Card

Munson Delivers Cummins Triple Engine, Hamilton Jet Boat For Lake Erie Use



The 36-foot patrol/rescue boat CX50 is powered by three Cummins diesel engines, each coupled with Hamilton waterjet for safe operation in the shallow debris-strewn waters on the eastern end of Lake Erie.

Munson Manufacturing Inc. of Edmonds, Wash., recently delivered a new 36-foot patrol/rescue boat, designated the CX50, to the Sheriff's Department of Chautauqua County in western New York.

The 17,000-pound boat—light for its size—is equipped with Cummins's latest model 6BTA5.9-M diesels and Hamilton's newest model 271 waterjet propulsion units for safe operation in shallow, debris-strewn waters. Each of the three turbocharged, aftercooled in-line, six-cylinder diesels develops 250 horsepower at 2,600 rpm. Each waterjet unit has a thrust of up to 2,600 pounds.

The 12-foot-beam boat is fully equipped with a dive ladder and platform, tow post, overnight cabin with galley and marine head and an array of electronic equipment, including a radar unit and Loran-C radio navigation unit. Fuel capacity totals 250 gallons and fresh water capacity, 30 gallons.

The CX50 will be placed into rigorous service. The patrol/rescue boat will be assigned to patrolling 30 miles of Lake Erie coastline, where Coast Guard vessels usually are unavailable as a first line of defense against storms as well as illegal drugs. Another primary mission is boating law enforcement. The boat will be based at Dunkirk, on Lake Erie.

For free literature giving complete information on Cummins diesel engines,

Circle 36 on Reader Service Card

For more information and free literature on the shipbuilding facilities of Munson Manufacturing,

Circle 30 on Reader Service Card

Maritime Reporter/Engineering News

FOR SALE

NEW WATERTIGHT DOORS

6 Dog

6-Dog right and left hand hinged doors with frames. 1/4" panel and 5/16" frame meet ABS Specs.

SIZES

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

EACH DOOR

IMMEDIATE DELIVERY

ALSO QUICK ACTING
LEVER OPERATED DOORS
30"x60"

IN STOCK
NEW GRADE 3 CHAIN
ABS Certified

We are authorized distributors for a major steel chain company. We stock in our Jersey City warehouse the following lengths of new GR3 chain:

(12) Shots—2 1/2"	(12) Shots—3-5/16"
(12) Shots—2 3/4"	(12) Shots—3 7/8"
(12) Shots—3"	(3) Shots—4 1/4"
(12) Shots—3-1/16"	(1) Shot—4 3/4"

WE ALSO HAVE ANCHORS WITH
ABS CERTIFICATES FROM 5000# TO
44,000#

CAPSTAN

With Explosion-Proof

motor & control

Suitable for oil barge, shipboard terminal, use, etc. 7 1/2 HP—220/440/3/60—7500 lbs @ 45 FPM. Totally enclosed, explosion-proof. Barrel of capstan 8" diameter—15" high.



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 27 1/4". IMMEDIATE DELIVERY FROM STOCK.



MARITIME POWER CORPORATION
200 HENDERSON ST—JERSEY CITY, NJ 07302
PHONE: (201) 433-0870

Intercon Receives MarAd Go-Ahead For Additional Four Twin Cargo Cranes

Intercontinental Engineering-Manufacturing Corporation (Intercon) recently received notice from the Maritime Administration to proceed with the manufacture of four pedestal-type, twin cargo cranes. The option follows the initial contract requirement for six twin cranes presently in process.

Single operated, each crane is rated at 30 long tons at 121-foot outreach, and 60 long tons at 121-foot outreach when operated in dual (two single cranes teamed) mode. All functions of the twin cargo cranes are electrohydraulically powered.

One shipset of twin cranes will be installed aboard the Navy's auxiliary craneship T-ACS 9, with the remaining shipset on T-ACS 10. Contract completion is scheduled for December 1989.

For free literature giving full information on products manufactured by Intercon,

Circle 55 on Reader Service Card

Sembawang Shipyard Wins \$7.3-Million Contract

Sembawang Shipyard Limited has won a major S\$15-million (about \$7.3 million) contract to reconstruct and refurbish a complete accommodation unit of a supertanker.

The contract to rebuild the 239,435-dwt Liberian registered tanker S/T Rova was awarded to Sembawang Shipyard by Olaya Shipping Corporation.

For free literature giving details on the facilities and capabilities of Sembawang Shipyard,

Circle 53 on Reader Service Card

Call For Papers For Conference On Advanced Marine Systems

The Intersociety Advanced Marine Vehicles Conference and Exhibit, which will be held June 5-8, 1989 at the Hyatt Regency Hotel in Crystal City, Washington, D.C., is soliciting unclassified abstracts and papers on a wide range of topics related to advanced marine systems.

The conference and exhibit provides a forum for technologists, potential commercial and industrial users, military planners, regulators and operators to exchange and discuss new ideas in the field of advanced marine systems.

Papers are being solicited for the following topics: mission and application scenarios; advanced monohull systems; air cushion systems, SWATH vehicles; seaplanes; sub-surface vehicles and ROVs; wing-in-ground-effect vehicles; hydrofoils; surface effect ships; planing hulls; hybrid and nonconventional craft; competition marine craft; multi-hull craft; design methodologies; sea-

based space launch systems; AMV testing facilities and techniques; at-sea launch and recovery techniques; institutional and regulatory issues; and AMV operations and economics.

One session will be devoted to a student paper competition. Prizes of \$200, \$100 and \$50 will be awarded for first, second and third place. There will also be a poster session for brief project reports and

a film video viewing of the latest operations and testing.

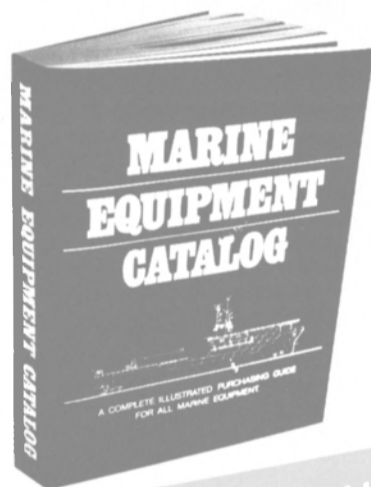
Some of the major societies involved in the conference include: The Society of Naval Architects and Marine Engineers; the American Society of Naval Engineers; the U.S. Hovercraft Society; the Wingship Society; and the Canadian Air Cushion Technology Society.

The deadline for submitting abstracts, which should be between

200-400 words, is October 29, 1988. Abstracts should include paper title, principle author, organization, address and telephone number. Notice of acceptance will be issued on November 30, 1988, with final manuscript due March 17, 1989.

Abstracts should be sent to: **H. Weiland**, Intersociety Advanced Marine Vehicles Conference, Conference Committee, P.O. Box 1071, Mercer Island, Wash. 98040.

NEW 1988 EDITION MARINE EQUIPMENT CATALOG



SUBSCRIBE NOW
ONLY \$32.00 per copy
ORDER YOUR PERSONAL COPIES NOW

The World's Most Complete Annual
Marine & Naval Equipment Catalog
For Vessel Owners, Shipbuilders,
Marine Designers, Naval Architects
and Purchasing Agents.

DETACH AND MAIL

Mail to: Marine Equipment Catalog
c/o Maritime Reporter
118 East 25 Street
New York, New York 10010

Yes, I wish to take advantage of this Special Offer. Please reserve _____ copies of Marine Equipment Catalog. (\$45.00 outside the U.S.)

Name _____

Position _____

Company _____

Business _____

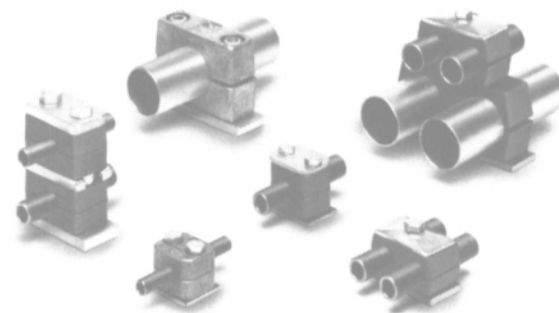
Address _____

Enclosed is my remittance of \$32.00 per copy for _____ copies of the Marine Equipment Catalog. (\$45.00 outside the U.S.)

Please bill me

Please bill my company

From Stauff Hydraulics Headquarters:



SHOCK ABSORBING, OIL SAVING PIPE SUPPORTS — 1/8" to 36" DIA.

No one can duplicate the field-proven performance of Stauff's complete line of pipe and tubing supports. Reported 40% faster to install than competitive supports, the Stauff Standard and Heavy Series provide maximum shock and vibration absorption plus greater noise reduction. Superior chemical resistance reduces the risk of line leakage and systems downtime, too. Available in a wide variety of tube and pipe sizes, versatile Stauff supports can be mounted in many configurations for single or multiple line applications. Pipe Supports: another high performance component from Stauff.



Stauff Corporation (Corporate Headquarters)
21-23 Industrial Park, Waldwick, NJ 07463
Phone: 201-444-7800 TLX 13-4465

Midwestern Regional Office: 312-692-9690 • Southeastern Regional Office: 404-578-1645

Circle 253 on Reader Service Card



MAN DISCOVERS ELECTRIC TOILET

*O' Dan McGrew was in the outhouse
when the lightning hit.*

Salty words he was heard to emit.

But one thing he said was very true,

"That electric toilet is way over due!"

INCINOLET incinerates waste to ash
with electric heat, and without water.

- Built to last a lifetime • Non-polluting
- Economical • No winterizing needed

Call Toll-free for information or
brochure: 1-800-527-5551.



INCINOLET THAT ELECTRIC TOILET

RESEARCH PRODUCTS/Blankenship
2639 Andjon • Dallas, Texas 75220 • (214) 358-4238

Circle 345 on Reader Service Card

PROPULSION UPDATE

Propulsion Plant Debut For MAN B&W's Mini-Bore, Two-Stroke Diesel Engine

Free Brochure Available

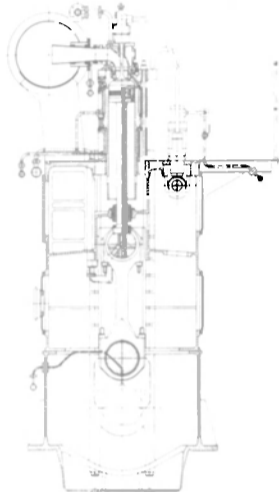
The recent seagoing debut of MAN B&W Diesel's S26MC two-stroke design—plus a growing order backlog—suggest that there is a strong market for what is reportedly the world's smallest low-speed crosshead engine in the small-to-medium oceangoing, coastal and inland ship propulsion market.

The 260-mm bore/980-mm stroke engine was released last year to extend the economic and technical merits of MAN B&W's MC two-stroke program for ships which were previously restricted to four-stroke, medium-speed geared machinery. The S26MC range encompasses four to eight-cylinder models, which offer outputs ranging from 700 kw (950 bhp) to 2,920 kw (3,970 bhp) at speeds of 250 rpm or less, allowing direct-coupling to the propeller.

The overall operational advantages of the new model—including high reliability, low maintenance demands and impressive fuel economy on low grade bunkers—have attracted Asian and European owners. Interest has intensified with the entry into service of the first S26MC marine installation—a six-cylinder model powering the Japanese 126-TEU feeder containership, the Rokku Maru.

The 6S26MC engine installed aboard the 239-foot containership, which was subcontracted to Han-shin Diesel by MAN B&W licensee Kawasaki, develops 2,185 kw (2,970

S26MC CROSS SECTION



bhp) at 250 rpm and is directly coupled to a CP propeller for a design speed of 14.3 knots.

Both the shipowner, Marui Kauin, and shipbuilder, Yamanaka Shipyard, reported that the engine performed well during sea trials with the use of heavy fuel with a 0.9963 specific gravity and 165 cSt viscosity. Very little smoke was observed under all maneuvering conditions, and none at all at full load. Low noise and vibration levels— notable features of the design—also confirmed expectations. Open inspection of the engine revealed no



The Japanese feeder containership Rokku Maru features the first MAN B&W S26MC diesel engine installation.

signs of piston ring sticking or coke.

The debut marine installation will provide a convenient practical testbed for longer term monitoring of the S26MC engine on heavy fuel. The operational integrity and performance of the design have already been well proven by the six-cylinder prototype after over a year of exhaustive testing at MAN B&W Alpha Diesel's factory in Frederik-

shavn, Denmark. The initial development goals have been comfortably met within the engine's potential margins. The prototype 6S26MC engine is now available for sale.

