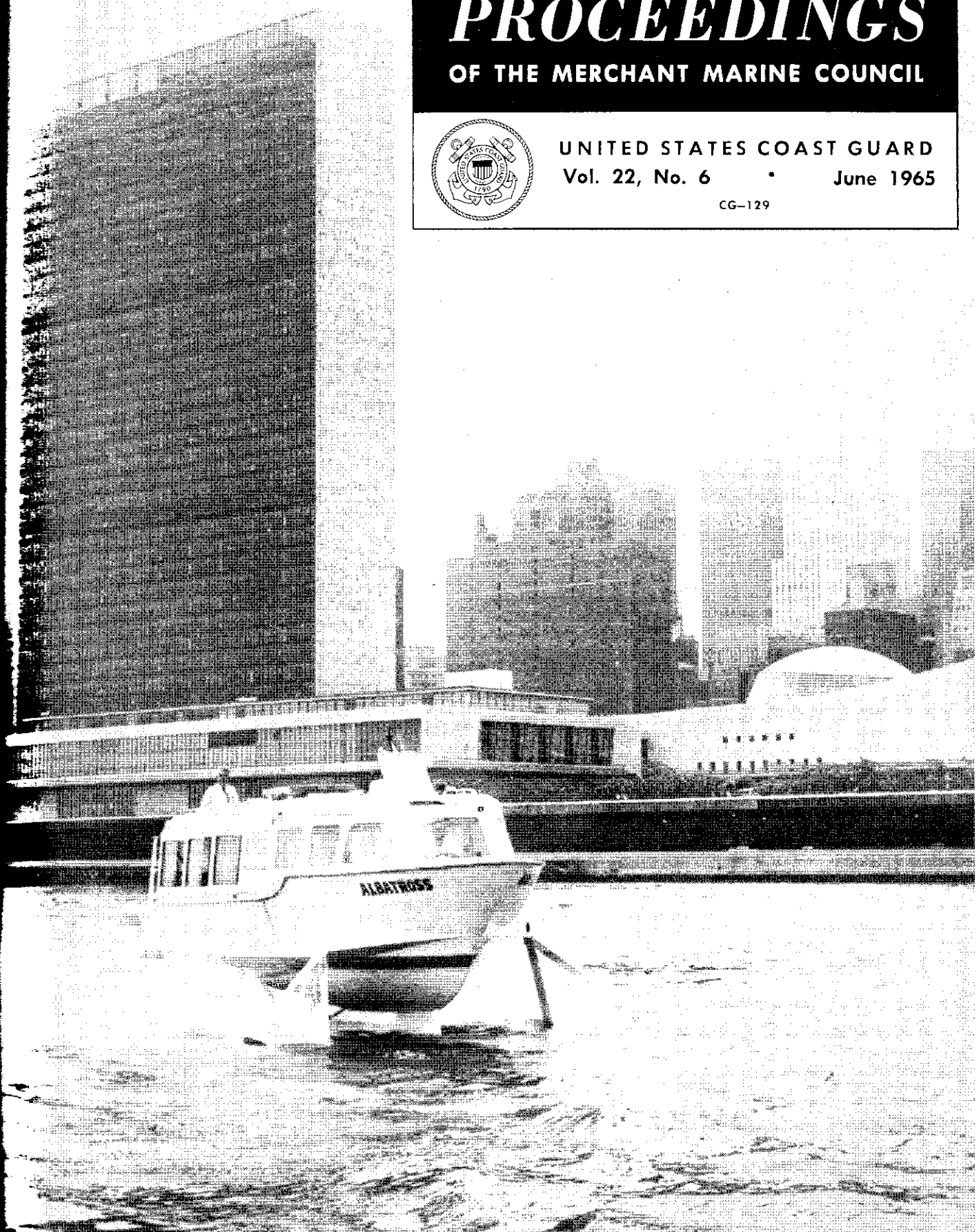
PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

UNITED STATES COAST GUARD

Vol. 22, No. 6 • June 1965

CG–129



IN THIS ISSUE . . .

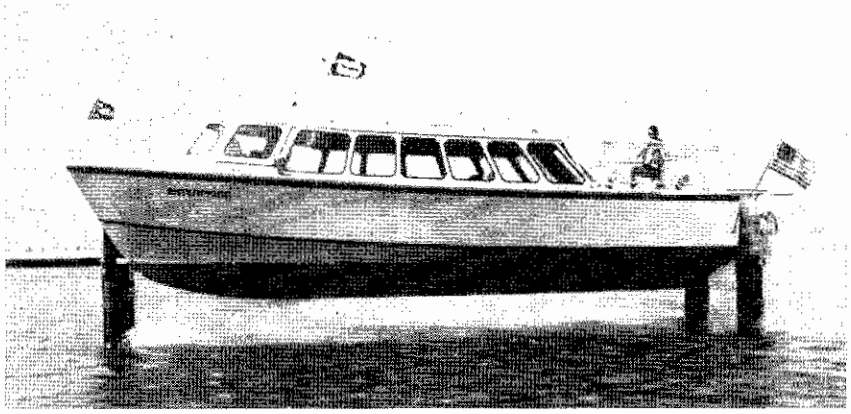
Hydrofoil activity as it affects the roles and missions of the Coast Guard is examined in three commonly oriented, but disparately based articles.

An overview of commercial hydrofoil activity in the United States is made by an officer whose duties include hydrofoil plans approval, beginning page 127.

Actual operating experiences are set down by an officer who has been a keen observer of hydrofoil operations in New York Harbor, beginning page 131.

Hydrofoil construction techniques, some quite unique to shipbuilding, are examined by a marine inspector who has inspected many of these neoteric craft on the building blocks, beginning page 134.

The Rules of the Road comparison continues on page 140.



The submerged-foil *Enterprise* of Hydro-Marine International of Miami in operational tests on Biscayne Bay.

THIS COPY FOR NOT LESS THAN 20 READERS—PASS IT ALONG

CONTENTS

FEATURES

DEPARTMENTS

COVERS

FRONT: The *Albatross*, first Coast Guard certificated hydrofoil cruises New York Harbor.
BACK: An FMC 30-foot hydrofoil foilborne in San Francisco Bay.

DIST. (SDL NO. 80)

A: a aa b c(2); remainder (1)
B: n(35); c(16); eq(5); f(4); h(3); g(2); remainder (1) F; p (13)
C: a b (less Quonset Pt.) c d e f g i m o u (1)
D: i(5); q(2); a b c d e f g h k l r v w (1)
E: o(New London only) (1)
List 141M
List 111

PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

Published monthly at Coast Guard Headquarters, Washington, D.C., 20226, under the auspices of the Merchant Marine Council, in the interest of safety at sea. Special permission for republication, either in whole or in part, with the exception of copyrighted articles or pictures, is not required provided credit is given to the Proceedings of the Merchant Marine Council. Use of funds for printing this publication has been approved by the Bureau of the Budget November 20, 1962.

A Coast Guard Look at

COMMERCIAL HYDROFOIL ACTIVITY

By LCDR Philip J. Danahy, USCG

Every departure from the mainstream yields new and challenging problems. Hydrofoils are no exception. To give an indication of the Coast Guard's safety-oriented interest in this apparently burgeoning area, an overview has been prepared by the hydrofoil projects officer of the Merchant Marine Technical staff at Coast Guard Headquarters. LCDR Danahy is uniquely suited for the task of demonstrating the Coast Guard's interest: His primary duty is hydrofoil plans approval.

LCDR Danahy is a 1954 graduate of the U.S. Coast Guard Academy. He has served aboard the icebreaker Eastwind *in both deck and engineer billets and has served as engineer officer (i.e., Chief Engineer) aboard the cutters* Sebago *and* Campbell. *He completed postgraduate training in Naval Architecture at the University of Michigan and served in the Marine Inspection Office at Mobile prior to his assignment to headquarters.*

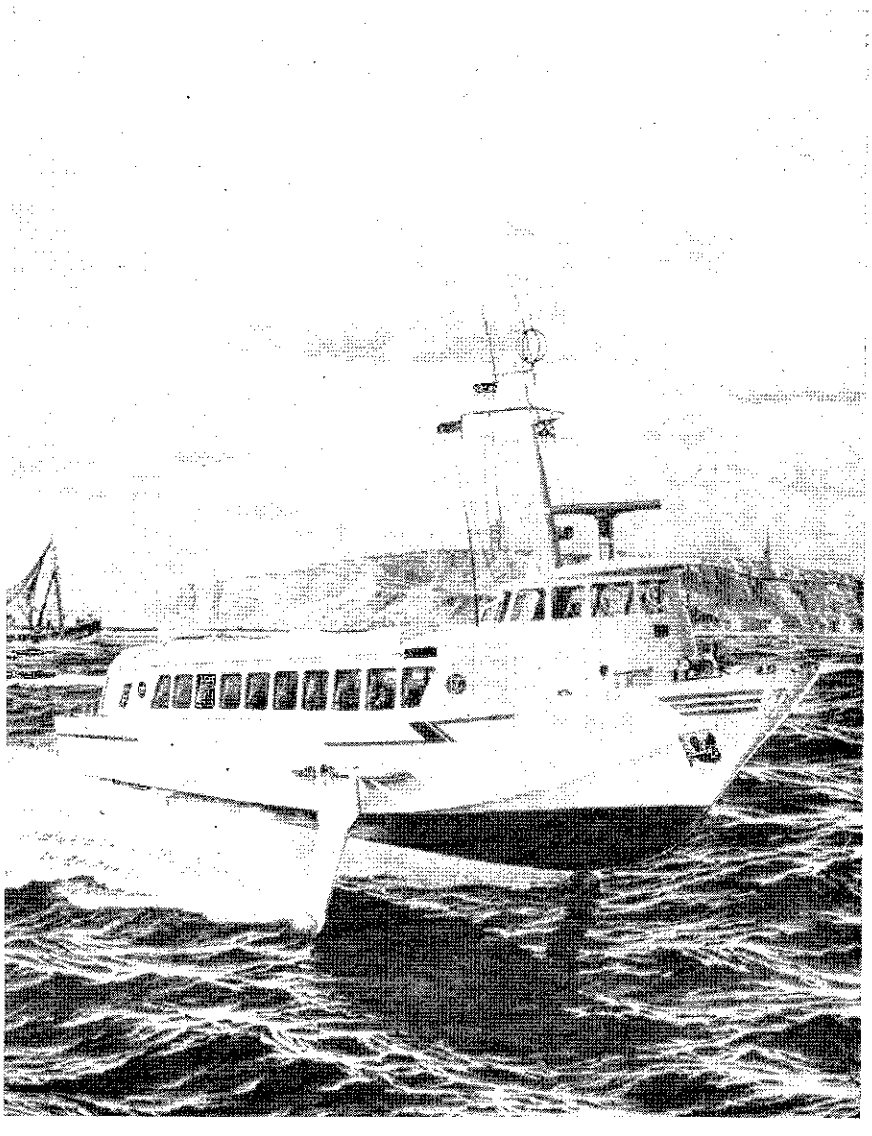
IN MAY of this year the spring meeting of the Society of Naval Architects and Marine Engineers focused on hydrofoil vessels. This typifies the increased attention and recognition being given to these craft.