For a free brochure detailing the features and applications of the S26MC engine from MAN B&W Diesel,

Circle 110 on Reader Service Card

Yarrow Wins U.K. Frigates Order Worth \$538.5 Million

The U.K.'s Yarrow Shipbuilders recently won an order to build three more Type-23 frigates for the Royal Navy. The order for a fourth ship will be held over until next year when another batch of new vessels will be announced.

Each ship is about 10 million pounds (\$17 million) cheaper than the average of three earlier Type-23s ordered in 1986, bringing the price to about 105 million pounds per vessel (\$179.5 million).

The three new Duke-class ships—the Iron Duke, Monmouth and Montrose—follow four other Type-23s already under construction, three at Yarrow.

The number of new frigates of all types now on order for the Navy is now 10. Type-23 is the main anti-submarine ship envisaged for service over the next decades.

Plans call for the government to order two new frigates next year, two in 1990, three more in 1991, and again the following year. This will ensure that aging ships are replaced and the escort force of about 50 is maintained.

For free literature giving details on the facilities and capabilities of Yarrow Shipbuilders,

Circle 52 on Reader Service Card

Kiene Diesel Offers Free Literature On Cylinder Pressure Indicator K-100

Kiene Diesel Accessories, Inc. of Addison, Ill., is offering free literature on their cylinder pressure indicator K-100 for reading firing and compression pressures on gas or diesel engines.

The patented K-100 utilizes the "trapped pressure" principle, whereby cylinder pressure is "trapped" within a chamber and the pressure read directly and conveniently on a high-quality bourdon gauge. This field-proven concept reduces the moving part of the indicator to a single lightweight, high-temperature resistance valve, thus eliminating springs, counters, pistons and other operating problems.

The literature contains ordering information on the Model K-100 cylinder pressure indicator, as well as Model K-101 and Model K-107. Also discussed are V-line indicator valves for two or four-stroke/cycle gas or diesel engines.

For more information and free copies of the literature from Kiene Diesel,

Circle 34 on Reader Service Card

Daewoo's Okpo Shipyard Delivers Pan Ocean's Fourth Car Carrier

Daewoo's Okpo shipyard recently delivered Pan Ocean Shipping Co.'s fourth car carrier, the Auto Diana.

The last of the 5,700-car-capacity vessels ordered by Pan Ocean at the South Korean shipyard two years ago, the newly built car carrier will be put into service on the north American and European route to carry South Korea's export cars.

Other vessels delivered to Pan Ocean this year include the Auto Atlas and Auto Benner in March, and the Auto Champ in June.

BOAT LIFTING SLINGS

AVAILABLE IN POLYESTER AND NYLON
CUSTOM MADE TO YOUR ORDER
CALL OR WRITE FOR FREE CATALOG



FREE DELIVERY ANYWHERE IN THE CONTINENTAL U.S.A. ON ORDERS OF \$500.00 OR MORE

Rated Capacity in Pounds

Stock No.	Width (Inches)	Ply	Basket Hitch
BLS-1-602	2	1	4800
BLS-1-902	2	1	6400
BLS-2-602	2	2	9600
BLS-2-902	2	2	12800
BLS-1-603	3	1	7200
BLS-1-903	3	1	9600
BLS-2-603	3	2	13320
BLS-2-903	3	2	17760
BLS-1-604	4	1	9600
BLS-1-904	4	1	12800
BLS-2-604	4	2	17280
BLS-2-904	4	2	23040
BLS-1-605	5	1	12000
BLS-1-905	5	1	16000

Stock No.	Width (Inches)	Ply	Basket Hitch
BLS-2-605	5	2	21000
BLS-2-905	5	2	28000
BLS-1-606	6	1	14400
BLS-1-906	6	1	19200
BLS-2-606	6	2	24480
BLS-2-906	6	2	32640
BLS-1-908	8	1	25600
BLS-2-908	8	2	40960
BLS-1-910	10	1	32000
BLS-2-910	10	2	48000
BLS-1-912	12	1	38400
BLS-2-912	12	2	53760

METRO WIRE ROPE CORP.

553 Lehigh Ave., Union N.J. 07083
(201) 964-3690 Fax: (201) 964-8990

HYDRAULIC CRANES

Aerial Baskets
Knucklebooms
Digger Derricks
Pressure Diggers
HiRail Equipment
80 Used Units in Stock
sold as is or reconditioned



Wanted - listed used equip

OPDYKE'S Trucks & Equipment
Hatfield, PA 19440
(PHILA. AREA) (215) 721-4444

PROFESSIONAL

24 Hours
A Day
7 Days
A Week

AMT

Marine
Emergency
Service

***ENGINEERING/CONSULTING SERVICES — SURVEYING**
***LASER/COMPUTER ENGINE ALIGNMENTS**
***DIESEL ENGINES - STEAM - TURBINES - BOILERS**
***MACHINING - IN SHOP OR IN PLACE "METRIC" AND "INCH"**
***BEARING REBABBITTING - CLASS APPROVED**
***HYDRAULICS - PNEUMATICS - REFRIGERATION**
***STEELWORK - PIPE - MACHINERY - ELECTRICAL**

2400 N.W. 39 Ave., Miami, U.S.A. FL 33142
 (305) 871-4094 Telex: 512408 Teletax: (305) 871-3180 Cable: AMT MARINE
 FACTORY AUTHORIZED Repairer and Spares Dealer for

CAPTAIN ASTAD CO. INC. SHIPBROKERS
PURCHASE & SALE OF ANY TYPE OF SHIPS
PURCHASE AGENTS ENGINE & DECK SPARE PARTS
OWNERS REPRESENTATIVE

CAPTAIN ASTAD CO. INC.
 P.O. BOX 1093
 HOUMA, LA 70360
 PHONE 504/529-4171
 FAX 504/851-7084
 TELEX 6821298 "ASTAD"
 JODY M. ST. GERMAIN ESKINE, V.P.

CAPTAIN ASTAD CO INC.
 P.O. BOX 350486
 FORT LAUDERDALE FL 33335
 PHONE 305/344-3502
 FAX 305/771-5214
 TELEX 705722 "OPMC" FTL
 CAPT. A. J. ASTAD, PRES.

ARTHUR D. DARDEN
 INCORPORATED

NAVAL ARCHITECTS & MARINE ENGINEERS
 3100 RIDGELAKE DR. SUITE 101
 METAIRIE, LOUISIANA 70002 (504) 832-3952

PUSHBOATS, TUGS, CREWBOATS, TENDERS
BARGES OF ALL TYPES, INLAND OR OFFSHORE
 WILLIAM T. BERGERON
 BERGERON & ASSOCIATES
 MARINE BROKERS
 (504) 271-7171

P.O. BOX 726 CHALMETTE, LA 70044
 "IF YOU NEED IT, WE CAN FIND IT"

DESIGN ASSOCIATES, INC.
 M. KAWASAKI
 14360 Chef Menteur Highway
 New Orleans, Louisiana 70129

Naval Architects Marine Management **Marine Engineers Transportation Consultants**
 Phone: (504) 254-2012 TWX 810-951-5317

advanced marine
 ENTERPRISES, INCORPORATED

HEADQUARTERS:
 Suite 1300
 1725 Jeff Davis Hwy.
 Arlington, VA 22202
 703 979-9200

SYSTEMS MANAGEMENT
 Acquisition Management
 Logistic Support
 Systems Integration
 Charles H. Piersall Jr., Division President

SHIP ENGINEERING & DESIGN
 Feasibility Studies through Detail Design
 Alteration & Conversion Design
 Systems Engineering
 Dr. Robert S. Johnson, Division President

FIELD OFFICES:
 Virginia Beach
 Philadelphia

FLEET SUPPORT & FIELD ENGINEERING
 In-service Engineering
 Overhaul, Repair, and Test Support
 Self-help & Alteration Installation
 Gordon M. Green, Division President

PROJECT OFFICES:
 At Customer Sites

COI marine company
 PROFESSIONAL • EXPERIENCED • RESPONSIVE

SUPPORTING THE MARINE INDUSTRY WITH:

ENGINEERING SERVICES
 DETAILED DESIGN
 COMPUTER AIDED DESIGN
 TECHNICAL PUBLICATIONS
 LOGISTICS

JACKSONVILLE (904) 724-9700 PHILADELPHIA (609) 228-1853 NEWPORT NEWS (804) 245-0516 PORTSMOUTH (804) 397-8000 BREWERTON (206) 479-8829

E.Y.E. MARINE CONSULTANTS
 NAVAL ARCHITECTS • MARINE ENGINEERS
 SHIP SURVEYORS • OFFSHORE ENGINEERS

Dartmouth, Nova Scotia Tel: (902) 463-8940
 Fax: (902) 463-6319
 Canada Tlx: 019-22632
 St. John's, Newfoundland Tel: (709) 722-5560
 Fax: (709) 722-4880

ENCON MANAGEMENT & ENGINEERING
 CONSULTANT SERVICES

Marine Structures • Engineering Analysis • Marine Survey
 Project Management • Loss Prevention • Naval Architecture

P.O. Box 7760 • Beaumont, Texas 77706
 (409) 866-9158

C.T. MARINE
 NAVAL ARCHITECT • MARINE ENGINEER

18 Church Street, Georgetown, CT 06829
 Telephone: 203-544-8110
 Telex: ITT 4994761

• TUGS
 • TOWBOATS
 • BARGES

BARGES - TUGS - TOWING
 CHARTERS AND SALES
 (312) 798-2419
 FAX (312) 798-1077

Jack Faulkner
 Tug & Barge Sales

PROCUREMENT AGENTS
 ON INLAND
 AND OCEAN TOWING

2419 Caddy Lane Flossmoor, Illinois 60422
 TOWING ANYWHERE THERE IS WATER

CHILDS ENGINEERING CORPORATION
Waterfront Engineering
Diving Inspection

BOX 333, MEDFIELD, MA 02052
 (617) 359-8945

CHRISTOPHER J. FOSTER, INC.
 WORLD-WIDE EXPERIENCE AS DESIGNERS OF
 GRAVING DOCKS • MARINE STRUCTURES
 SHIPYARDS • MODERNIZATION • PORT FACILITIES
 OFFSHORE TERMINALS • FLOATING DRYDOCKS

MARINE ENGINEERS • NAVAL ARCHITECTS
CONSULTING ENGINEERS
 PORT WASHINGTON NEW YORK 11050
 (516) 883-2830 TELEX 14-4674 CABLE: "CEFOSTA"

AmSEC AMERICAN SYSTEMS
 ENGINEERING CORPORATION

Marine Engineers • Port Engineer Services
 Systems Analysis • Propulsion Plant Training
 Qualified Manufacturers Field Representatives

P.O. Box 8988 • Virginia Beach, VA 23452 • (804) 463-6666
 Philadelphia, PA • Bremerton, WA • Virginia Beach, VA
 Arlington, VA • San Francisco, CA • San Diego, CA

CRANDALL
 DRY DOCK ENGINEERS, INC.

Railway and Floating Dry Docks
 Waterfront Structures • Consulting
 Design • Inspection
 Dry Dock Hardware and Equipment

21 Pottery Lane Dedham, MA. 02026
 Tel. (617) 329-3240 Telex: 924406

GIBBS & COX INC
 NAVAL ARCHITECTS & MARINE ENGINEERS

119 West 31st Street • New York, N.Y. 10001
 (212) 613-1300

AMIRIKIAN ENGINEERING CO.
 HARBOR AND DRYDOCKING FACILITIES
 FLOATING LIFT DOCK AND SHORE TRANSFER
 CONCEPTS, DESIGN, INVESTIGATIONS

Chevy Chase Center Office Bldg.
 Suite 505, 35 Wisconsin Circle
 Chevy Chase, Md. 20015 (301) 652-6903

crane consultants inc.

15301 1st Ave. So. Seattle, Washington 98148
 (206) 246-7962 TWX 910-444-2085
 Crane hoist, materials handling specialists

JOHN W. GILBERT ASSOCIATES, INC.