It is considerably easier to propel a vessel through air than through water since water is approximately 800 times more dense, and resistance characteristics are proportional to fluid density. Similarly the lift of a wing is more effective in water than in air. Hydrofoils are wings which generate lift when moving through water the same way airfoils generate lift when moving through air. Because of the difference in density between water and air, hydrofoils can be appreciably smaller than airfoils.

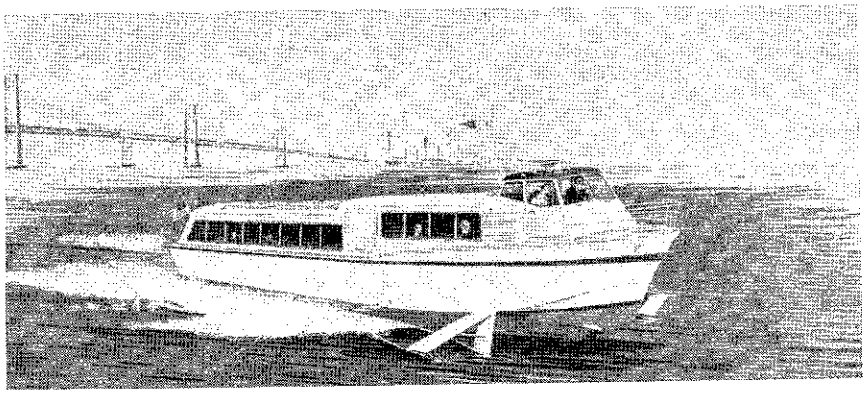
EARLY U.S. EFFORTS

Surprisingly, such foils have been known and used for over 70 years. Perhaps the first person to utilize hydrofoils was C. A. de Lambert in 1891 on the river Seine in France. The development of hydrofoils in America spans nearly 60 years. In 1907 the Wright brothers conducted experiments with hydrofoils with the idea of improving seaplanes. Capt. H. C. Richardson, USN, successfully demonstrated hydrofoils in 1909. By 1918 Alexander Graham Bell had a 5-ton vessel powered by 700 hp. and capable of 71 m.p.h.

U.S. hydrofoil activity was somewhat sporadic until recently. Commercial hydrofoil vessels have been operating for less than 3 years. De-



PASSENGER HYDROFOIL TO BE DEVELOPED BY GRUMMAN



FMC 50-FOOT 58 PASSENGER PROTOTYPE

spite this short duration of commercial operations, there are some 2 dozen commercial vessels already certificated by the Coast Guard. This sudden interest can be readily understood when we remember that nature abhors a vacuum and rushes to fill it whenever discovered. In the spectrum of transportation over water there is a gap between ships and planes which exists in at least three parameters, speed, cargo capacity, and cost per ton-mile. Postwar technological advancements resulting from research efforts by both the Government and industry have created the know-how to begin to fill this gap. One means of filling the gap is the hydrofoil vessel.

Technical literature is plentiful concerning all aspects of hydrofoils from theory through design, construction, and operation. As this article is not intended to be technical in nature, descriptions included are necessarily simplified. When discussing hydrofoil vessels certain terms are used to describe components, or phenomena. Some simplified explanations are included for clarity.

Figure 1 shows an advantage of hydrofoils over a regular planing vessel. At low speeds the hydrofoil craft has increased drag or resistance caused by the appendages (struts and foils). As speed increases, the foils lift the vessel out of the water. The drag is markedly reduced allowing speed to increase until drag reaches the limiting value equal to available propeller thrust. For the example in figure 1 the speed of the vessel is essentially doubled for the same power requirements.

Foil systems in use are either submerged or surface-piercing. A surface-piercing foil is generally considered area stabilized and inherently stable (note: this is not necessarily true, but can be designed into the system easily). As the term suggests, part of the foil lifting surface pierces the surface of the water on either side of the vessel. If the vessel rolls to one side more foil area will be immersed, generating more lift to oppose the roll. Also as the vessel increases speed through the water the foils generate greater lift and lift the vessel further out of the water. This reduces the wetted area and reduces the lift. Since lift must equal vessel weight and lift depends on speed and wetted foil area the vessel will ride at some predetermined height. Figure 2 illustrates an arrangement of surface-piercing foils.

Submerged foils are also what the name implies. Their lifting surfaces are totally submerged and some auxiliary means must be provided to control the depth of submergence. Mechanical, pneumatic, electronic, or a combination of these systems are used to "fly" the submerged foil at the desired depth. Figure 2 also shows an example of submerged foils.

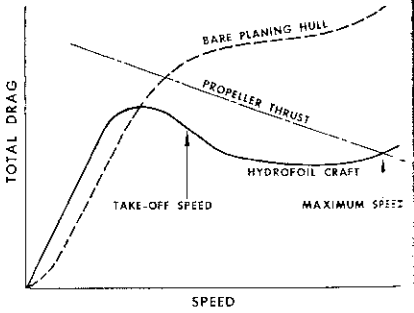


Figure 1.—Thrust-Drag Comparison.

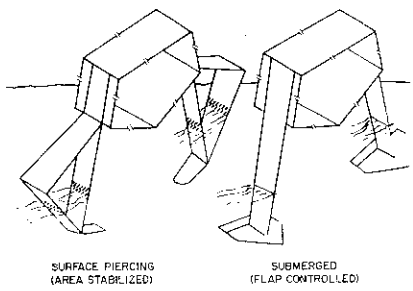
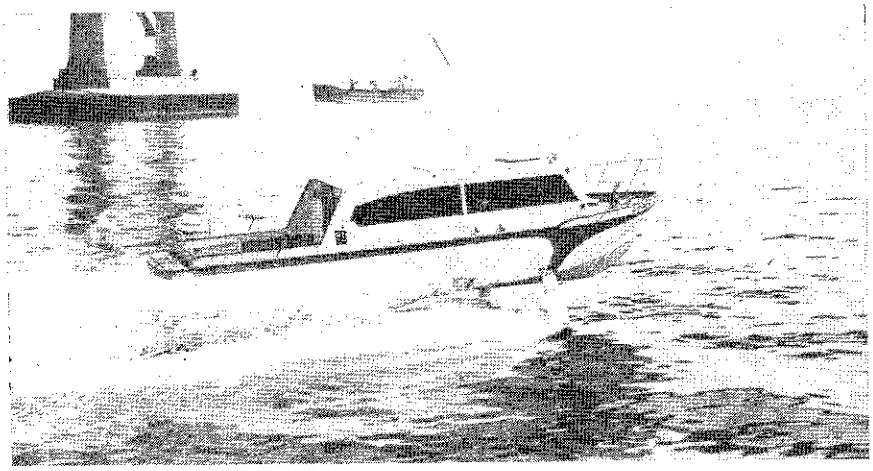


Figure 2.—Comparison of Surface Piercing and Submerged Hydrofoils.



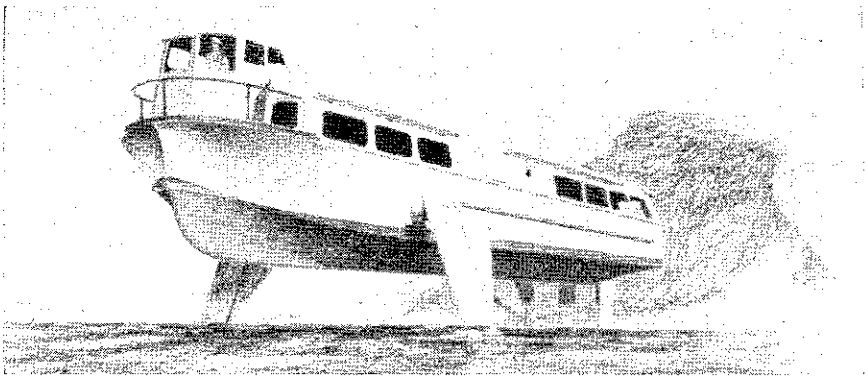
FMC 30-foot experimental model.

The foils may be either subcavitating or supercavitating. These are compared in figure 3. The most prevalent at present are the subcavitating foils shaped much like wings on aircraft. These have speed and loading limitations. At higher speeds and high loads on the foils a cavitation or vapor bubble can be created which may present structural and control problems. A supercavitating foil section is more wedgelike, having a sharp leading edge and a blunt trailing edge. To attain speeds over 60 knots supercavitating foils become a necessity. In this condition only the lower surface of the foil will be in contact with water and a large cavitation bubble will extend over the upper surface.

The foil arrangement will generally fall into one of three common ar-

rangements shown in figure 4. The tandem arrangement has the forward and the after foils each providing 50 percent of the total lift. The Canard arrangement has the forward foil providing one-third, or less, of the total lift. The conventional or "airplane" arrangement is essentially the reverse of the Canard. There are many combinations and arrangements that are proprietary. Nevertheless the preceding definitions help describe the essential characteristics of most foil systems.

The concept may appear simple and obvious to the observer when viewing a successful hydrofoil vessel in operation, but it represents a culmination



ATLANTIC HYDROFOIL 70 PASSENGER BOAT FOR NANTUCKET SOUND

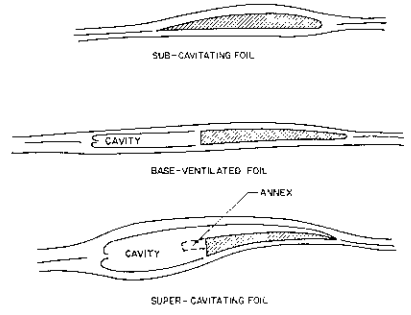


Figure 3.—Comparison of Subcavitating and Supercavitating foil sections.

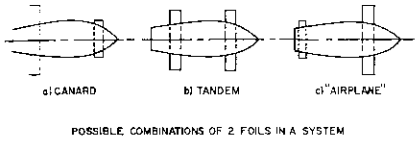


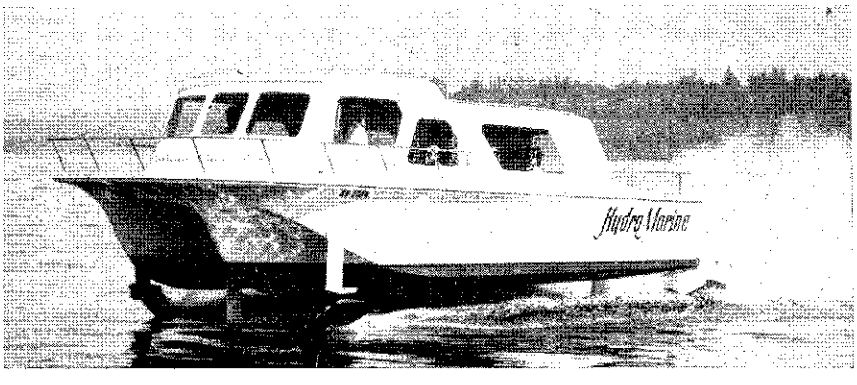
Figure 4.—Basic foil arrangements.

of knowledge and experience from many sources. Basically such a vessel is a lightweight, well-designed vessel with appendages that allow somewhat higher performance (on the order of several feet, to attempt to be humorous). The successful design incorporates the ideas, principles, and products from the hydrodynamicist, structural engineer, metallurgist, chemist, mechanical engineer, electronics engineer, and others.

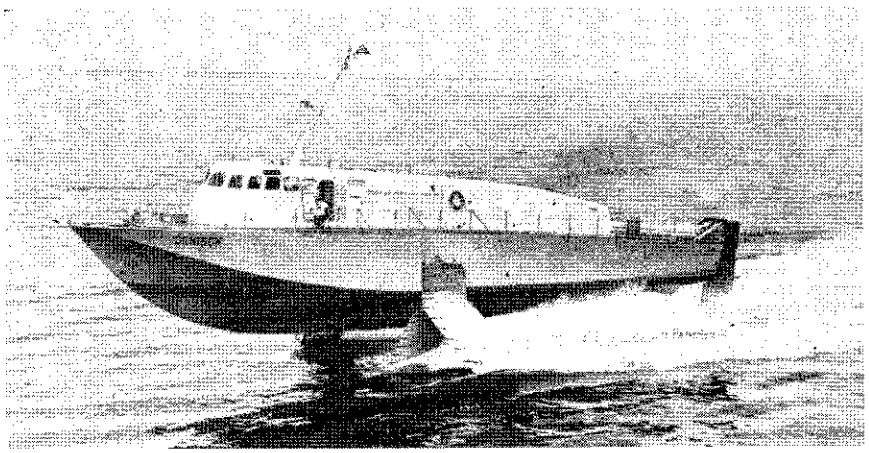
The advantage offered by foils is to lift the vessel out of the water, reducing resistance and allowing increased speed for a given power. This means more miles per dollar. Because of the lifting requirement the designer must make the vessel as light as allowable. The metallurgist and chemist contribute lightweight, high-strength material suitable for marine use. The structural engineer and naval architect put the material together in an efficient manner, adapting aircraft techniques to naval architecture. The mechanical engineer provides lightweight engines (more power per pound) and develops transmission systems to deliver the power from the engine to the propeller beneath the water. The hydrodynamicist develops the foils, props, and struts for efficient operation at high speeds. The electronics engineer develops the appropriate "black box" to control the vessel at increased speeds and height. Then the naval architect and marine engineer tie it all together in a final design and someone builds it. But before construction is completed there will be many problems to solve and they will all be involved with the pound and the dollar (weight and cost).

Obviously thrust must be provided by some method. Research vehicles have used air screws, air jets, and water jets in addition to water screws. Perhaps continued research will develop a method uniquely adapted to hydrofoil vessels. To use a water propeller it must be located far below the hull and remain submerged after the foils have lifted the hull clear of the water. Connecting the propeller to the engine requires engineering ingenuity. A vertical shaft drive can utilize the foil strut for support, but will require two right-angle gear units capable of high speeds and high loads. Lubrication, inspection, and maintenance can become difficult, particularly for the lower gear unit. An angled shaft drive reduces the gearing problem, but increases the shaft support problem and positions the propeller at a less than optimum angle with respect to the direction of travel through the water.

In addition to satisfying himself and his customers, the designer must also satisfy the U.S. Coast Guard if his vessel is to be certificated. To assure that these vessels provide a degree of safety comparable to that provided by conventional vessels in the same service, the Coast Guard has exercised close supervision over their commercial development. The major areas of concern have been the hull structure, subdivision, and stability. These vessels must be lightly built to allow for a profitable payload capacity. One



Hydro Marine's (Kirkland, Washington) surface piercing passenger hydrofoil.



MARAD'S Denison

method of reducing structural weight is to reduce the scantlings, but this will reduce the strength. On the other hand as operating speeds increase, the potential wave impact loads also increase. These loads are essentially proportional to the square of the velocity of impact, i.e., doubling the speed increases the impact load four times. It then becomes clear that there is a finite limit to the amount of weight reduction possible by reducing scantlings. The more promising weight reductions are realized by strong lightweight materials and more efficient structural arrangements.

Plans of proposed hydrofoils are reviewed by the Merchant Marine Technical Division of the Coast Guard to verify adequacy of the design. Structural analyses are required to show that the designer has provided adequate strength considering the particular structural arrangement and choice of materials. A specific requirement has been provision of a "weak link" in the attachment of the forward foils to avoid structural damage to the hull in case the foils should strike an "immovable" object. Additionally, the subdivision and stability provided should allow the vessel to remain afloat and upright in the event reasonable damage is sustained by the hull.

Summarizing, the Coast Guard's approach has been to insure that the hull is structurally sufficient and that should it be damaged it will remain afloat and upright. This approach has received the cooperation of the hydrofoil designers, builders, and operators. Safe operation, particularly during the first few years, is essential for the long-range commercial development of hydrofoils.

The outlook for hydrofoil designs appears optimistic with more efficient foil systems emerging from current research, but the future success of this vessel type will be determined by the hard facts of economics. In this respect the critical importance of route must be considered. The major factors controlling profitability for hydrofoil vessels are: (a) competing transportation systems, (b) environmental conditions, (c) market characteristics (passenger quantities, daily and seasonal variations, etc.), (d) operating costs, and (e) vessel performance characteristics (comfort, range, speed). Where these factors combine to give hydrofoils the advantage over other modes of transportation commercial applications must succeed.

Table I is included to show a more comprehensive view of the commercial activity today.

Commercial hydrofoil activity is not only intense, but widespread geographically as revealed by the listings of areas of operations in table II.

TABLE I.—COMMERCIAL HYDROFOIL ACTIVITY

Design (plans submitted for USCG review)	Planned	Construction in progress	Completed	Results (certificated, etc.)
A			1	Experimental.
B	Quantity unknown	10	20	19 certificated 1 pleasure.
C	Quantity unknown	None in U.S.	Unknown	Foreign.
D	Quantity unknown	None in U.S.	Unknown	Foreign.
E		1	1	1 certificated.
F	Inactive.			
G	1 (foreign)			
H	2	1	3	3 certificated.
I	Inactive.			
J	Inactive.			
K			1	Experimental.
L		1		
M	3	2		
N	1			
O	Quantity unknown		1	Experimental.
Total: 15	7+	15+ anticipate certification during 1965.	27 U.S.A.	23 U.S.A.

TABLE II.—GEOGRAPHIC DISTRIBUTION OF CERTIFICATED VESSEL OPERATIONS

Past/present	Anticipated additions during 1965	Anticipated additions in near future
New York, N.Y.	Nantucket Sound, Mass.	Boston, Mass.
Washington, D.C.	San Francisco, Calif.	Hawaiian Islands.
Richmond, Va.	Seattle, Wash.	Long Island Sound.
Pittsburgh, Pa.	Lake Tahoe, Nev.	Gulf coast.
Philadelphia, Pa.	Miami, Fla.	
Cincinnati, Ohio		
San Diego, Calif.		

LCDR P. J. DANAHY

A Summer at the Fair

COMMERCIAL HYDROFOILS IN N.Y. HARBOR

By CDR Nathaniel F. Main, USCG

In keeping with the futuristic theme of the N.Y. World's Fair, hydrofoils were introduced last summer as an adjunct to the usual forms of public transportation serving the fair site. Thanks to that mass exposure, hydrofoils made a great leap forward toward becoming established as a common mode of water transportation in the United States.

The Coast Guard, with a weather eye cut for any inherent unsafe idiosyncrasies of these craft, has studied and inspected them from the drawing board, through construction to certification, and then during operation.

The following report is of last summer's operations of the World's Fair commuter-excursion hydrofoils by American Hydrofoil Inc., of New York.

The author, CDR Nathaniel F. Main is a 1941 graduate of California Maritime Academy. He sailed as deck officer on U.S. merchant ships until 1948, obtaining licenses as Master and Pilot. He served as First Lieutenant and seamanship instructor at California Maritime Academy and aboard the training ship Golden Bear *before entering the Coast Guard in 1950 under the Public Law 219 program.*

CDR Main has served in marine inspection duties at San Francisco, Albany, New York, and New York City. He has been Commanding Officer of CGC Nettle *in the Philippine Islands and is presently Executive Officer of the icebreaker* Northwind.

ON 15 JULY 1963, at about 8:30 a.m., the first commercial hydrofoil service in the New York area was inaugurated with the departure of the *Albatross* from Port Washington, Long Island, bound for the foot of Wall Street in Manhattan with 16 passengers.

This vessel, developed at Wilmington, Calif., during 1961 and certificated by the Coast Guard as a small passenger vessel in October 1962, represented the prototype design for later vessels built and added to the New York fleet.

As these later vessels left the builder's yard and arrived in New York, similar commuter service was established to other points in the metropolitan area. According to the operators, passengers may save 30 to 45 minutes over other means of commercial transportation depending upon the distance of the run.

In April 1964, passenger service to the New York World's Fair was opened, providing direct transportation between Manhattan and the World's Fair Marina on Flushing Bay. Departures were scheduled every 5 minutes, and en route the passengers were treated to views of the many waterside sights of New York.

Each boat accommodates 22 passengers in twin aircraft-type seats arranged two abreast along a center aisle. A licensed operator is in charge of navigation, assisted by an additional crewmember during night hours of operation on the 22-minute, 11-mile run.