Naval Architects Marine Engineers

66 LONG WHARF
 BOSTON, MASS. 02110
 (617) 523-8370

COATINGS—CHEMICALS—GAUGES
 International Paint (U.S.A.) Inc.
 Henric-Vecom (U.S.A.) Ltd.
 DeFelsko Corporation

ARMORICA SALES INC.
 2 Marineview Plaza • Hoboken, NJ 07030
 (201) 792-7682

C. R. CUSHING & CO., INC.
 NAVAL ARCHITECTS, MARINE ENGINEERS
 & TRANSPORTATION CONSULTANTS

18 Vesey Street
 NEW YORK, N.Y. 10007
 TEL (212) 964-1180 CABLE CUSHINGCO
 TX: 752481

Seattle, Washington
 Phone: 206-624-7850
 Telex: 882053

THE GLOSTEN ASSOCIATES, inc.
 CONSULTING ENGINEERS SERVING THE MARINE COMMUNITY

Ocean Engineering Centre
SHIP-MODEL TESTING

- Resistance Tests • Flow Visualization
- Wake Surveys
- Towed Directional Stability Evaluations
- Seakeeping

For Information Contact:
B.C. Research
Ocean Engineering Centre
 3650 Westbrook Mall,
 Vancouver, Canada V6S 2L2
 Telephone (604) 224-4331
 Telex 04-507748

DLI MARINE
 ENGINEERING CORPORATION VIBRATION ANALYSIS
 NOISE CONTROL

253 Winslow Way West, Bainbridge Island, WA 98110
 (206) 842-7656

Measurement, recording and
 analysis of mechanical,
 structural and electrical
 phenomena.

MORRIS GURALNICK ASSOCIATES, INC.

NAVAL ARCHITECTS MARINE ENGINEERS

620 Folsom St., Suite 300, San Francisco, CA 94107
 Main Office: (415) 543-8650
 Ventura Office: (805) 656-2322

C. Raymond Hunt Associates, Inc.
High Speed Powerboat Design

69 Long Wharf - Boston, MA 02110
 Tel: (617) 742-5669/FAX: (617) 742-6354

THE WORLD'S LARGEST NS&V FACILITIES

H-TEST

LABORATORIES, INC.

CORPORATE OFFICE
P.O. BOX 226
BUCKINGHAM, VA 23921
(804)969-4264

GOV T LIAISON OFFICE
CRYSTAL SQUARE 4 SUITE 300
1745 JEFFERSON DAVIS HWY
ARLINGTON, VA 22202
(703)521-2511

TEST FACILITIES
P.O. BOX 87
ARVONIA, VA 23004
(804)581-3204

COMPETITIVE ON SCHEDULE

- HI-Impact Shock Testing (MIL-S-901) Light/Medium/Heavy
- Environmental Vibration Testing Type I (MIL-STD-167) To 35,000 Lbs
- Internally Excited Vibration Testing Type II (MIL-STD-167)
- Airborne & Structureborne Noise Testing (MIL-STD-740)
- Pitch & Roll Simulation Testing (MIL-STD-16400) To 20,000 Lbs
- Functional Testing, QA Testing (NDT) & Failure Analysis
- Fixture, Structure and Foundation Design & Fabrication
- Qualified Welding—Steel, Aluminum SS, HY80, HY100, HY130, HSLA
- Finite Element Analyses (DDAM Structural, Dynamic & Transient)
- Noise, Shock, & Vibration (NS&V) Field Testing and Shipboard Surveys
- NS&V Program Management Plans & Impact Studies (ECP's, Failure Mods)
- NS&V Data Review, Evaluation, Management & Coordination
- NS&V Test Plans, Procedures, Reports & Management Support
- State of the Art NS&V Measurement and Data Analysis Instrumentation

SUPPORTING THE MARINE INDUSTRY WORLDWIDE

Consulting in Naval Architecture & Marine Engineering
Marine Design Computer Services
NavCad™ Marine Engineering Software

45 JAMES FARM - LEE
PO BOX 865
DURHAM, NH 03824
603-659-2660

HYDROCOMP

MARINE SURVEYORS
ENGINEERS
CONSULTANTS

INTRAMARINE, INC.

P.O. BOX 53043 JACKSONVILLE, FL 32201
(904) 353-0828 TELE: 56-8421
FAX (904) 353-1103

•HULL •MACHINERY •YACHT SURVEYS

JJH Inc.

A NAVAL ENGINEERING COMPANY

"Quality First"

CHERRY HILL, NJ 609-663-3020
CRYSTAL CITY, VA 703-920-3435
PORTSMOUTH, VA 804-399-4096
BATH, ME 207-443-1303

R. D. Jacobs and Associates
Naval Architects • Marine Engineers
Consulting Engineers

MARINE AND STATIONARY PROJECTS
Marine Surveyors: Project Specifications and Designs.
Energy Efficient Concepts
Owner Representation Services: Machinery
Casualty Investigations:
Practical Engineering Economics Analyses

11405 MAIN ST., ROSCOE, IL 61073 815-623-6760

JAMES S. KROGEN & CO., INC.

NAVAL ARCHITECTS & MARINE ENGINEERS

Tel. (305) 642-1368

1515 N.W. 7th St., Suite 124, Miami, FL 33125

RODNEY E. LAY & ASSOCIATES
NAVAL ARCHITECTS

NAVAL ARCHITECTS • MARINE ENGINEERS

13891 Atlantic Blvd.
Jacksonville, Florida 32225

(904) 246-6438 TWX 810-828-6094

CLYDE LEAVITT INC.

CONSULTING NAVAL ARCHITECT
ADMIRALTY LITIGATION EXPERT
MARINE FORENSIC MODEL CONSTRUCTION
MARINE SURVEYOR

13901 Puerto Drive, Ocean Springs, MS 39564-2019
Telephone 601-875-5711

MACPHERSON MARITIME SERVICES

Marine Transportation Consultants
Shipping Economists
Business Planners

141 Jefferson Avenue
Westfield, New Jersey 07090

Telephone: 201/232-3636 Telex: 833231 (700)

Alan C. McClure Associates, Inc.
NAVAL ARCHITECTS • ENGINEERS

2600 South Gessner • Suite 504 • Houston, Texas 77063
(713) 789-1840 • Telex 792397

Mc ELROY

MACHINE & MFG. CO., INC.
A PREDCO COMPANY
ENGINEERING & DESIGN OF

ANCHOR HANDLING SYSTEMS
AND MARINE DECK MACHINERY
COMMERCIAL-OFFSHORE-MILITARY

P.O. Box 4454
Biloxi, MS 39535-4454
PHONE (601) 896-3736
TELEFAX (601) 896-0874
1-800-634-6478

John J. McMullen Associates, Inc.

JJMA

Naval Architects • Marine Engineers • Transportation Consultants

New York, NY • Arlington, Va • Newport News, Va • Houston, Tx
Ventura, Ca • Bath, Me • Seattle, Wa • Pascagoula, Ms

One World Trade Center/Suite 3000/New York, New York 10048/(212)466-2200

Speed & Propulsion Power Policy

FENDALL MARBURY

NAVAL ARCHITECT

9 NEAL STREET
ANNAPOLIS, MARYLAND 21401 (301) 266-8254

MAINTENANCE MANAGEMENT
FULL SERVICE SYSTEMS

MMS

MARINE MANAGEMENT SYSTEMS INC.

- SPARE PARTS INVENTORY
- PLANNED MAINTENANCE
- CONDITION MONITORING

SOFTWARE • HARDWARE • ENGINEERING SERVICES

102 HAMILTON AVENUE • STAMFORD, CT 06902 • (203) 327-6404
TLX 996483 • FAX (203) 967-2927

THE PROFESSIONALS

Maintenance, Repair & Retrofit Specialists

MPA

MARINE POWER ASSOCIATES

MARINE ENGINEERS

1010 Turquoise St., Ste. 217, P.O. Box 99546
San Diego, CA 92109, (619) 488-7703

MARITIME DESIGN, INC.

NAVAL ARCHITECTS MARINE CONSULTING MARINE DESIGN

MARINE ENGINEERS COMPUTER PROCESSING MARINE SURVEYS

2955 HARTLEY RD • JACKSONVILLE, FL 32217 • (904) 268-9137

Coast Guard/State Pilotage License Insurance

Worried about defending your license or yourself in a hearing conducted by the Coast Guard, National Transportation Safety Board or a State Pilotage Authority which could result in license revocation, suspension or assessment of a fine/money damages against you personally?

Stop worrying. Insure yourself and your license with a marine license insurance policy provided by the Merchant Officers Protective Syndicate (MOPS). For more information contact R.J. Mellusi & Co. Agent, 71 Hudson St., N.Y. 10013 (212) 962-1590

Telephones (212) 943-7070
(201) 984-2295

MOWBRAY'S

SPECIALISTS IN BUYING, SELLING AND RENTING TUG BOATS • BARGES CONTRACTORS FLOATING EQUIPMENT

Night (201) 538-1789
FAX: 710-991-0290

TUG AND BARGE SALES CORP.
35 DE BARI STREET, MORRISTOWN, N.J. 07960
YOUR MARINE CONSULTANTS

NELSON & ASSOCIATES, INC.

MARINE

SURVEYORS ENGINEERS CONSULTANTS APPRAISERS

610 N.W. 183 St., Miami, Fla. 33169 (305) 653-4884
Telex: 44-1869 Cable: NELSURVEY

NORD-MARINE, INC.
MARINE SURVEYORS-ENGINEERS-CONSULTANTS

153 KEMP AVE. FAIR HAVEN, NJ 07704
PHONE: (201) 741-4403 (24HR/7DAY) TELEX: 178323 NORD UT

• INSURANCE APPRAISING • PURCHASE AND SALE SURVEYS • MAINTENANCE AND REPAIR SUPERVISIONS OF HULL AND MACHINERY • DIESEL ENGINES • NEW BUILDING SUPERVISIONS • DRAFTING SERVICES • CASUALTY AND PERSONAL INJURY INVESTIGATIONS • CONSULTING IN ADMIRALTY CASES •
Languages: Finnish, Swedish/Scandinavian, German

NORTHERN MARINE

Naval Architecture - Marine Engineering
Marine Surveying
(616) 946-5959

P.O. Box 1169 Traverse City, MI 49685

OCEAN-OIL INTERNATIONAL
ENGINEERING CORPORATION

3019 Mercedes Blvd., New Orleans, Louisiana 70114, U.S.A

NAVAL ARCHITECTS • MARINE SURVEYORS
SALVAGE ENGINEERS

Hector V. Pozos, P.E.
Phone: 504/367-4072
Telex: 58364 NLN
FAX: 504/367-0122

Q.E.D. SYSTEMS, INC. VIRGINIA BEACH (804) 490-5000

MARINE ENGINEERS NAVAL ARCHITECTS
LOGISTICS ENGINEERS

ARLINGTON BREMERTON JACKSONVILLE
SAN DIEGO PHILADELPHIA
LAKEHURST CHARLESTON SAN FRANCISCO

M. ROSENBLATT & SON, INC.
NAVAL ARCHITECTS AND MARINE ENGINEERS

New York City 350 Broadway New York, NY 10013 (212) 431-6900
San Francisco 667 Mission Street San Francisco, CA 94105 (415) 777-0500
Boston Philadelphia Washington, D.C. Newport News Charleston Norfolk
Bremerton San Diego Honolulu Oxnard

M. ROSENBLATT & SON, INC.
NAVAL ARCHITECTS AND MARINE ENGINEERS

STV/SANDERS & THOMAS

Marine Engineering • Systems Analysis
Consulting/Design Engineering

7900 Westpark Drive McLean, VA 22102 703/893-1339

SARGENT & HERKES, INC.

NAVAL ARCHITECTS • MARINE ENGINEERS

225 BARONNE ST., SUITE 1405
NEW ORLEANS, LA 70112
(504) 524-1612

Seaworthy Systems, Inc.

Marine Engineers and Naval Architects

P.O. Box 338 Essex, CT 06426
P.O. Box 205 Solomons, MD 20688
17 Battery Pl N.Y., N.Y. 10004
2 Skyline Place/Suite 311 Falls Church, VA 22041
Telex: 517931 Seaworthsys

New Satellite Communications System From Comsat Selected For Blue Riband Competition

Comsat Technology Products, Inc. recently announced that its MCS-9120 Satellite Communications Terminal has been selected for use aboard the Gentry/Continental's Proud Bird—the U.S. competitor in the upcoming challenge for the Blue Riband of the Atlantic.