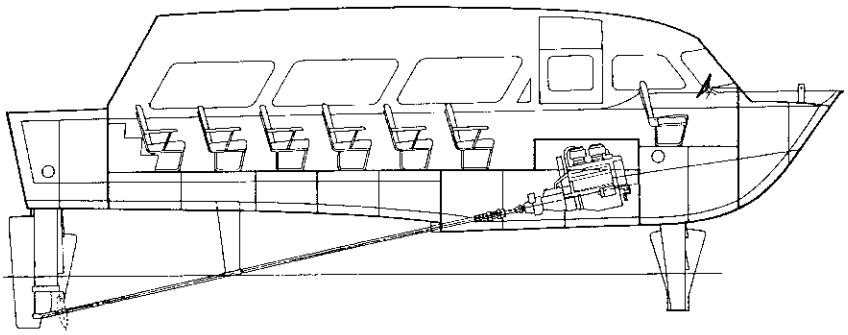
Two of the boats, the *Aquafoil XII* and the *High Time*, were chartered for private use until the Fair closes in October 1965. These boats are fitted with extra plush features in lieu of the regular passenger seating arrangements.

At full operation in 1964 a total of 13 boats were in service; *Albatross I* through *VI*, *Aquafoil VII* through *XII*, and the *High Time*.

TYPICAL OPERATION

The boats become foilborne at about 18 mph in a distance of about 500 feet, and provide a smooth ride at a cruising speed of about 32 m.p.h., without the wake noise and wave action experienced in a conventional craft at this speed. Top speed is about 40 m.p.h., and even at this speed the boats can be brought to a dead stop in about three boat lengths. While "foilborne" the boats are extremely maneuverable and obeying the Rules of the Road presents little or no problem for the operator, at this high

PASSENGER ACCOMMODATIONS ABOARD A NEW YORK COMMUTER-HYDROFOIL



CUTAWAY SIDE VIEW OF THE *ALBATROSS* SHOWING SEATING ARRANGEMENTS

speed, can resolve any potential situation well before any risk of collison can develop. The diesel propulsion engines generate considerable noise, but passenger conversation is unaffected.

Hullborne, although the vessels are fitted with quite large rudders, they cannot be turned sharp around by backing and filling, as can conventional craft, due to the extensive underwater foil surfaces. Spring lines are employed to turn them about at the docks.

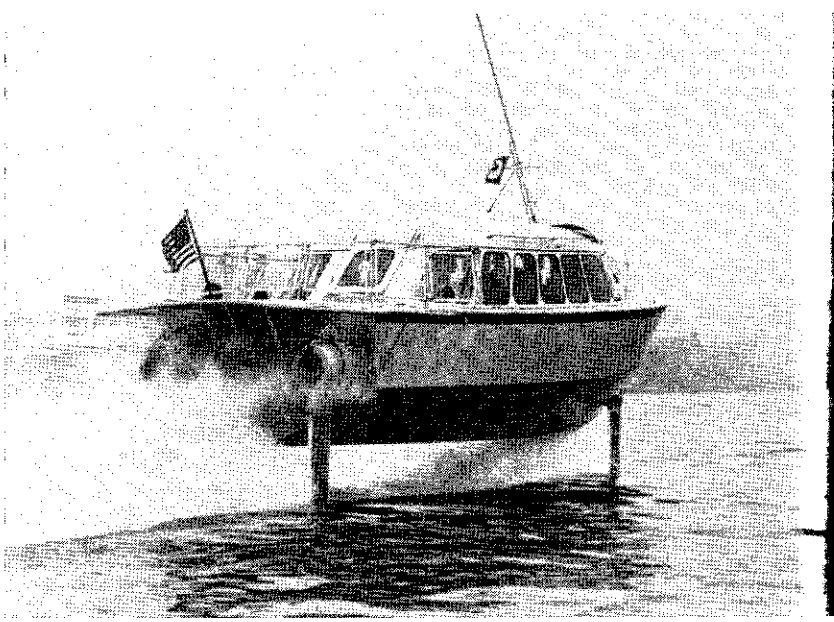
CASUALTIES FEW

It was anticipated that floating debris in the river would present a prime hazard to the vessels while "foilborne," but experience has shown that they can strike quite large timbers and pilings at full speed and rarely sustain disabling damage. Usually the boats can be backed clear of the material lodged in the foils, and proceed on their way. When damage is caused from this source it usually consists of stretching or breaking the two bolts by which the foils are attached to the center vertical struts, and by which the critical foil angle is adjusted. The extra crewmember was added during night operation primarily to serve as lookout for debris, and though much material is avoided as a result, night operation proves to be little more hazardous than daytime. *Albatross* was originally fitted with radar to assist the operator, but this has since been removed.

Another condition with which the operator must contend is the general uncleanliness of the water in the area, which requires frequent, and sometimes emergency, cleaning of the engine cooling water strainer. Early in the 1964 operation, two or three of the vessels experienced equipment failures that resulted in loss of steering, but on the whole the vessels are rarely inoperative due to casualties, and only one has resulted from the hydrofoil character of the craft. On this occasion the vessel nosedived back into the river while passing through a large wake produced by an overtaken tugboat. The windshield was knocked from its rubber mounting and water was shipped in the cabin, alarming several of the passengers, but injuring none. In passing through a wake in this manner, the vessel is riding in what amounts to a following sea, and the time to pass through the turbulence is considerably longer than if the vessel were meeti the wake head on. What occurs that the forward foil, on entering t first wake crest, lifts the bow slight Then, as this foil passes through t crest and enters the void of the trou beyond, the bow is suddenly dropp and slammed into the crest of t second wake line. This action can avoided or minimized if the opera will throttle back slightly as the f crest is entered, and then reapply f power as the foil enters the trou but this requires much skill and a c tain amount of luck to be successf A redesigned bow, with an extre flair, a flush deck, and additional serve buoyancy, overcomes the ill e fects of such a dive.

LICENSED OPERATORS

Among licensed operators, all a are represented, and experience bac grounds are varied; many are form Coast Guardsmen, and others ran from small boatsmen, to recent Ma time Academy graduates, to vete ocean licensed deck officers. Ina much as these boats while "foilborn experience no wave action or no against the hull, a new operator r quires about 25 hours of training get the "feel" of the craft. Safe and comfort of passengers, the co pany's requirements concerning o

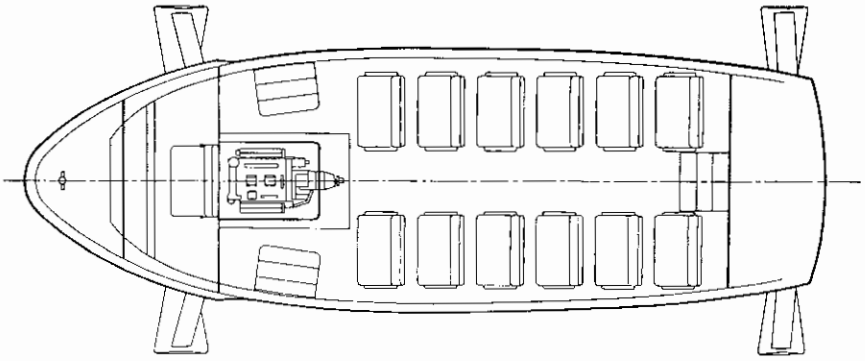


THE SUBMERGED FOIL HYDROFOIL *ENTERPRISE*

erating procedures, maintenance and repair schedules and methods, preparation of operating logs, and making the critical foil angle settings are training subjects new operators must complete.

MAINTENANCE

The boats are hauled out by floating crane at least every 10 days for hull cleaning and foil check. The leading edges of the foils are often found nicked or bent, and these are returned to a knife edge by filing. At this time the foil angle is checked to insure that the boats will "fly" at even list and trim with a full load of passengers. If badly damaged, both foils can be replaced in 4 to 6 hours.



CUTAWAY PLAN VIEW OF *ALBATROSS* SHOWING ARRANGEMENTS AND FOIL EXTENSION

FACILITIES

Terminal facilities are floating docks fitted with outrigged catwalks that extend over the vessel's foils at deck level. Passengers are easily and safely handled to and from the boats from these catwalks, and at the same time there is no chance of damaging the foils.

The boats are fitted with radiotelephone equipment but it has been reported that there are many "dead" spots on East River, and communications are not always reliable. For the World's Fair service, dispatchers at each end of the run maintain telephone communication to relay each boat's departure, so that if one were to be overdue, another boat can be sent to search and assist if needed.

CDR NATHANIEL F. MAIN

In addition to the passenger-carrying version in use in the New York area, this same craft has been produced in a sports fishing model, having a large cockpit with fishing chairs and the control station in a flying bridge on the cabin top. Rapid passage to and from fishing grounds is said to be the advantage of this model. Interest in the Boston area for obtaining a fast means of getting lobsters into market may result in a cargo version of the same basic design.

Though the vessels satisfactorily overcome the hazards of debris in the East River, the operator does not attempt to challenge the winter ice usually found in New York Harbor and all services are suspended until spring, with the boats hauled out for winter storage. This summer, the three commuter services will resume, and with the opening of the fair that service will be reestablished. Other plans include an increase of sightseeing service on the Potomac River at Washington, D.C.; an additional commuter service to Yonkers, N.Y., on the Hudson River; and a service for airline passengers between Manhattan and La Guardia Airport.

At the close of the World's Fair in October 1964, American Hydrofoils, Inc., reports they had carried just over 100,000 passengers for a total of 1,600,000 passenger miles without a single reported passenger injury, thus establishing the hydrofoil in the United States as a fast, reliable, and safe means of mass transportation by water. ⚓

THE HONOLD SPORT MODEL

HYDROFOIL CONSTRUCTION INSPECTION

By

LCDR Donald W. Smith, USCG

Hydrofoil construction on a prod tion basis in the United States, Coast Guard inspections during progress of that construction rather novel marine experiences. Coast Guard marine inspector has conducted hydrofoil construc inspections is the author of the companying article. The backd against which he draws his revie the Ludwig Honold Co. of Folcr Pa., makers of New York World's F hydrofoils.

LCDR Smith is a 1953 graduate the Coast Guard Academy, and served in both deck and engineer c cer capacities aboard the cutt Ramsden, Gresham, Androscogg Humboldt *and* Aurora. *He has ser as Assistant Chief, Naval Engineer Section for the 9th Coast Guard D trict and presently serves as a mar inspector at Philadelphia, where he principally assigned to hydro construction.*

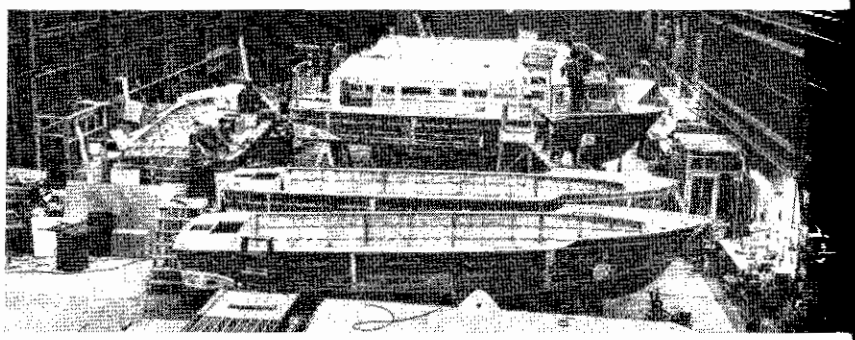
DUE TO THE suitability of the hydrofoil for carrying passengers for hire in ferry and excursion service, these vessels at times come under the purview of the U.S. Coast Guard for certification as small passenger vessels.

Following is a brief case history of construction and construction inspection procedures involved in the manufacture of one model of these unique craft.

THE CRAFT

The hydrofoil at hand is a deep vee, stepped-hull model equipped with fixed surface-piercing foils. The foil lift is automatically adjusted with a change in the foil area exposed to the water which makes the vessel stable and self-righting. The hydrofoil has the tendency to increase the flying condition when entering a wave and to decrease when leaving a wave, thus the designer can ensure the desired stability of his vessel by choosing suitable shapes for the foils, but he cannot eliminate the unfavorable conditions of a following sea which causes the boat to nosedive from wave to wave. To minimize this behavior the front and rear foils are of different shapes, this assists in providing more favorable stability. Another design feature, depending on the area of operation, is the height of the foil from the hulls. The greater this measurement, the more draft exists when the hydrofoil is in the displacement condition, however, at the same time, the normal sea conditions must be considered so the vessel will have hull clearance at all times.

LCDR DONALD SMITH



ASSEMBLY

The aluminum frames, bulkhead, shell plate, and scantlings are mass produced in one of the company's plants and assembled at another.

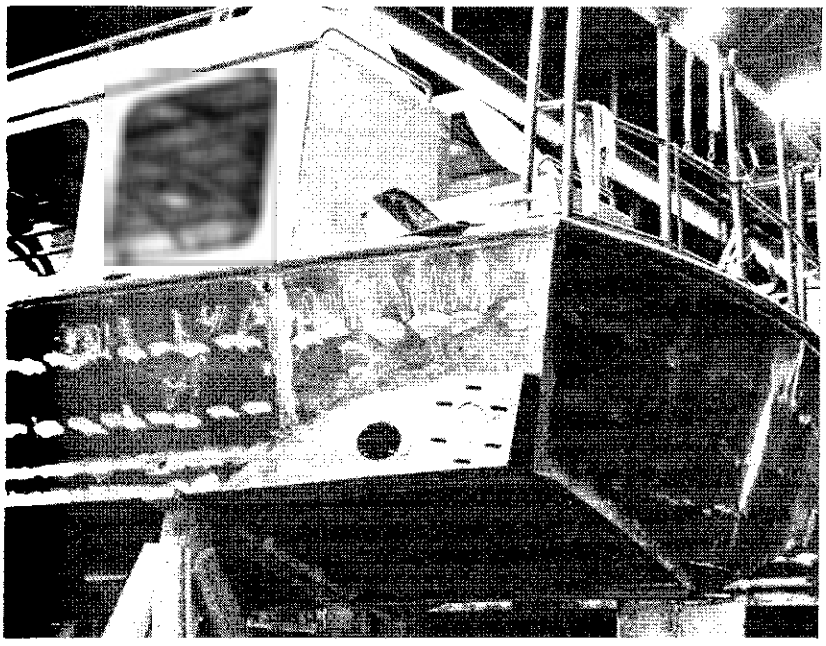
First, aluminum frames are welded in a jig then set upside down on an erection fixture where the longitudinals are welded in place with particular attention to the stress plates where the hull is stepped to provide for continuous strength and stiffness. The vessel is skinned with one-eighth- to three-sixteenths-inch alumin sheets. The foil attachments a then installed. The hull is then righted and welded inside. Up completion of the hull welding, no destructive examination is perform

BUOYANCY ADDED

The hull is then filled with an a proved buoyant foam in all spac under the passenger deck that will n be utilized for machinery and cont equipment and in the side pane throughout the cabin space. Som 205 cubic feet of rigid foam ad structural reinforcement and flotati to the boat.

MACHINERY AND SHAFT

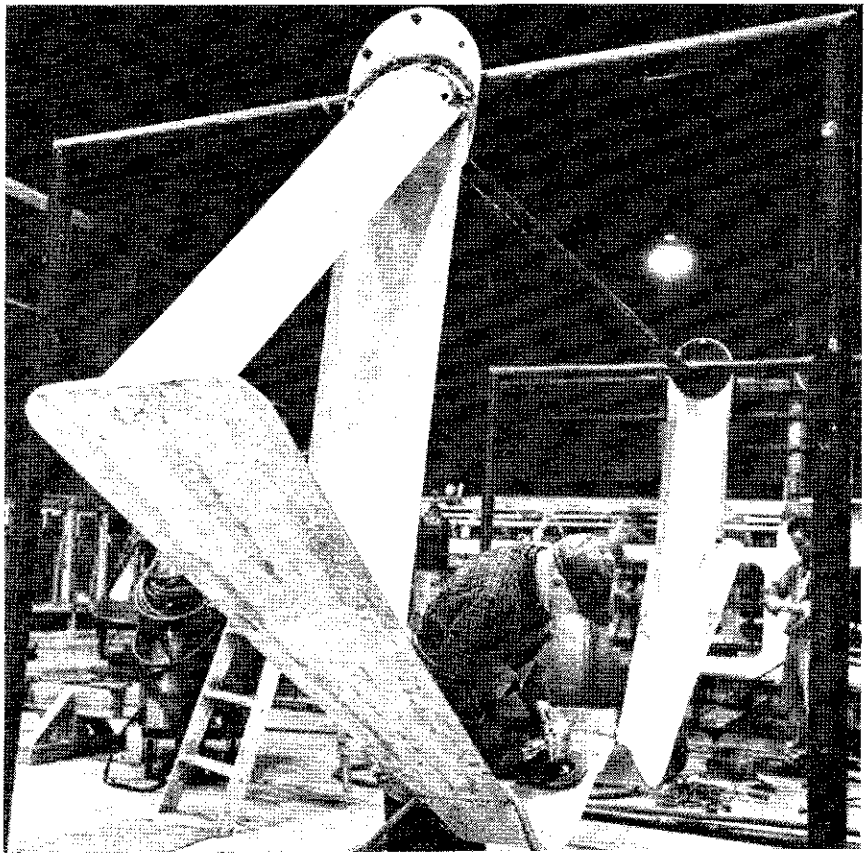
After the cabin deck is laid and t side panels installed, the hull struc ture is ready for the machinery, a for electrical and cabin installatio



ABOVE. Stern section showing tail shaft rudder post, rudder aftertail-side-attachment-pod and cabin construction.

RIGHT. After foil under construction. Foils are built up from extrusions to a designed hydrofoil shape.

LEFT. All welded aluminum hydrofoil hulls under various stages of construction at Ludwig Honold Mfg. Co.



Simultaneously with the hull erection, the cabin and foils are fabricated and readied for installation as soon as the engine has been mounted on the foundations. A diesel engine is installed, then the shaft is installed at a sharp downward angle beneath the boat, supported in the middle by a vee strut. The versatile rudder post is utilized for the rear foil center support, after propeller stub shaft bearing housing, and engine cooling water injection piping as well as the support for the rudder.

Because the hull of the hydrofoil is clear of water when in the foilborne condition, the following construction differences exist over the usual displacement hull:

(1) The tail shaft stuffing box receives lubrication and raw water cooling from the engine cooling system.

(2) The sea injection suction scoop is built into the center of the rudder post with the scoop opening at the base directly aft of the propeller. This arrangement insures maximum submersion for water supply under all conditions of operation. However, the propeller tends to pull water from the system on backing. The backing operation is never of any long duration and with the closed freshwater engine cooling, overheating is unlikely.

(3) The rudder is constructed with a larger surface area at the bot-

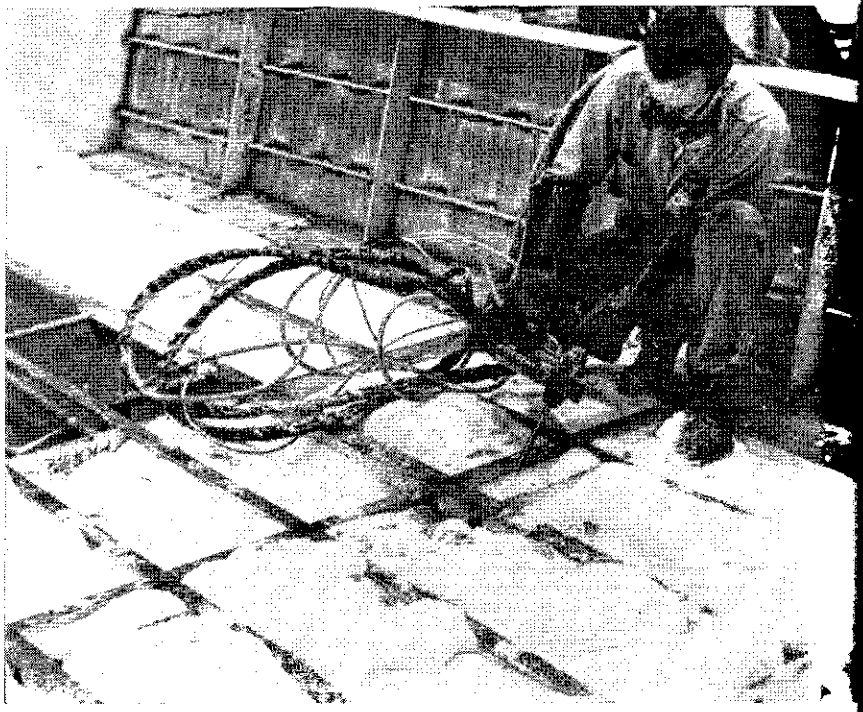
Tail shaft extends from hull at a steep angle supported by a vee-strut near mid point of exposed shafting.

route. The steering system is a high pressure hydraulic unit. A manu tiller is provided for emergencies.

STABILITY TESTS

After the hull is completely constructed, inspected, and equipped in accordance with the approved plan and materials, the vessel is then launched for the operational and foilborne stability trials. The prototype hydrofoil *Albatross* had a conventional stability test for a displacement hull which is considered sufficient evidence of satisfactory stability for the remaining vessels of the identical class. However, each vessel must have a foilborne operational stability test with a full passenger load as each foil has its own particular setting and alinement for best stability. A foil setting for a light load has proved to be relatively unstable with a full load. This relatively unstable boat on its foils is not a dangerous condition as the vessel will simply roll to one side or the other, slow down and ride on the hull.