This will be the first time a maritime satellite communications terminal (Satcom) has been used at continuous high-speeds (averaging 45 knots per hour), as the Gentry/Continental's Proud Bird attempts to break the record for trans-Atlantic crossings. Throughout the running, the MSC-9120 will provide voice telex and fax transmissions enabling the crew to keep abreast of weather updates and progress reports.

Comsat's MCS-9120 is one of the smallest, lightest, maritime satellite communications terminals available. It provides instantaneous, private, direct-dial, voice, data, facsimile, and telex communications through the worldwide Inmarsat satellite network.

Inmarsat is an international cooperative comprised of approximately 50 member countries that oversees operation of its global satellite system. All communication to and from the Satcom passes through a designated Inmarsat satellite and Coast Earth Station which provides access to the international Telex and Telephone networks.

The MCS-9120 is a third generation marine

satellite communications (Satcom) system. Comsat developed and introduced the first Satcom to the marine community more than 12 years ago. Comsat Technology Products, Inc. is a wholly owned subsidiary of the Comsat Corporation.

For more information and free literature from Comsat Technology Products,

Circle 26 on Reader Service Card

Samson Sold To Management Group—Will Focus On Expanding Use Of High Performance Ropes

Enserch Corporation of Dallas, Texas, has sold its wholly owned subsidiary, Samson Ocean Systems, Inc., to the company's management group of **Stephen Swiackey**, president and chief operating officer; **Charles E. Smith**, vice president of sales and marketing; and **Daniel Dally**, vice president of finance. This group represents 35 years of combined service in the cordage industry, and has been in position for three years.

The offshore energy business of Samson, located in Coatbridge, Scotland, was recently sold to Bridon Fibres PLC of England. The offshore operation designed and manufactured fiber rope mooring systems for the offshore loading of oil tankers.

According to president **Swiackey**, Samson will now concentrate its engineering, manufacturing and sales on expanding the high performance cordage and rope markets it has developed and served in the U.S. and Canada, including

hardware, housewares, commercial fishing, pleasure boating, power transmission and distribution, commercial marine and Department of Defense requirements. This includes the use of recently developed higher tenacity fibers which can be made into ropes with up to 10 times the strength of steel, making it possible to expand applications of synthetic fiber strength members. Current projects include micro-braids for artificial ligaments, zero-stretch halyards for sailboats, higher strength mooring lines for ships and improved net and lead lines for commercial fishing.

For additional information and free literature,

Circle 27 on Reader Service Card

Seaward International Delivers 34 Sea Guard Marine Fenders To U.S. Naval Station In Florida

Seaward International, Inc., Clearbrook, Va., recently announced that it has completed the manufacture, testing and delivery of thirty-four 7-foot-diameter by 14-foot-long Sea Guard® marine fenders for installation at the U.S. Naval Station in Mayport, Fla.

In 1982, Seaward supplied the base with twenty 6- by 12-foot Sea Guard fenders for use in protecting the relatively thin-skinned hulls of the new FFG-class ships being homeported at Mayport. These original fenders provided outstanding performance. As a result, the naval station has systematically been upgrading the fendering at all of its piers and wharves with foam-filled fendering. The recent order brings the total number of Seaward fenders at the base to over 130 fenders.

In late 1987, Ed Waters & Sons Contracting Co., Inc., a Jacksonville, Fla.-based marine construction company, was awarded a contract by the U.S. Navy for the removal and replacement of the existing fender system at four berths on Pier D located at the Mayport Naval Station. Seaward delivered the 34 large fenders within 90 days after the contract award, and the project was completed in less than one-half the allocated contract time. All normal daily port operations were conducted without disruption.

The Sea Guard fenders supplied for this project were manufactured by Seaward International to the U.S. Navy specifications which were developed largely based on the design and performance of the standard Sea Guard marine fender product line. Seaward manufactures and supplies a wide range of marine fenders and flotation equipment to the Navy and commercial marine industries.

For further information on Seaward's other fendering and flotation products,

Circle 24 on Reader Service Card

Woods Hole To Award Contract On Competitive Bid Basis To Pre-Qualified Contractors

The Woods Hole Oceanographic Institution is planning the overhaul and refit of two oceanographic research vessels, the Melville and the Knorr. The scope of work includes lengthening, repowering, propulsion replacement, and general overhaul commencing on or about November 1988 for the first ship and July 1989 for the second ship. The ships presently have a length between perpendiculars of 220 feet, 46-foot beam, 16-foot draft, and are of 2,200 long tons displacement. Work is to be done by a qualified shipyard in the contiguous U.S.

An award will be on a competitive bid basis to pre-qualified contractors. Shipyards desiring to qualify should address letters of interest to: Purchasing Manager, Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543, phone (617) 538-1400, telex 951679.

DECK OFFICER COURSES

USCG approved - RADAR OBSERVER COURSE
USCG approved - FIREFIGHTING SCHOOL
Also USCG Exam Prep Courses for CAPTAIN, MASTER, AB, ENGINEER, QMED

SEASCHOOL TOLL FREE 1-800-BEST-ONE NATION WIDE

GEORGE G. SHARP, INC.

SYSTEMS ANALYSIS
NAVAL ARCHITECTS - MARINE ENGINEERS
100 CHURCH STREET-NEW YORK, N.Y. 10007
(212) 732-2800

WASHINGTON, D.C. (703) 892-4000
VIRGINIA BEACH, VA. (804) 499-4125
PHILADELPHIA, PA. (609) 772-0888
TWX: 710-581-2758 CABLE: GEO SHARP NYK

T.W. SPRETTGENS

TORSIONAL VIBRATION SPECIALISTS
OUR 42ND YEAR SERVING INTERNATIONAL CLIENTS

156 W. 8th Ave. (604) 879-2974
Vancouver, Canada V5Y 1N2 Telex 0455188
FAX: (604) 879-6588

R.A. STEARN INC.

NAVAL ARCHITECTS and MARINE ENGINEERS
253 N. 1st Avenue
Sturgeon Bay, WI 54235
Phone (414) 743-8282 TLX 753166, ESL 62388810

STURGEON BAY MODEL SHOP
SHIP MODELS SINCE 1941

phone
414/894-2859
414/743-2921
414/744-3091

Wm. L. Herbst
187 N. Ninth Ave.
Sturgeon Bay, WI 54235

DISPLAY & DESIGN MODELS

Quality Management, Training, Technical Support, ILS and Marine Engineering Services

SEACOR

15 Locations Worldwide

SYSTEMS ENGINEERING ASSOCIATES CORPORATION
200 EAST PARK DRIVE
MT. LAUREL, NEW JERSEY 08054
(609) 866-2400

SEACOR is a subsidiary of Day & Zimmermann, Inc.

Trans-International Marine Services Corp.

TIMSCO

MAINTENANCE MONITORING SYSTEMS
INVENTORY CONTROL SYSTEMS
P.O. Box 91360
Mobile, Alabama 36691 205/666-7121

Tracor Hydronautics

INTEGRATED ENGINEERING SERVICES FOR THE MARINE INDUSTRY

RESEARCH • DEVELOPMENT
DESIGN • TESTING

HYDRONAUTICS SHIP MODEL BASIN

Tracor Hydronautics
7210 Pindell School Road
Laurel, Maryland 20707
Telephone: (301) 776-7454
Telex: 8-7585

VIBRANALYSIS ENGINEERING CORP

- PREDICTIVE MAINTENANCE PROGRAMS
- VIBRATION ANALYSIS
- FIELD & SHOP BALANCE
- ACOUSTICAL CONSULTANTS
- COMPUTERIZED DATA COLLECTION
- MARINE APPLICATIONS

VIBRANALYSIS ENGINEERING CORP
4380 S. Wayside, Suite 100 713-643-1051
Houston, TX 77087

WELDING CONSULTANTS USA
6517 RADBURN, GREENDALE, WI [414] 421-3252
ST. PETERSBURG, FL. HOUSTON, TX.

PROVIDING WELDING ENGINEERING SERVICES TO SHIPS, MACHINERY, HULL, MARINE STRUCTURAL DESIGNS, ALTERATION, REPAIRS, CONVERSIONS AND UNDER-WATER STRUCTURES

WINCHES
CRANES



HATCH
COVERS

DEL GAVIO

MARINE HYDRAULICS, INC.


SALES • SERVICE • CONSULTING • PARTS

Complete Repairs
On All Types of Electro Hydraulic
Steering Systems and Deck Machinery

Hydraulic Pump Testing,
Rebuilding For Certification

24 Hour Service, Worldwide
207 West Central Ave., Maywood, N.J. 07607
Telephone: (201) 843-4700
Telex: 132610 DELMARINE

Circle 155 on Reader Service Card



CHOICE OF PROFESSIONALS
RIGID HULL INFLATABLE BOATS

PATROL RESCUE ENFORCEMENT

ZODIAC OF NORTH AMERICA

P.O. BOX 400
THOMPSON CREEK ROAD
STEVENSVILLE, MD. 21666

Circle 281 on Reader Service Card

McELROY

DECK EQUIPMENT

ENGINEERED TO PERFORM
ENGINEERED TO LAST

P.O. BOX 4454
BILOXI, MISSISSIPPI
39535-4454
(601) 896-3736
TELEFAX: (601) 896-0874
1-800-634-6478



WINDLASSES




CAPSTANS

McElroy stands ready to engineer,
design, and quickly deliver any type
deck equipment your requirements
call for.

Circle 138 on Reader Service Card

JIM'S PUMP REPAIR INC.



Established 1974

JIM LAGONIKOS,
President

BOB MOONEY,
Sales & Service
Manager

Reconditioned Coffin & Pacific Pumps
A-1 Conditon

TYPE • F-CG - DE - DEB - IND -T- DEB-22
TBA • 12 - 16 - 16½

Service 24 HRS • Parts Available
TEL 718-392-4444 • TLX-TWX
FAX 718-482-8372 • 710-5824847 JPRNYK

Circle 332 on Reader Service Card

We have built over 5000

BARGES




Inland, ocean, and specialty service
barges of all types.

If you transport—chemicals, petroleum,
commodities, coal, hazardous materials, or
whatever, we can build it to your design
or ours. Up to 600 feet with ASME tanks.



Equitable Shipyards, Inc.
A Trinity Industries Company
P.O. Box 8001, New Orleans, La. 70182
504-286-2500 Telecopy: 504-286-2554

Circle 269 on Reader Service Card



Specializing in

- Water Transportation of General
Cargo, Chemicals and Bulk
Petroleum
- Sales, Charters and Brokerage
of Marine Equipment and Vessels
- Vessel Design, Construction
and Repair

3121 SW Moody Avenue, Portland, Oregon 97201
(503) 228-8691/(800) 547-9259
RCA Telex 283985 FAX: (503) 228-6750
Ask for Bill Gobel or Jack Breshears

Circle 178 on Reader Service Card

FISH EXPO[®] 1988

Sponsored by National Fisherman

BAYSIDE EXPOSITION CENTER,
BOSTON, MASSACHUSETTS, USA.
OCTOBER 12-15, 1988

Now in our 22nd year, FISH EXPO
'88 returns to Boston, where you
can meet the world's leading
suppliers of Fishing Gear, Marine
Equipment and Supplies at the
World's Largest Commercial
Fishing Trade Show. Don't miss it!

Over 750 Exhibits
500 Companies
15,000 Visitors
Free Seminars

For more information:
National Fisherman Expositions, inc.
P.O. Box 7437 DTS, Portland, ME 04112
207-772-3005
Telex: 322721 FAX: 207-772-5059

Circle 290 on Reader Service Card



DIESEL AMERICA INC. Manufacturers of Quality Diesel Powered Equipment

Introducing: The Diesel Alternative (Diesel Pump Under \$1000 & 90 lbs.)



We offer a full range of light weight air cooled Diesel Products including Pumps, Generators, Compressors, Pressure Washers etc., with prices and weight comparable with gasoline products. (30 day limited offer our L40-2D5E. 2" cent. pump complete is reduced from a list of \$1195 to \$995). Call for details on our other full range of products.

Diesel America
(West)
PO Box 968
Friday Harbor, WA 98250
Tel: (206) 378-4182
Fax: (206) 378-3315

Diesel America
(Central)
5217 River Road
New Orleans, LA 70123
Tel: (800) 456-0918
Tel: (504) 733-6944
Fax: (504) 733-6939

DIESEL PUMPS
&
OTHER DIESEL PRODUCTS

Circle 186 on Reader Service Card

FERNSTRUM GRIDCOOLER

When lives depend on your
boat's reliability ...



Don't take a
chance on your
cooling system. Crockett
& McConnell use Fernstrum
GRIDCOOLERS to keep their
search and rescue crafts always ready.

Fernstrum GRIDCOOLERS are completely assembled and factory tested to assure dependable service. Fernstrum GRIDCOOLERS are available in copper-nickel 90/10 and 5000 series aluminum.

TO CONTACT US:
R. W. FERNSTRUM & COMPANY
MENOMINEE, MICHIGAN, U.S.A. 49858
Phone: (906) 863-5553 • Telex: 26-3493
Answer Back: FERNSTRUM MNOM

Circle 165 on Reader Service Card

FOR MORE INFORMATION ON EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

CIRCLE THE APPROPRIATE NUMBER ON READER SERVICE CARD OPPOSITE PAGE 78

ADVERTISER	EQUIPMENT CIRCLE /SERVICE NO.
ACUREX	POWERMETERS 142
AEROQUIP	MARINE HOSE FITTINGS 121
	T-J CYLINDERS 122
	CONVOLUTED TEFLON HOSE 123
	QUICK DISCONNECT COUPLINGS 124
ASEA BROWN BOVERI	TURBOCHARGERS 126
ALLIED SIGNAL, FIBERS DIV	ROPE 295
ALLIED SIGNAL, SAMSON OCEAN SYSTEMS	POWER BRAID ROPE 125
ASTILLEROS ESPANOLAS	SHIPBUILDING 184
BALDT	ANCHOR/CHAIN 166
BERGEN DIESEL	DIESEL ENGINES 191
BIRD JOHNSON	CP PROPELLERS 131
BRODOSPLIT	SHIPBUILDING 192
CHEVRON	MARINE LUBE OILS 200
CINCINNATI GEAR	GEARS 195
CLA-VAL	VALVES 151
COMBUSTION ENGINEERING	WASTE HEAT RECOVERY 206
COMSAT MARITIME SERVICES	COMMUNICATION EQUIPMENT 204
CRANDALL DRYDOCK	DRYDOCK CONSULTING/DESIGN 278
CRUISE SHIPPING '89	TRADE SHOW 223
CURACAO DRY DOCK	SHIP REPAIR 229
DEL GAVIO	HYDRAULICS 155
DIESEL AMERICA	DIESEL PUMPS 186
EES/OMNIPURE	OMNIPURE WASTEWATER TREATMENT SYSTEM 216
ECKOLD	ECKOLD KRAFT FORMS 148
ELDEC	ELECTRONIC SWITCHES 164
F.C.S.	CERAMIC COATED COMBUSTION COMPONENTS 208
FERNSTRUM	GRIDCOOLERS 165
FINCANTIERI	SHIP REPAIR 128
FISH EXPO 88	TRADE SHOW 290
STANLEY FLAGG CO	FITTINGS & FLANGES 237
GE NAVAL & DRIVE TURBINES	PROPULSION SYSTEMS 300
GAYLORD	GALLEY HOODS 238
GOLTENS	DIESEL ACCESSORIES 230
HBC	BARGE BUILDING 218
HENSCHEL	SHIPBOARD ADDRESS SYSTEMS 241
HITACHI ZOSEN	OIL CARRIER DESIGN 210
HYATT AT OAKLAND	ACCOMMODATIONS 350
INTERNATIONAL MARITIME ASSOC	MARKETING INFORMATION SERVICES 275
INTERNATIONAL MARITIME EXPOSITION/S.N.A.M.E.	ANNUAL MEETING 175
INTERTRADE	FENDERS 197
JIM'S PUMP	PUMP REPAIR 332
JUGOLINJA	VESSEL OPERATOR 236
KAHLENBERG	ELECTRIC HORN/NAVIGATION SAFETY EQUIPMENT 234
KaMeWa	PROPULSION TECHNOLOGY/SYSTEMS 244
KELVIN HUGHES	RADAR SYSTEMS 201
KIENE DIESEL	DIESEL ACCESSORIES 221

ADVERTISER	EQUIPMENT CIRCLE /SERVICE NO.
KRUPP MaK	DIESEL ENGINES 273
LEISTRITZ CORP	PUMPS 261
LOEFFLER	VALVES 261
McCAUSEY	MARINE LUMBER 225
McELROY	DECK MACHINERY 138
MAN B&W DIESEL, HOLEBY	DIESEL ENGINES 215
MAN GHH	DRYDOCKS 202
MARINE TRAVELIFT	MOBILE VESSEL HOISTS 163
MARKISCHES WERK	VALVE SPINDLES 232
L. Q. MOFFITT	BEARINGS/STAVES/SLEEVES 227
	SHAFT LINERS 226
MORRISON-KNUDSEN, POWER SYSTEMS DIV	EMD DIESEL ENGINES 133
NATIONAL SPECIALTY PRODUCTS	FIBERGLASS PRODUCTS 235
NEUHAUS	HOISTS 246
NON-FERROUS BOLT	FASTENERS 268
NORCONTROL	TRAINING SIMULATORS 220
OKABE CO	FASTENERS 343
OVAKO	STEEL COUPLINGS 212
PBM	BALL VALVES 150
PALMER INTERNATIONAL	POLYMERS 270
PHOENIX PRODUCTS	LIGHTING PRODUCTS 330
PORT OF IBERIA	PORT SERVICES 214
PORTABLE GUN DRILLING	SHIPBUILDING EQUIPMENT 194
RAYTHEON SERVICE	
	NAVIGATION/COMMUNICATION EQUIPMENT SALES/SERVICE
RESEARCH PRODUCTS/BLANKENSHIP	INCINOLET ELECTRIC TOILET 345
SCHOTTTELL	RUDDERPROPELLERS/THRUSTERS 146
SERVICE MARINE	SHIPBUILDING 250
SLINGMAX	LIFTING SLINGS 242
SOUTHWEST MARINE	VESSEL REPAIR 189
SPERRY MARINE	NAVIGATION/COMMUNICATION EQUIPMENT 304
STAUFF CORPORATION	HYDRAULIC COMPONENTS/ACCESSORIES 253
SULZER-ESCHER WYSS	CP PROPELLERS 255
SWAGELOK	TUBE FITTINGS 296
3 MAJ	SHIPBUILDING 299
TEAMTEC	INCINERATORS 259
TELEFLEX	RVA VALVES 159
TEXACO	MARINE LUBE OILS 249
TIOGA PIPE	PIPE 225
TRINITY MARINE/EQUITABLE SHIPYARDS	SHIPBUILDING 269
ULSTEIN TRADING	MARINE EQUIPMENT & SERVICES 305
UNIVERSAL MARINE MEDICAL SUPPLY	MEDICAL SUPPLIES 130
VSE	MARINE DESIGN SERVICES 287
VITA MOTIVATOR	EDUCTORS 317
J. M. VOITH	WATER TRACTOR 306
ZIDELL	BARGES 178
ZODIAC OF NORTH AMERICA	RIGID HULL INFLATABLE BOATS 281

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


Standard Communications Introduces New Marine Radio And Loud Hailer

"The most water-resistant radio and hailer on the market today" is how Standard Communications describes the new Horizon Infinity VHF marine radio and the LF10 loud hailer.

The 25-watt Horizon Infinity, in addition to being extremely water-resistant, incorporates an ultra-sensitive Gasfet receiver and more advanced scanning, programming and features including an LCD display that is easier to read in sunlight. It also has a built-in intercom, PA and includes all U.S., International and Canadian channels.

Standard's Horizon LF10 loud hailer has an output of 30 watts of power and features listen-back, four fog horns, a four-station intercom and other alarm signals. Attractive optional-flush mount systems are available for both units.

For free literature containing additional information on the new Horizon Infinity or LF10 loud hailer, Circle 42 on Reader Service Card



Turbine Components Corporation
2 Commercial Street
Branford, Connecticut 06405-0801
(203) 481-3451 • TWX: 710-452-3094
Represented by FAX: 203-488-1834

FCS Inc.
22 Main Street • Centerbrook, CT 06409
Telephone: (203) 767-3095
Telex: 517931 • FAX: (203) 767-1263

Reduce Emissions & Fuel Costs Extend Component Life Reduce Maintenance Costs

— By —

Ceramic Coating Diesel Engine Combustion Components

TURBINE COMPONENTS CORP., A PIONEER IN HIGH TEMPERATURE COATINGS FOR OVER 20 YEARS, IS APPROVED BY THE AMERICAN BUREAU OF SHIPPING (ABS)

- ★ Thermal Stresses Reduced
- ★ Ignition Delay Reduced
- ★ Detonation Pressure Reduced
- ★ Fuel Consumption Reduced
- ★ Emissions Reduced

Payback - In As Little As
Four (4) Months

**GUARANTEED
PERFORMANCE**



Circle 208 on Reader Service Card

Tidewater Marine Acquires Three Vessels In Exchange For Common Stock

Tidewater Inc.'s marine division, Tidewater Marine Service, has completed an agreement to purchase three utility vessels from Bollinger Machine Shop & Shipyard, Inc. of Lockport, La., and two of its affiliated companies.

The three 800-horsepower, 105-foot utility vessels built in 1980 were acquired in exchange for 168,000 shares of Tidewater Inc. common stock, bringing the company's total shares of common stock outstanding to 22,452,047. Bollinger is a major builder of vessels for the offshore oil and gas industry, as well as the U.S. Navy and U.S. Coast Guard.

The vessels are currently being readied for service in Tidewater

Marine's "small boat" division in the U.S. Gulf of Mexico, according to Tidewater Marine president **Richard M. Currence**. "This division has experienced substantial progress, more than doubling in size since its inception in late 1987. We anticipate further fleet expansion if current trends continue," Mr. Currence said.

He added that this is the company's third vessel package purchase

in eight months.

Tidewater Inc. owns and operates one of the largest fleets of vessels supporting the international offshore oil and gas industry.

Spliethoff's Places \$87.3-Million Order For Six Cargo Ships

Dutch ship operator Spliethoff's Bevrachtingskantoor has placed an \$87.3-million order in the Netherlands for the construction of six 10,000-dwt multipurpose cargo vessels.

Four of the vessels will be built by Tille Scheepsbouw at the Frisian yard. The other two vessels will be built by Verolme Heusden.

The vessels are expected to be delivered between October 1989 and April 1990.

Swiss Firm Of Eckold AG Offers Free Literature On 'Press-Joining'



The photo shows an Eckold mobile tool for press-joining air ducts.

Eckold AG of Trimmis, Switzerland, is offering free literature on "press-joining," an advanced method of connecting metal sheets, profile sections and components. These can be of either the same or different materials and up to a maximum combined thickness of 5 mm (0.200 inches).

Press-joining requires no heat and no auxiliary materials. Eckold says you can forget about rivets, screws, nuts and bolts when connecting light-gaged metal parts, thus saving time and money while also avoiding fumes, surface damage and distortion of the material. All it needs is a hydraulic unit to drive one of the mobile tools which have various throat depths to enable you to press-join air duct parts or other metal components on construction sites or in the shop.