Foam filling of hull spaces prior to installing deck plating. When the foam sets it adds structural reinforcement and flotation to the boat.



tom to provide sufficient control surface when only that portion of the rudder is submerged.

(4) The engine box is of watertight construction and lined with acoustical insulation and is ventilated to the atmosphere. The engine can be exhausted both through twin dry vertical stacks directly behind the operator's seat (in older models) or with wet exhausts discharging through the hull sides (newer models).

THE FOILS

The foils are of aluminum welded construction made with utmost precision to provide the design airfoil shape. The foil and struts are made fast to the attachment plates with stainless steel bolts designed to shear off to prevent hull failure in case of grounding or collision with a submerged object.

The navigation equipment, fire protection and lifesaving apparatus is the same as that specified by law for a small passenger vessel of this size and

MARITIME SIDELIGHTS

AMVER WANTS YOU IS YOUR SHIP PLOTTED?

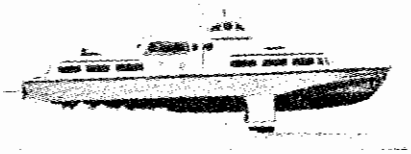
AMVER participants are reminded that the AMVER Center with its new computer is now capable of maintaining a plot of vessels for the entire North and South Atlantic regions. Radio officers are encouraged to file sail plans as soon after departure from European and South American ports as communications can be established with the radio stations currently accepting AMVER messages. Are you an AMVER participant? It could be a lifesaver!

Details of AMVER System operations may be obtained from Commander, Eastern Area, U.S.C.G., Customhouse, New York, N.Y., 10004. AMVER instructions are available there, and at Coast Guard Captain of the Port and Marine Inspection Offices in major Atlantic and Gulf ports of the United States. The instructions are published in the following languages: Danish, Dutch, English, French, German, Greek, Italian, Japanese, Norwegian, Portuguese, Russian, Spanish, and Swedish. Requests for instructions should state the language desired if other than English. ⚓

MERCHANT FLEET STATISTICS RELEASED

During the 6-month period of November 1, 1964, to April 1, 1965, the active oceangoing U.S. merchant fleet of 1,000 gross tons and over continued to decline. The fleet standing at 917 vessels on November 1, diminished by 2 to 915 on December 1, and by 3 to 912 on January 1. A significant drop to 741 was experienced on February 1, owing to the longshoreman strike. This figure increased to 799 on March 1, with a partial return to work of some longshoremen. The April 1 figure, with all ports operating normally, the fleet stood at 904 (882 active, 22 still strike bound in Gulf coast ports), 13 fewer than the count 6 months previous.

There were, on April 1, 21 Government-owned and 861 privately owned ships in active service.



MEN OF ALCOA VOYAGER HONORED FOR RESCUE

The American cargo ship *Alcoa Voyager* of the Alcoa Steamship Co. has been honored in New York for a rescue feat performed last May off Charleston, S.C. The Ship Safety Achievement Citation of Merit, jointly awarded by the American Merchant Marine Institute and the Marine Section, National Safety Council, was presented at a special ceremony by Capt. J. O. Thompson, USCG, Chief, Merchant Marine Safety Division, Third Coast Guard District, to Capt. Trygve E. Haagensen, the ship's master.

At 2 p.m., May 6, 1964, the *Alcoa Voyager* was southbound off Charleston in high seas when an alert bridge lookout sighted a flare on the horizon ahead. Changing course, they found the battered and dismasted ocean racing yawl *Doubloon* with four men on board. The hulk rode so low in the heavy sea that one ship had already passed without seeing her. The yachtsmen later reported that their craft had done two complete rollovers at the height of the storm.

Although the big *Alcoa Voyager* was in ballast and hence hard to maneuver in the strong northeast wind, Capt. Haagensen jockeyed her into position to windward of the derelict and got a heaving line aboard. Unable to transfer the crew of the yawl because of sharks, the weather, and the deep rolling of both vessels, he determined to take the *Doubloon* in tow to avoid losing sight of her in darkness, which was now falling. All night, at low speed, the tow continued, while stern lookouts on the freighter maintained a searchlight watch.

At 7 a.m., May 7, a Coast Guard cutter arrived to take over the tow. Not only were her crew saved, but the *Doubloon* herself was salvaged and has since returned to racing.

MOOREMACK RECEIVES FIFTH HEALTH AND SANITATION AWARD

Moore-McCormack Lines has been selected by The Surgeon General of the U.S. Public Health Service to receive a Special Citation for Excellence in Sanitation, for the fifth consecutive year.

The citation was awarded to Moore-McCormack Lines in recognition of the excellent sanitary conditions on board the line's fleet of 41 ships, covering 166 items of maintenance and operation. ⚓

CG TO INAUGURATE SAFETY PATROLS IN HIGH-DENSITY BOATING AREAS

As part of its recreational boating safety program, the U.S. Coast Guard will inaugurate roving "safety patrols" to visit high-density boating areas to detect unsafe practices on the waters of the Third Coast Guard District.

In the Federal water areas of Connecticut, New Jersey, Delaware, and parts of Pennsylvania, Vermont, and New York, Coast Guard boarding officers will be on the lookout for such unsafe practices as excessive speed, overloading, improper loading, operating in swimming areas or posted dangerous waters, erratic operation or failure to carry required safety equipment.

The Coast Guard roving safety patrols will operate from 22 coastal Coast Guard Stations, and 3 mobile boarding teams from New London, Conn., Gloucester City, N.J., and New York, N.Y.

Assisting the Coast Guard in its recreational boating-safety program is the Coast Guard Auxiliary with its public instruction courses and courtesy motorboat examinations.

The safety patrol concept is part of a broader Coast Guard recreational boating safety program which will concurrently stress education through boating organizations and public information channels. It also calls for greater uniformity, reciprocity, and comity between the State and Federal agencies active in this field. ⚓

FV *Two George's* Casualty Findings Approved

Near noon on 25 March 1964, the small passenger vessel *Two George's*, on returning from a morning fishing trip with passengers aboard, broached and capsized with loss of life near the South Lake Worth Inlet in Florida. After due consideration of the findings, conclusions, and recommendations of the Marine Board of Investigation convened to investigate the mishap, the Commandant has announced his action. It follows verbatim.

THE TWO GEORGE'S sometime prior to casualty.

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

26 January 1965

Commandant's Action
on

Marine Board of Investigation; capsizing of the M/B *Two George's* off South Lake Worth Inlet, Florida, on 25 March 1964, with loss of life

1. The record of the Marine Board of Investigation convened to investigate subject casualty together with the findings of fact, conclusions and recommendations, has been reviewed.

2. The *Two George's*, O.N. 269648, is a twin screw, single deck, wood hull vessel, 60 feet in length, of 11 gross tons and used as a party fishing boat carrying passengers for hire. The vessel had a valid Coast Guard Certificate of Inspection with no deficiencies outstanding. It was manned with sufficient personnel, was properly equipped and was in a sound, stable and seaworthy condition.

3. South Lake Worth Inlet is a channel dredged through the beach from Lake Worth to the ocean. It varies between 100 feet and 200 feet in width and has a depth of between 5 and 6 feet. There are two concrete jetties on the oceanside which extend about 40 feet out from the beach. About 200 yards offshore from the jetties there is a sand bar. The depth of water over the bar is about 7 feet. Because the inlet is narrow and shallow and a bar exists immediately offshore, easterly seas, swells, and wind conditions cause seas to break across the bar and restrict its navigability. When the tide is ebbing, strong curre flowing out of the inlet combine with the swell and s conditions and make crossing the bar hazardous.

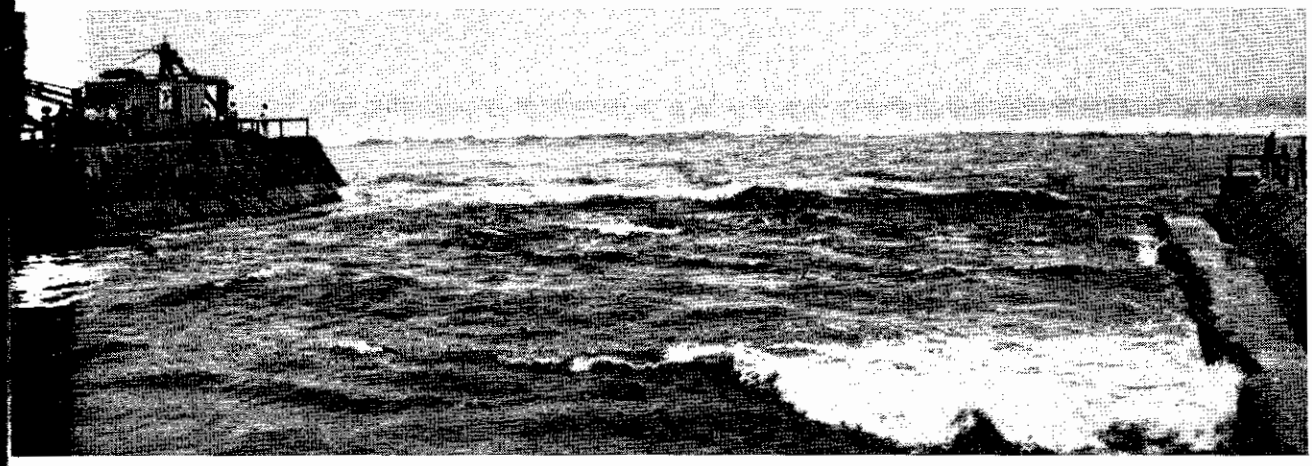
4. There are about 50 charter boats and party fishi boats operating out of South Lake Worth Inlet. T Master makes the decision as to whether or not the b can be safely crossed. The procedure for crossing the b and entering the inlet from seaward varies with ea operator depending upon his experience and the boa capabilities. In general, the operator will approach t bar area and slow or stop his vessel in a safe area j beyond the breaker line. In this position, he can evalu the sea conditions and the period of the swells and se the most favorable moment to cross the bar.

5. When the casualty occurred, the wind was from th southeast Force 5, the sea from the southeast at approxi mately 4 to 6 feet in height with an easterly swell est mated to have been about 5 feet in height. The tide wa ebbing, high tide having occurred at about 0616 with lo tide to occur at 1241. On the bar the surf was cresting a between 8 and 10 feet, occasionally increasing to betwee 12 and 15 feet.

6. On 25 March 1964, the *Two George's* departed Sou Lake Worth Inlet at about 0805, on the first of thre usually scheduled daily trips for the fishing grounds of shore. There were 3 crewmembers and 17 passengers o board. The outward passage over the bar was made with out difficulty.