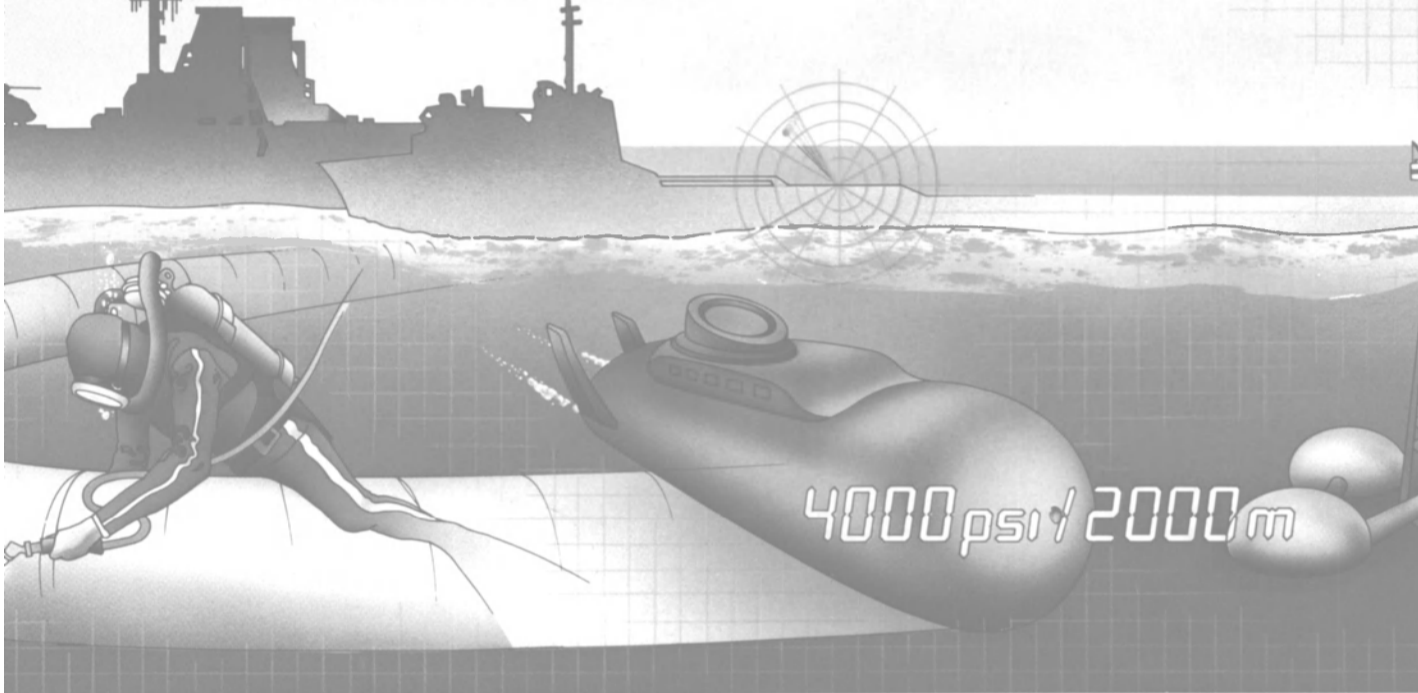
Eckold can also supply tools and stationary machines for multiple joints in a single work cycle.

Press-joining is said to be fast, simple, reliable and easy to inspect. For free detailed literature from Eckold,

Circle 23 on Reader Service Card

For literature on Aeroquip products, circle the appropriate number of the reader service card: Hose & Fittings—Circle 121; T-J Cylinders—Circle 122; Teflon Hose—Circle 123; Quick-disconnect Couplings—Circle 124.

Security at sea is using Aeroquip products before you leave the dock



RISIC Couplings



Aeroquip RISIC 3 Rubber Insert Sound Isolation Couplings provide superior sound and vibration dampening. **RISIC 3 is approved on U.S. Navy surface and subsurface vessels.**

Consult Aeroquip for your application.

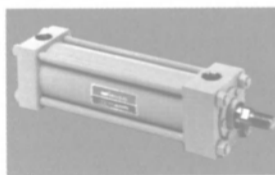
Marine Hose and Fittings

Aeroquip's FC300 AQP hose now has **NAVSEA** approval. FC300 hose has been engineered for demanding high-temperature shipboard applications and is available with a complete selection of fittings. FC300 exceeds SAE 100R5 specifications.

Request Catalog 306

T-J™ Cylinders

Series TG hydraulic cylinders are fully approved by the American Bureau of Shipping (ABS). They handle pressures up to 3500 psi (5000 non-shock). And are available in 15 standard mounting styles.



Request Bulletin 4120

Convuluted Teflon® Hose

Aeroquip Teflon hose designs are USCG approved, and are unsurpassed for lightweight, fluid compatibility, and flexibility. Operating range from -65°F to +400°F.

*Teflon is a DuPont trademark

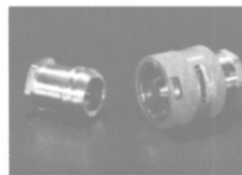
Request Catalog 306



Quick-Disconnect Couplings

Aeroquip offers hundreds of styles of quick-disconnect couplings, including our new Deluge Coupling for fire quenching applications in rocket launching chambers. Couplings are available in steel, stainless, and brass in diameters up to 1½" and with pressure ratings to 10,000psi.

Request Bulletin 258B



Aeroquip products meet strict MIL, NAVSEA, and USCG specifications, and are available through a worldwide network of distributors.

Our Marine/Military Customer Service Group is a team of experienced professionals who speak your language. For assistance, call them at 419-238-1190.

Aeroquip Corporation, 300 South East Avenue, Jackson, MI 49203-1972.

For literature call 800-982-0030.

Congratulations ASNE on your 100th Anniversary.

Aeroquip  **worldwide**

A TRIUNOVA COMPANY

Maritime Reporter/Engineering News

BUYERS DIRECTORY

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

AIR COMPRESSORS

Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION

Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Bailey Refrigeration Co., Inc., 2323 Randolph Avenue, Avenel, NJ 07001
Stal Refrigeration AB, Butangsgatan 16, S-60187 Norrköping SWEDEN

ANODES—Cathodic Protection

Electrocatalytic Inc., 2 Milltown Ct., Union NJ 07083

BALLAST

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

BARGE BUILDING

HBC Barge, Brownsville PA 15417

BARGES—Leasing

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

BASKET STRAINERS

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

BEARINGS—Rubber, Metallic, Non-Metallic

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Kingsbury Inc., 10385 Drummond Rd., Philadelphia PA 19154

Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309

Waukesha Bearings Corp., P.O. Box 798, Waukesha, WI 53186

BOILERS

Combustion Engineering, Inc., Windsor, CT 06095

Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

BOILER CLEANING

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

Infrasonik AB (an ASEA Stal Co.), S-612 20 Finspong, SWEDEN

BROKERS

Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale FL 33335;

P.O. Box 1093, Houma, LA 70360

Bergeron & Associates, P.O. Box 726, Chalmette LA 70044

Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422

Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

Ocean Marine Brokerage Services, P.O. Box 1257, Port Canaveral, FL 32927

BULKHEADS

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

BUMPERS (Crane)

M.E.K. Equipment, P. O. Box 2357, Newport News VA 23602

CARGO ACCESS EQUIPMENT

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

CARGO HANDLING SYSTEM

Saab Tank Control, 201 W. Passaic St., Rochelle Park NJ 07662

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

CASTINGS/FORGINGS

NKS Industria Pesada, Grupo Industrial, Reforma 404, 14th floor, Mexico D.F. 06600 MEXICO

CHAIN

Baldt Inc., P.O. Box 350, Chester PA 19106

Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

CHOCKING COMPOUND

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

COMPUTERIZED INFORMATION SYSTEMS

TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

Wright Austin Co., 3245 Wight St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring

ASEA, Inc., 4 New King St., White Plains, NY 10604

Eldec Corporation, 16700 13th Ave. West, P.O. Box 100 Lynnwood, WA 98036

Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062

Indikon Division, Metravib Instruments Inc., 26 New St., Cambridge, MA 02138

NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060

Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway

WABCO, 1953 Mercer Rd., Lexington KY 40511

CRANES—HOISTS—DERRICKS—WHIRLEYS

ASEA-Hagglund, Inc., 50 Chestnut Ridge Rd., Montvale NJ 07645

The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101

Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607

telex: 132610 DELMARINE

Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235

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

J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany

Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883

DECK MACHINERY—Cargo Handling Equipment

Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013

Gearmatic—see "Braden Carco Gearmatic" above.

Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134

McElroy Machine & Mfg. Co., Inc., P.O. Box 4455, Biloxi MS 39535

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

DIESEL ACCESSORIES—CYLINDER LINERS

Acurex Corporation, Autodata Division, 555 Clyde Ave., P.O. Box 7042, Mountain View, CA 94039

Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Diesel America Inc., 5217 River Rd., New Orleans LA 70123

FCS Inc., 22 Main St., Center Brook CT 06409

General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360

Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101

DIESEL ENGINE—Spare Parts & Repair

Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY

Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062

Chrome Locomotives, P.O. Box 197, Silvis IL 61282

Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511

Cummins Engine Co., Inc., Mail Code 40642, Box 3005 Columbus, IN 47202-3005

Goltens, 160 Van Brunt St, Brooklyn NY 11231

MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, Federal Republic of Germany

MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004

Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany

Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE

Muldoon Marine Services, P.O. Box 3221, Terminal Island, CA 90731

Parker Diving Service Inc., Berth 69, Los Angeles Harbor, P.O. Box 5272, San Pedro CA 90733

ELECTRICAL EQUIPMENT

Eldec Corporation, 16700 13th Ave West, P.O. Box 100, Lynnwood WA 98036

SPD Technologies, 13500 Roosevelt Blvd, Philadelphia PA 19116

Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550

Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

ELECTRONIC INFORMATION SYSTEMS

Inventory Locator Service Inc., 3820 Premier Ave., Memphis TN 38118

ELECTRONIC SYSTEMS

Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

ENGINE TEST EQUIPMENT

General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

EQUIPMENT—Marine

Atlas Copco Rental, 70 Demarest Dr., Wayne, NJ 07470

Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227

Kearfott Marine Products, 550 South Fulton Ave., Mount Vernon, NY 10550

Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

Space Machine & Engineering Corp., 2346 16th Ave North, St Petersburg FL 33713

EVAPORATORS

Atlas-Danmark Desalination Systems A/S, Stamholmen 93, 2650 Hvidovre (Copenhagen), Denmark

Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626

MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS

Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613

Flebu A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

Robinson Industries, P.O. Box 100, Zelenople, PA 16063

FASTENERS

Action Threaded Products Inc., 6955 S. Harlem, Bedford Park, IL 60638

Band-It Division, Houdaille Industries Inc., P.O. Box 16307, Denver CO 80216

Hardware Specialties Co., Ships Division, 48-75 36th St, Long Island City NY 11101

Lee Brass Company, P. O. Box 1229, Anniston AL 36202

Mapeco Products, Inc., 725 Glen Cove Ave., P.O. Box 6, Glen Head NY 11545

Non-Ferrous Bolt & Mfg Co., 4085 Nevso Dr., Suite C, Las Vegas NV 89103

Okabe Co., Inc., 175 Lively Blvd., Elk Grove Village, IL 60007

FENDERING SYSTEMS/BUOYS—Dock & Vessel

Intertrade Ltd., Marine Products Div., 15301 Transistor Lane, Huntington Beach CA 92649

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

Schuyler Manufacturing, 16901 Woodinville-Redmond Rd, Woodinville WA 98072

Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FILTERS

Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

Parker Filter Division, 16810 Fulton County Rd., #2, Metamora, OH 43540

FUEL ADDITIVE

U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010

FURNITURE

Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001

GALLEY EQUIPMENT

Gaylor Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062

GANGWAYS, LADDERS

A.L. Don, 1 Don Plaza, Dock St., Matawan NJ 07747

National Specialty Products, 5727 Heffernan St., Houston TX 77087

Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960

Westmont Industries, 10805 Painter Ave., Santa Fe Springs, Los Angeles, CA 90670

Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS

Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024

ITT Standard Heat Transfer Technology, Buffalo, NY 14240

MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

HORNS/WHISTLES

Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HYDRAULICS

Aeroquip Corporation, 300 South East Ave., Jackson, MI 49203

Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030

Del Gavio Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607;

telex: 132610 DELMARINE

Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112

INCINERATORS

Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY

A/S Vesta, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

INSTRUMENTATION

Technical Services Group, 2900 Main St., Alameda CA 94501

INSULATION—Cloth, Fiberglass

Bailey, Carpenter & Insulation Co., 2323 Randolph Avenue, Avenel, NJ 07001

The Claremont Company, 174 State Street, P. O. Box 952, Meriden CT 06450

Duracote Corp., 350 North Diamond St., Ravenna, Ohio 44266

Soundcoat, One Burt Drive, Deer Park NY 11729

JOINER—Watertight Doors—Paneling—Ceiling Systems

Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711

Bailey Distributors, Inc., 2323 Randolph Avenue, Avenel, NJ 07001

Dampa Inc., The Gatehouse at North Park, Suite 106-108, Hunt Valley MD 21030

Simpson Timber Co., Third & Franklin, Shelton WA 98584

Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS

R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights

Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232

Phoenix Products Company, Inc., 4769 North 27th Street, Milwaukee, WI 53209

UN E BLINDS

American Piping Products Inc., Box 1056, New Hyde Park, NY 11040

LUBE-OIL CENTRIFUGES

T. F. Hudgins, Inc., Spinner II Products, P.O. Box 920946, Houston TX 77292-0545

Keith Dixon Warehouse Supplier, Authorized distributor for Spinner II, 650 Whitehead Rd., Lawrenceville NJ 08648

Hamworthy Engineering Ltd., Fleets Corner, Poole, Dorset, BH17 7LA ENGLAND

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING

AMT, Inc., 2400 NW 39th Ave., Miami FL 33142

Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE

Goltens, 160 Van Brunt St., Brooklyn, NY 11231

In-Place Machining Co., 1929 North Buffum St., Milwaukee WI 53212

MARINE LUMBER

McCaussey Lumber Company, 36325 Harper Ave., P.O. Box 46129, Mt Clemens MI 48046

MEDICAL SUPPLIES

Universal Marine Medical Supply, 69-06 3rd Ave., Brooklyn NY 11209

METAL MARKERS/LETTERS

Johnson Brothers Enterprises, Inc., P.O. Box 1138, Patterson, LA 70329

J. P. Nissen Company, P.O. Box 188, Glenside PA 19038

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS

Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202

Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356

American Professional Captains Association, P.O. Box 350398, Ft. Lauderdale FL 33316

American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452

Amirikian Engineering Co., Chevy Chase Center Bldg., Suite 505, 35 Wisconsin Circle, Chevy Chase, MD 20015

Amtech Services, Inc., P.O. Box 84148, Seattle WA 98124

Armcor Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030

B.C. Research, 365

Leesburg Pike, Falls Church VA 22041.
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
T.W. Spaetgens, 156 W. 8th Ave., Vancouver BC CANADA V5Y 1N2
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054

TIMSCO, P. O. Box 91360, Mobile AL 36691
Tracor Hydraulics, Inc., 7210 Pindell School Rd., Laurel, MD 20707
VSE Corporation, 1417 No Battlefield Blvd., Chesapeake VA 23320
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744

NAVIGATION & COMMUNICATIONS EQUIPMENT

AT&T, 412 Mt Kemble Ave., Room N420, Morristown NJ 07960
Atkinson Dynamics, 10 W Orange Ave., So San Francisco CA 94080
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Corporation, RF Communications Group, 1680 University Ave., Rochester NY 14610

Henschel Corporation, 9 Hoyt Dr., P.O. Box 30, Newburyport MA 01950
IT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex IG6 2UR England
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207

Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norcontrol Simulation A/S, Bekkjordet 8A, P.O. Box 1024, N-3191 Horten NORWAY

Ocean Satellite Television Ltd., Avmar House, 61 Brushfield St., London E1 6AA ENGLAND

Petroleum Communications Inc. (Petrocom) Head Office: 5901 Earhart Expwy., New Orleans LA 70123; 556 Jefferson St., Suite 100, Lafayette LA 70501; Allied Bank Plaza, Suite 5440, 1000 Louisiana St., Houston TX 77002

Racal Marine Inc., 70 Jackson Dr., Cranford NJ 07016
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Company, 46 River Rd., Hudson NH 03051
Raytheon Service Company, 5760 Northampton Blvd., Ste 102, Virginia Beach VA 23455

Robertson Shipmate Inc., 3000 Kingman St., Suite 207, Metairie LA 70006
S P Radio A/S, DK 9200 Aalborg DENMARK
SPT Audio, 8928 Kirby Dr., Houston TX 77054

Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
Standard Communications, P.O. Box 92151, Los Angeles CA 90009
Standard Radio & Telefon AB, P.O. Box 501, S-162 15 Vallingby, SWEDEN
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA

Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

OILS—Marine—Additives
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830
Chevron USA, 575 Market St., San Francisco, CA 94105
Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL/WATER SEPARATORS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647

FAST Systems Inc., 1717 Sublette Ave., St Louis MO 63110
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals Co., 460 Coit St., Irvington NJ 07111
Palmer International, P.O. Box 8, Worcester, MA 01940
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

White Metals Inc., 6300 Midvale, Houston TX 77087

PIPE-HOSE—Cargo Transfer Clamps, Couplings, Coatings, Supports
Aeroquip, 300 South East Ave., Jackson, MI 49203
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Stauff Corporation, 21-23 Industrial Park, Waldwick NJ 07463

PORT SERVICES
Port of Iberia, P.O. Box 897, New Iberia LA 70561

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Inc., Engine Division, 100 N E Adams, Peoria IL 61629
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511

Combustion Engineering, Inc., Windsor, CT 06095
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Finantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY

GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420

General Motors, Electro-Motive Division, LaGrange, IL 60525
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada

KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MAK Maschinenbau GmbH, P.O. Box 9009, D-2300 Kiel 17, WEST GERMANY

Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Markisches Werk, Halve, P.O. Box 1442, D-5884 Halver WEST GERMANY
MAN B&W Diesel, 50 Broadway, New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Hoelby, Denmark
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9900 Frederikshavn Denmark

MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 Germany
MAN High Performance Diesels (Nurnberg), 160 Van Brunt St., Brooklyn NY 11231

Michigan Wheel Corp., 1501 Buchabab Ave., SW, Grand Rapids MI 49507
Morrison-Knudsen Company, Power Systems Division, P.O. Box 1928, Rocky Mount NC 27801

MTU of North America, 10450 Corporate Dr, Houston TX 77478
North American Marine Jet P.O. Box 1232 Benton, AR 72015
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Schottel-Werft, Josef Becker GmbH, KG, D-5401 Spay, WEST GERMANY
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Sulzer/Escher Wyss, Ravensburg WEST GERMANY

Ulstein Maritime Ltd., 96 North Bend Street, Coquitlam BC CANADA V3K 6H1
Ulstein Propellers, N-6065 Ulsteinvik, NORWAY
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway

J.M. Voith GmbH, Marine Division, Postfach 1940, 7920 Heidenheim/Brenz, WEST GERMANY
Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021

Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

PUMPS—Repairs—Drives
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE

Golts, 160 Van Brunt St., Brooklyn, NY 11231
Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leitritz Corporation, 165 Chestnut St., Allendale NJ 07401
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11530
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, NY 11231

ROPE—Manila—Nylon—Hawsers—Fibers
Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
American Manufacturing Co., Cordage Div., P.O. Box 52125, Lafayette LA 70505
Samson, Phoenix St., Shirley, MA 01464

SANITATION DEVICES—Pollution Control
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Systems Inc., 1717 Sublette Ave., St Louis MO 63110
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits CA 95490
Research Products/Blankenship (Incinolet), 2639 Andjion, Dallas, TX 75220

SCALE MODELS
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLE
L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211
Juniper Industries, 72-17 Metropolitan Ave., Middle Village, NY 11379
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHIPBREAKING—Salvage
The River Smelting & Refining Co., 4195 Bradley Rd Cleveland OH 44109
The Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

SHIPBUILDING EQUIPMENT
American Marine, P.O. Box 8126, New Orleans LA 70182
Eckold Ltd., CH-7203 Trimmis, SWITZERLAND
Hilman Inc., 2604 Atlantic Ave., Wall, NJ 07719
M.A.N.—GHH, Sterkrade Werksrabe 112 D-4100 Duisburg 18, West Germany

MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, West Germany
NEI Syncralift, Inc., 8970 S W 87th Ct., Miami FL 33176
Portable Gun Drilling Systems Inc., P.O. Box 123, Auburn WA 98071

SHIPBUILDING—Repairs, Maintenance, Drydocking
Aluminum Boats Inc., 304 Midway Dr., River Ridge LA 70123
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Blount Marine, Box 368, Warren RI 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport LA 70374
Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA

Burmeister & Wain Skipsvaerft A/S, P.O. Box 2122, Refshaleoen, DK-1015 Copenhagen, DENMARK
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Danyards A/S, P.O. Box 719, DK-9900 Frederikshavn DENMARK
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Finantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Hyundai Corporation, ShipSales Dept., 140-2 Kye dong, Chongro-ku, Seoul, KOREA
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
Paul Lindenau GmbH & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany

Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
Marinette Maine Corporation, Marinette, WI 54143
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Northwest Marine Ironworks, P. O. Box 3109, Portland OR 97208
Portland Ship Repair Yard, 5555 N Channel Ave., Portland, OR 97217
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA

Trinity Marine Group, Box 29266, New Orleans LA 70189
Versatile Pacific Shipyards, Inc., P. O. Box 86099, North Vancouver BC Canada

Wartsila Marin Industri AB, P.O. Box 1090, SF 00101 Helsinki, FINLAND
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

SHIP MANAGEMENT
Texaco Marine Services Inc., P. O. Drawer 1028, Port Arthur, TX 77641

SIMULATOR TRAINING
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

SILENCERS
Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT
Parkway/Imperial, 241 Raritan St., So. Amboy, NJ 08879
Viking Life Saving Equipment (America) Inc., 38 NW 11th St., Miami FL 33136

TANK CLEANING
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

TANK LEVELING INDICATORS
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
King Engineering Corp., P.O. Box 1228, Ann Arbor MI 48106
Marine Moisture Control, 60 Inip Dr., Inwood, NY 11696

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, Canada, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighthouse, Salvage, etc.
Curtis Bay Towing, World Trade Center, Suite 800, Baltimore MD 21202
Jack Faulkner, 1005 W. Harimaw Ct., Metairie, LA 70001
McAllister Bros., Inc., 17 Battery Pl., New York, NY 10004

Miller Electric Offers 'Regency' 200 And 350 Power Sources For Mig Welding

The new Regency 200 and 350 family of single phase, constant voltage, DC power sources for gas metal arc welding (GMAW) are from Miller Electric Mfg. Co. Both units operate with a wide variety of constant speed and voltage sensing wire feeders.

Regency 200 and 350 have a 14-pin Amphenol receptacle consistent with other Miller constant voltage machines, for easy direct connection to Miller constant speed wire feeders: Spoolmatic 3 feeder/gun, Miller 50 series, XR push-pull system. For MIG spot welding, units can be used with Spoolmatic 1C/S gun and control with spot timer, or with spot controls installed in the firm's wire feeders.

Regency 200 is rated 200 amps at 60 percent duty cycle and has six-position voltage adjustment and high/low range for 12 different voltage selections. Regency 350 is rated 350 amps at 60 percent duty cycle. It provides 25 voltage selections with a five-position coarse and five-position fine voltage switch. Volt meter and ammeter are standard. Both units have Cam-Lok output receptacles with mating plugs for secondary connections.

For more information and free full-color literature from Miller Electric,

Circle 14 on Reader Service Card

VALVES AND FITTINGS

Aeroquip, 300 South East Ave., Jackson, MI 49203
Bailey, Division of CMB Industries, P.O. Box 8070, Fresno, CA 93747
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Chemiquip Products Co., Inc., 3 W. 18th St., New York, NY 10011
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, Anaheim, CA 92803

Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Crawford Fitting Company, 29500 Palom Road, Salom, OH 44139
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902

Lexair Inc., Airmatic/Beckett, 299 Gold Rush Rd., Lexington KY 40503
Loeffler Machine, US #1 & Robbins Ave., Pennel PA 19047
Newman's Inc., 7500 E Redding Place, Box 1856, Tulsa OK 74101
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
PBM Inc., RD 6, Box 387A, Sandy Hill Rd, Irwin PA 15642
Pancoast Marine Division, Front & Porter St., Philadelphia, PA 19148
Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-0450
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007 3500
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Tate Andale Inc., 1941 Landsdowne Rd., Baltimore, MD 21227
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143
Williams Valve Corp., 38-52 Review Ave., Long Island City NY 11101

VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

WASTEWATER TREATMENT
EES Corporation/Omnipure, An Eltech Systems Company, 12850 Bourne-wood Dr., Sugarland TX 77478

WATER PURIFICATION TREATMENTS
Electrocatalytic Inc., 2 Milltown Ct., Union NJ 07083

WATER PURIFIERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Atlas-Danmark Desalination Systems A/S, Staholmen 93, 2650 Hvidovre (Copenhagen), Denmark
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING
Miller Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912
Welding Consultants of Wisconsin, 6517 Radburn Lane, Greendale WI 53129

WIRE ROPE
Sling Max, P.O. Box 2068, Aston PA 19014

WIRE ROPE LUBRICATION SYSTEMS
Atlantis Services, 1057 Kings Ave., Jacksonville FL 32207
DynaLube, The Kirkpatrick Group, 415 N. Loop 12 at Pioneer Dr., P.O. Box 150907, Irving TX 75014

WINCHES AND FAIRLEADS
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
Gearmatic—see 'Braden Carco Gearmatic' above.
Markey Machinery Co., 79 South Horton St., Seattle, Washington 98134
Nashville Bridge Co., P.O. Box 239 Nashville TN 37202
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108

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

WINDOW WIPERS
Marketec, Inc., 27 Bowers Lane, Chatham NJ 07928

WIRE AND CABLE
Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007

VSE CORPORATION SINCE 1959
2,300 Employees, 30 Offices Nationwide

MARINE DESIGN SERVICES
MASTER ORDNANCE REPAIR CERTIFIED

Join the professional marine design staff that keeps growing. You may qualify based on your experience and education in the following areas:

- NAVAL ENGINEERING
- NAVAL ARCHITECTURE
- COMBAT SYSTEMS
- COMPUTER AIDED DESIGN SERVICES
- MACHINERY CONDITION ANALYSIS
- MACHINERY VIBRATION ANALYSIS
- LOGISTIC SUPPORT SERVICES
- DIVER'S LIFE SUPPORT SYSTEMS
- OVERHAUL PLANNING SERVICES
- SHIP'S SELECTED RECORD SERVICES

Competitive salary and benefits

Please send resume or call our Employment Office for consideration

1417 N. Battlefield Blvd.
Chesapeake, Virginia 23320
(804)547-8556
EOE M/F/V/H

Circle 287 on Reader Service Card

HBC BARGES LAST LONGER.