7. At about 1130, the motorboat *Two George's* in com pany with the motorboat *Sea Mist*, a 60 foot long inspecte passenger vessel, and the *Mart Jean Too*, a 63 foot lon inspected passenger vessel left the fishing area to retur to port. The vessels approached the bar with the *Sea Mi* in the lead followed by the *Two George's* which was fol lowed by the *Mart Jean Too*. The *Sea Mist* slowed as i approached the bar but did not stop, and when condition were favorable crossed the bar without difficulty. Th engines of the *Two George's* were slowed while waitin for the *Sea Mist to* enter. As soon as the *Sea Mist* wa clear of the bar, the operator of the *Two George's* place the engines at about two-thirds speed ahead and starte in. The operator of the *Two George's* was apparently un aware of the dangerous situation developing until th engines began to labor, and upon looking astern, he sa a large wave estimated to have been 15 to 18 feet i height, about 25 feet astern. As the wave overtook th vessel, the stern was raised until the propellers and rudde were out of the water. With the vessel out of control the bow veered to starboard and the boat broached o the face of the wave and capsized.

8. After the *Two George's* capsized, the *Mart Jean To* crossed the bar and the *Sea Mist* returned from insid the inlet to attempt to rescue survivors. Smaller vessel



Looking seaward through jetties of South Lake Worth Inlet.

...n joined the search and within 45 minutes the last ...rvivor was safely ashore. As a result of this casualty, ...e lives of four passengers were lost, and a fifth is miss... and presumed to be lost.

REMARKS

1. Concurring with the Board, it is concluded that this ...ualty occurred as the result of the *Two George's* being ... or in the vicinity of the bar at the moment when the ... swell and tide conditions combined to create a wave ...able of broaching and capsizing the vessel.

2. Further concurring with the Board's conclusions, it ...considered that the placing of the vessel in such posi...n constitutes evidence of inattention to duty on the ... of the operator. The confused sea condition on the ... necessitated cautious evaluation of the bar conditions, ...d seamanship and experienced boat handling. He was ...are that there was an easterly swell estimated at about ... feet in height. He was also aware that an easterly ...ell could create dangerous surf conditions on the bar. ... stated by the Board, "It is inconceivable that a proper ...utiny of the conditions to seaward by the operator while hove to, off the bar, would not have revealed the presence of this swell prior to committing the vessel to the bar."

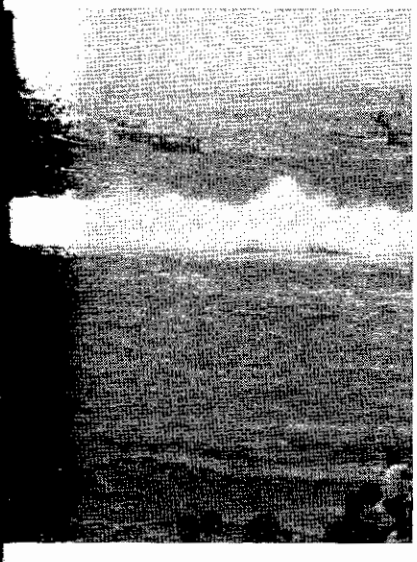
3. The Board's conclusion that the operation of party and charter boats out of South Lake Worth Inlet on a scheduled basis without regard to the stage of the tide and accompanying current subjects passengers to unnecessary hazards is concurred in. A continuing study of the operation of certificated passenger vessels which regularly use the inlet is being made to determine under what special conditions, if any, they should be permitted to continue operation.

4. Concurring with the Board's recommendations, copies of this report will be forwarded to the South Lake Worth Inlet Commission, the United States Army Corps of Engineers and the United States Attorney having jurisdiction for consideration and such action as is deemed appropriate.

5. Subject to the foregoing remarks, the record of the Marine Board of Investigation is approved.

E. J. ROLAND,
Admiral, U.S. Coast Guard,
Commandant.

...O GEORGE'S (left) on another day moves along breakers just outside inlet.



CG HELICOPTER on the scene.

TWO GEORGE'S debris washes ashore.

1960 AND 1948 INTERNATIONAL RULES COMPARED: REVISIONS OF RULES 21 THROUGH 28 EXPLAINED

This eighth article of a series continues the comparison of the 1948 International Rules of the Road presently in use with the revised 1960 International Rules which will become effective on 1 September 1965.

In the following presentation, the 1960 rule appears in standard roman type immediately followed by the superseded 1948 rule. A résumé of primary changes follows the rule presentation.

PART D—STEERING AND SAILING RULES

RULE 21

1960 INTERNATIONAL RULES

Where by any of these Rules one of two vessels is to keep out of the way, the other shall keep her course and speed. When, from any cause, the latter vessel finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision (see Rules 27 and 29).

(Same as 1948 Rule)

RULE 22

1960 INTERNATIONAL RULES

Every vessel which is directed by these Rules to keep out of the way of another vessel shall, so far as possible, take positive early action to comply with this obligation, and shall, if the circumstances of the case admit, avoid crossing ahead of the other.

Changed. 1948 Rule Read:

CROSSING AHEAD

Rule 22 Every vessel which is directed by these Rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

PRIMARY CHANGE

The addition of the language "so far as possible, take positive early action to comply with this obligation" makes it clear that the burdened vessel should not hang on until the last moment and only then reluctantly yield the right-of-way. Such action, meeting the letter of the law under the 1948 Rules, is no longer sufficient.

RULE 23

1960 INTERNATIONAL RULES

Every power-driven vessel which is directed by these Rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

(Same as 1948 Rule)

RULE 24

1960 INTERNATIONAL RULES

(a) Notwithstanding anything contained in these Rules, every vessel overtaking any other shall keep out of the way of the overtaken vessel.

(Same as 1948 Rule)

(b) Every vessel coming up with another vessel from any direction more than 22½ degrees (2 points) abaft her beam, i.e., in such a position, with reference to the vessel which she is overtaking, that at night she would be unable to see either of that vessel's sidelights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these Rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

(Substantially same as 1948 Rule)

(c) If the overtaking vessel cannot determine with certainty whether she is forward of or abaft this direction from the other vessel, she shall assume that she is an overtaking vessel and keep out of the way.

(Same as 1948 Rule)

RULE 25

1960 INTERNATIONAL RULES

(a) In a narrow channel every power-driven vessel when proceeding along the course of the channel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

(b) Whenever a power-driven vessel is nearing a bend in a channel where a vessel approaching from the other direction cannot be seen, such power-driven vessel, when she shall have arrived within one-half (½) mile of the bend, shall give a signal by one prolonged blast on her whistle which signal shall be answered by a similar blast given by any approaching power-driven vessel that may be within hearing around the bend. Regardless of whether an approaching vessel on the farther side of the bend is heard, such bend shall be rou with alertness and caution.

(Same as 1948 Rule)

(c) In a narrow channel a po driven vessel of less than 65 fe length shall not hamper the safe sage of a vessel which can nav only inside such channel.

(New. No 1948 Counterpar

PRIMARY CHANGES

Rule 25(c) simply voices a previ recognized but unwritten co which, under the General Prude Rule, dictated that small m boats should keep clear of large less maneuverable vessels operati restricted waters. The formal i sion of this common sense propos together with a counterpart Ru (b) applicable to small sailing ves is necessary because of the drasti pansion in the recreational boa field within the past few years and attendant increase in the numbe operators unaware of the fa which make it unsafe for a sma sel to hamper large vessels in stricted waters.

PART D—STEERING AND SAILING RULES

RULE 26

1960 INTERNATIONAL RULES

All vessels not engaged in fis except vessels to which the provis of Rule 4 apply, shall, when under keep out of the way of vessels eng in fishing. This Rule shall not to any vessel engaged in fishing right of obstructing a fairway used vessels other than fishing vessels.

Changed. 1948 Rule read:

RIGHT OF WAY OF FISHING VESSE

RULE 26 All vessels not engaged in fishing shall, when under way, keep out of the way of any vessels fishing with nets or lines or trawls. This Rule shall not give to any vessel engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels.

PRIMARY CHANGES

Rule 26 now clearly specifies vessels engaged in fishing do not h the right-of-way over vessels g erned by the provisions of Rule 4.

RULE 27

1960 INTERNATIONAL RULES

In obeying and construing th Rules due regard shall be had t dangers of navigation and colli and to any special circumstances cluding the limitations of the involved, which may render a de

...e from the above Rules necessary ...der to avoid immediate danger.

(Same as 1948 Rule)

ART E—SOUND SIGNALS FOR VESSELS IN SIGHT OF ONE ANOTHER

RULE 28

1960 INTERNATIONAL RULES

a) When vessels are in sight of one ...ther, a power-driven vessel under ...r. in taking any course authorized ...required by these Rules, shall in...cate that course by the following ...nals on her whistle, namely—

One short blast to mean "I am alter...g my course to starboard."

Two short blasts to mean "I am ...ering my course to port."

Three short blasts to mean "My en...es are going astern."

(Same as 1948 Rule)

b) Whenever a power-driven vessel ...ich, under these Rules, is to keep ...r course and speed, is in sight of ...other vessel and is in doubt whether ...ficient action is being taken by the ...er vessel to avert collision, she may ...dicate such doubt by giving at least ...e short and rapid blasts on the ...istle. The giving of such a signal ...all not relieve a vessel of her obli...ations under Rules 27 and 29 or any ...er Rule, or of her duty to indicate ...y action taken under these Rules by ...ving the appropriate sound signals ...d down in this Rule.

(Same as 1948 Rule)

c) Any whistle signal mentioned ...n this Rule may be further indicated ...y a visual signal consisting of a white ...ght visible all round the horizon at a ...stance of at least 5 miles, and so ...vised that it will operate simultane...sly and in conjunction with the ...istle-sounding mechanism and re...ain lighted and visible during the ...me period as the sound signal.

(New. No 1948 Counterpart)

d) Nothing in these Rules shall ...terfere with the operation of any ...pecial rules made by the Government ...f any nation with respect to the use ...f additional whistle signals between ...ips of war or vessels sailing under ...nvoy.

(Same as (c) of 1948 Rules)

PRIMARY CHANGES

Rule 28 has been expanded to in...lude provision for an optional "whistle light" to show in synchro...ism with operation of the whistle. The light is similar to that required on ...ertain waters governed by Western Rivers Rules of the Road except that ...t is white instead of amber.

nautical queries

DECK

Q. In casting off from the dock, what should be seen to before the engines are started?

A. Have a report from the engineroom that everything is clear about the engines; see that there is nothing foul of the propeller; be very careful to haul in the slack of the quarter line as it is eased off; for fear of the bight fouling the screw; and see that the wheel chains, leads and rudder are in perfect working order.