They last longer because they are:

- built by craftsmen.
- designed to provide maximum pound for pound strength with attention to critical wear points.
- built with a full measure of quality materials and welding.
- built straight and dimensionally accurate.

HBC Barge

What's more, HBC has the versatility to build the barge that will last longer in your service.

Brownsville
Pennsylvania 15417
Phone: 412/785-6100



Circle 218 on Reader Service Card

SHIPBUILDERS

If you're looking for a fast labor saving system to drill precision holes for fitted bolts that is extremely accurate (and portable) and met U.S. NAVY requirements on L.S.D.'s 41, 42, & 43. Plus Lockheed Space & Missile Div. requirements. PLEASE PHONE OR WRITE TO:

PORTABLE GUN DRILLING SYSTEMS, INC.
P.O. BOX 123, AUBURN, WA 98071 U.S.A.
PHONE (206) 939-1663

THE ONLY PRECISION PORTABLE GUN DRILLING SYSTEMS.

Circle 194 on Reader Service Card

HYATT  AT OAKLAND INTERNATIONAL

455 HEGENBERGER ROAD
OAKLAND, CALIFORNIA 94621 USA
415 562 6100 TELEX 335374

LYSA LEWIN
SALES MANAGER

MILITARY AND GOVERNMENT CONTRACTOR RATES

THE HYATT TOUCH

- olympic size pool
- 10 acre health club facility
- 2 restaurants and a lounge
- live band and dancing
- 18 minutes to San Francisco
- complimentary transportation to and from Oakland Airport

FOR INDIVIDUAL RESERVATIONS CALL
(800) 228-9000
FOR SPECIAL GROUP RATES CALL
(415) 562-6100 ext. 5125

Circle 350 on Reader Service Card

September, 1988

KIENE

With you worldwide — wherever diesels work

**Diesel cylinder indicators
K-Series Indicators for measuring
cylinder compression
and firing pressures**

- Optimize fuel consumption
- Reduce maintenance costs
- Pinpoint engine problems
- Improve engine availability
- Recommended and used by major engine builders

**Indicator valves
provide direct access
to engine cylinders**

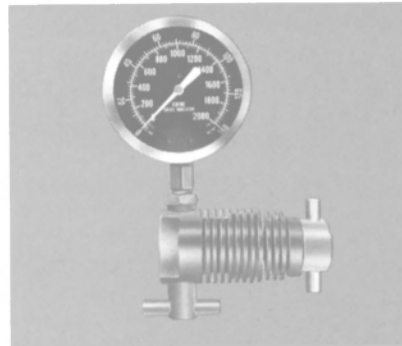
- Allows compression and firing pressure testing
- Required for engine performance analyzer and monitoring instruments
- Eliminates accidental valve opening
- Easy to install and exceptionally reliable
- Complete line of extensions and adapters available

KIENE DIESEL ACCESSORIES, INC.
325 S. Fairbanks St. P.O. Box 386
Addison, IL 60101
Telephone 1-800-237-3762, Ext. 186

4-87

... for greater diesel reliability

KIENE
DIESEL ACCESSORIES, INC.



Circle 221 on Reader Service Card

DRAMATIC



Nestled between winding bayou and shady oaks is one of the great "almost undiscovered" treasures of Cajun Country - Iberia Parish. Nowhere else can offer your company such a unique place to locate with waterfront property at the Port of Iberia, and large acreage tracts adjacent to the Port of Iberia available from Sterling Sugars, Inc. Iberia Parish also offers other industrial sites, as well as many incentives. So come on down to south Louisiana - it will be the best move your company ever made.

John J. Oubre
Executive Director
The Port of Iberia
P. O. Box 9986
New Iberia, La 70562-9986
(318) 364-1065

**THE PORT OF IBERIA
CAJUN HOT!**

iberia
industrial development foundation

Circle 214 on Reader Service Card

SIGNAL YOUR INTENT TO ATTEND THE 1988 INTERNATIONAL MARITIME EXPOSITION.

Yes, I would like to receive free tickets to this major industry event, held in conjunction with the Annual Meeting of its sponsor, the Society of Naval Architects and Marine Engineers. I want to preview the latest in marine and shipbuilding products, equipment, supplies, and services. I am eager to meet with the leading suppliers from around the world. Of course, I also don't mind saving myself and my associates, the regular \$7.00 admission charge.

When you need to give an affirmative answer, use the International Signal Flag shown here. *C* of the Alphabet Flags also means Yes.



Name _____		Title _____	
Company _____			
Address _____			
City _____		State _____	Zip _____
Phone () _____		Number of Tickets _____	

Mail to: Reber-Friel, Exposition Management, 221 King Manor Drive, King of Prussia, PA 19406. Or call them at: (215) 272-4020.

THE INTERNATIONAL MARITIME EXPOSITION

New York Hilton, New York, NY
 Wednesday, November 9, 1988: 2 pm to 6 pm
 Thursday, November 10, 1988: 10 am to 6 pm
 Friday, November 11, 1988: 10 am to 4 pm

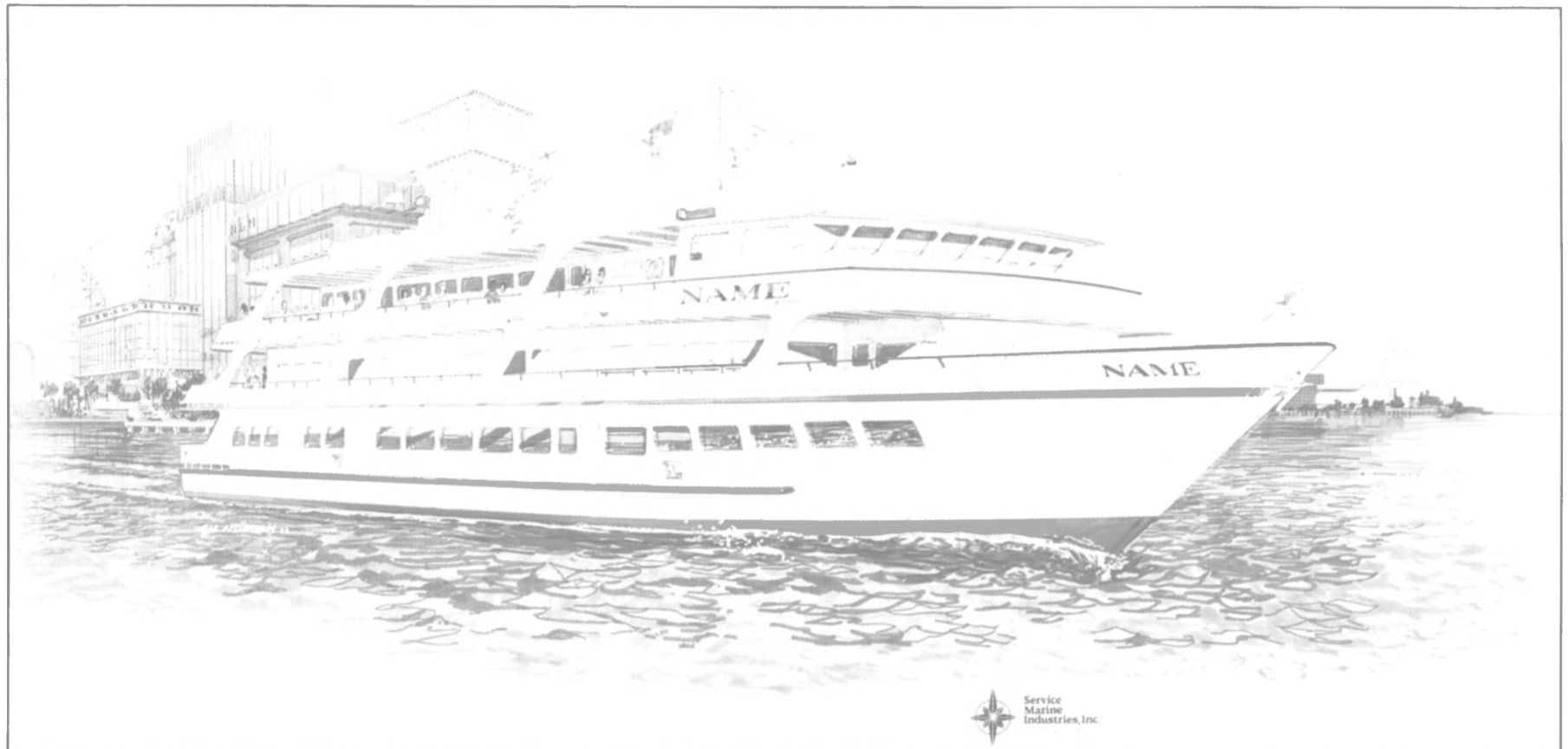


During the Annual Meeting of
 the Society of Naval Architects
 and Marine Engineers

Circle 175 on Reader Service Card

Maritime Reporter/Engineering News

THE INCOMPARABLE ATTRACTION OF A WORLD-CLASS YACHT



THAT'S A DINNER CRUISE/EXCURSION BOAT!

Sleek, Elegant, Modern, Luxurious — this boat attracts attention (and reservations!), wherever she sails.

1,000 passengers can cruise in luxury and comfort while enjoying the finest cuisine in four independent dining areas. The restaurant size galley is fully equipped for menu type meal preparation and has elevator service to the dining areas. This yacht is designed to make it

easy to provide the finest food and service in a truly royal setting.

The appointments are befitting of a Mega-Yacht of this beauty. The interior features a winding, brass trimmed staircase; gorgeous brass and glass bars in the cocktail lounges; and a spacious VIP lounge with access to the big ship style pilot house.

Service Marine builds in quality in all aspects of this vessel. It is air-

conditioned and heated for dual operating localities. It offers ultra-quiet operations at 10 knots, and it has a bow thruster for easy maneuvering.

Most amazing of all this 160'0" x 45'0" x 9'10" ship, completely outfitted and decorated, can be delivered in 10 months!

Call Service Marine Industries at (504) 631-0511 or (504) 764-1817.

SERVICE MARINE INDUSTRIES, INC. IS A FULL SERVICE SHIPYARD — DESIGN, ENGINEERING, CONSTRUCTION, INTERIOR DECORATING — MODULAR DESIGN OR CUSTOM BUILDING TO YOUR SPECIFICATIONS.



Service Marine Industries, Inc.

Trust • Quality • Economy • Service

P.O. Box 3606 • Morgan City, LA 70381 • (504) 631-0511 or (504) 764-1817

Circle 250 on Reader Service Card

TEXACO MARINE LUBRICANTS ARE WORKING PASSENGERS ON HOLLAND AMERICA LINE'S MS NOORDAM.

Maintaining on-time schedules is imperative for any cruise ship. And that means a demand for first-rate performance from the ship's engines. That's why the Holland America Line trusts Texaco marine lubricants to help insure trouble-free operation on the ms Noordam. Holland America Line knows that Texaco lubricants are unsurpassed in the industry, offering maximum protection for critical engine parts against wear, corrosion and deposits.

Texaco marine lubricants and services are available worldwide, which is another excellent reason to put your trust in Texaco.



For information on Texaco marine products and services, contact the offices listed below.

TEXACO
International Marine
Sales Dept.
2000 Westchester Ave.
White Plains, NY 10650
Phone: (914) 253-4000



TEXACO
International Marine
Sales Dept.
1 Knightsbridge Green
London SW1X 7QJ
Phone: 01 584-5000