Q. What is the speed of sound through air and how is this utilized in distance finding by means of synchronized radiobeacon and sound signals?

A. Sound travels 1,090 feet per second through air at 32° F, with an increase of 1.15 feet per second for each 1° rise in temperature above 32°, or an average of 1,100 feet per second.

Radiobeacon stations that are equipped for distance finding transmit a special radio signal and sound a corresponding signal on the fog apparatus at the same period of time. The reception of the sound signal by a vessel will be delayed depending upon the distance the sound has to travel, whereas the radio signal will be received practically instantaneously. The distance in miles from the station is obtained by dividing the number of seconds elapsed between the radio and the sound signals by 5.5 seconds per mile or by multiplying by 0.18 mile per second.

Q. (a) What is the purpose of quarantine inspection?

(b) What persons are allowed aboard a vessel subject to quarantine inspection?

A. (a) The purpose of quarantine inspection is to prevent the transmission of communicable disease by the personnel, passengers aboard a vessel, animals, plants, or cargo which may be aboard.

(b) Only the quarantine officer, quarantine employees, or pilots, shall be permitted to board any vessel subject to quarantine inspection until after it has been inspected by the quarantine officer and granted pratique, except with the permission of the quarantine officer. A person boarding such vessel shall be subject to the same restrictions as those imposed on the persons of the vessel . . . REGULATIONS GOVERNING FOREIGN QUARANTINE, USPHS.

ENGINE

Q. What are the requirements for feed lines and feed valves on marine boilers?

A. Feed stop valves shall be attached directly to the boiler or its economizer. Where conditions of installation will not permit of direct attachment, forged or cast steel fittings made as short as practicable may be used.

All feed lines shall be provided with a feed check valve adjacent to the feed stop valve. An approved form of feed water regulator may be interposed between the check and the stop valve.

All boilers except small donkey boilers shall be equipped with two connections for supplying feed water, and where practicable, these connections shall be through separate openings.

Q. (a) What are the requirements for the installing of a fuel oil system for boiler operation on board ship?

(b) What are the requirements for fuel oil on vessels?

(c) State the duties of the Chief Engineer on receiving fuel oil.

A. Application for permission to use petroleum or other mineral oil as fuel shall be made in triplicate on the prescribed blank form, and shall be forwarded through the local inspectors of the District where the installation is to be made. The application shall be accompanied by blueprints, in triplicate, showing the tanks, bracing, pumps, piping, riveting schedule, control valves, control apparatus, vent pipes, and the test to be applied to all fuel oil tanks.

Requirements for fuel oil:

1. Flashpoint—Oil to be used as fuel on vessels shall have a flashpoint of not less than 150° F. (closed cup test).

2. It shall be the duty of the Chief Engineer to make entry in the log, of each supply of fuel oil received on board, stating the quantity received, name of vendor, name of oil producer, and flashpoint (closed cup test) for which it is certified by producer.

3. It shall be the further duty of the Chief Engineer to draw and seal at the time the supply is received on board, a half-pint sample of each lot of fuel oil, such sample to be preserved until that particular supply of oil is exhausted.

AMENDMENTS TO REGULATIONS

TITLE 46 CHANGES

ROCKET LINE THROWING REGULATIONS AMENDED

In the Federal Register of April 24, 1965, the Commandant has set forth orders for merchant vessels equipped with impulse-projected rocket type line-throwing appliances. Reprinted below are significant portions of that Federal Register document:

* * * * *

1. All merchant vessels which carry the Model GR–52–CK impulse-projected rocket type line-throwing appliance, Approval No. 160.040/1, manufactured by Kilgore, Inc., Westerville, Ohio, or Harvell-Kilgore Corp., Toone, Tenn., are instructed as follows:

a. Report to the Commandant (MMT–3), U.S. Coast Guard, Washington, D.C. 20226, the name of the vessel, the name of the vessel's owner and the serial numbers of all rockets on board bearing a manufacturer's date between January 1 and July 31, 1963 (Serial Nos. 6689 through 7488). Also report the number of regular and buoyant harness assemblies on board where the tail harness that connects each side of the rocket to the tail cable has legs each of which are less than 17½ inches in length. The manufacturer has agreed to replace these rockets and harnesses free without prejudice. The Coast Guard will supply the manufacturer with the rocket numbers and other information so that replacement rockets and yoke assemblies in proper number can be manufactured and be available beginning May 1, 1965.

b. As soon as possible after June 15, 1965, obtain through usual sources of supply Harvell-Kilgore Conversion Kit No. 3274 (approximate cost $35.00) and convert the appliance to a remote firing arrangement. Also order replacement rockets or yoke assemblies previously reported as instructed in paragraph "a" above, noting these are to be furnished without charge. The rockets having serial numbers noted above, shall be disposed of by dumping at sea or other safe means after the replacement rockets are obtained. The harnesses having yoke assemblies less than 17½ inches shall be exchanged for new harnesses (regular or buoyant) through the manufacturer or his distributor. New instructions are packed with the conversion kit. The old instructions are to be discarded after the conversion has been made.

c. All vessels which have replaced all rockets and yoke assemblies, and which have converted their appliance to the remote firing arrangement, as indicated in paragraphs "a" and "b", shall resume quarterly drills, following the new instructions for remote firing of the appliance.

d. All complete appliances shipped by the manufacturer after April 15, 1965, will be arranged for remote firing.

2. The temporary suspension of the provisions in 46 CFR 35.10–1 (Tank Vessels), 78.17–140 (Passenger Vessels) and 97.15–25 (Cargo Vessels), as announced in Local Notices to Mariners and in Weekly Notices to Mariners, Parts I and II, is canceled and the required drills shall be resumed as indicated in paragraph 1c above .

3. This Notice is effective until December 31, 1965, by which time all conversions should be completed.

* * * * *

Navigation and Vessel Inspection Circular 2–65, as mentioned in last month's *Proceedings*, covering the same subject is available at the local Marine Inspection offices or from Commandant (CHS) U.S. Coast Guard Headquarters, Washington, D.C., 20226.

APPROVED EQUIPMENT

COMMANDANT ISSUES EQUIPMENT APPROVALS; TERMINATES OTHERS

By Commandant's action of April 14, 1965, approvals were granted on various items of lifesaving and miscellaneous equipment, installations, and materials used on merchant vessels subject to Coast Guard inspections and on certain motorboats and other pleasure craft. At the same time the Commandant terminated Coast Guard approval for certain lifeboats and buoyant vests and cushions.

Those interested in these equipment list changes must consult the Federal Register of April 21, 1965, for detailed itemization and identification.

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from April 1 to April 30, 1965, inclusive, for use on board vessels in accordance with the provisions of Part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

CERTIFIED

Pennsalt Chemicals Corp., Three Penn Center, Philadelphia, Pa., 19102, Certificate No. 242, dated April 19, 1965, PENNSALT 3008 HEAVY DUTY CLEANER, and Certificate No. [illegible] dated April 19, 1965, PENNSALT [illegible] LATEX CLEANING COMPOUND.

CANCELED

(Failed to renew in accordance with 46 CFR 147.03–9)

The following certificate was [illegible] celed effective May 1, 1965:

E. I. duPont de Nemours & Co., [illegible] Wilmington, Del., Certificate No. [illegible] dated November 17, 1959, BLOCK CORROSION AND MOISTURE CONTROL.

AFFIDAVITS

The following affidavits were [illegible] cepted during the period from March 15, 1965, to April 15, 1965:

Dussault Foundry Corp., 2 Wall [illegible] burn Street, Lockport, N.Y., CASTINGS.

Anaconda Metal Hose Division, Anaconda American Brass Co., Waterbury 20, Conn., FITTINGS.[1]

Fisher Governor Co., Marshalltown, Iowa, VALVES AND FITTINGS.[2]

H. C. Macaulay Foundry Co., [illegible] 811 Carleton Street, Berkeley, Calif., CASTINGS.

REVISED INTERNATIONAL RULES OF THE ROAD TO BE DISTRIBUTED

The revised International Rules [illegible] the Road will become effective September 1, 1965, replacing those [illegible] in effect. "Rules of the Road—Inland—International" (CG–169) is [illegible] being printed with the revised International Rules and will be distributed in early August.

These revised Rules have been made *drastically changed with respect to vessels engaged in fishing* than any other primary class of vessel. To acquaint U.S. fishermen who operate on international waters with such changes as altered navigation lights and fog signals, an information pamphlet, "Fishing Vessel Rules of the Road," has been prepared. Although most of the distribution will be accomplished through local Bureau of Commercial Fisheries (Department of Interior) offices, a bulk supply will also be furnished to Coast Guard District Commanders with a substantial number of fishermen operating in international waters.

---

[1] Approval is for bellows-type expansion joints for service not exceeding 15 psig.

[2] Approved on August 26, 1963. [illegible] omitted from previous listing in CG–19[illegible]

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Sunday, Monday, and days following holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. Subscription rate is $1.50 per month or $15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1965 are now available from the Superintendent of Documents, price $2.75.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (9–1–64). F.R. 2–13–65.
123	Rules and Regulations for Tank Vessels (4–1–64). F.R. 5–16–64, 6–5–64, 3–9–65.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (6–1–62), F.R. 1–18–63, 5–23–63, 5–29–63, 7–6–63, 10–2–63, 12–13–63, 4–30–64, 11–5–64, 12–18–64.
172	Rules of the Road—Great Lakes (6–1–62). F.R. 8–31–62, 5–11–63, 5–23–63, 5–29–63, 10–2–63, 10–15–63, 4–30–64, 11–5–64.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–65).
176	Load Line Regulations (7–1–63). F.R. 4–14–64, 10–27–64.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (6–1–62). F.R. 1–18–63, 5–23–63, 5–29–63, 9–25–63, 10–2–63, 10–15–63, 11–5–64.
190	Equipment Lists (8–3–64). F.R. 10–21–64, 10–27–64, 3–2–65, 3–26–65, 4–24–65.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (2–1–65). F.R. 2–13–65.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (10–1–63). F.R. 11–5–64.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (6–1–62).
239	Security of Vessels and Waterfront Facilities (7–1–64).
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (4–1–64). F.R. 6–5–64.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (9–1–64). F.R. 2–13–65, 3–9–65.
258	Rules and Regulations for Uninspected Vessels (1–2–64), F.R. 6–5–64, 6–6–64, 9–1–64.
259	Electrical Engineering Regulations (7–1–64). F.R. 2–13–65.
266	Rules and Regulations for Bulk Grain Cargoes (7–1–64).
268	Rules and Regulations for Manning of Vessels (2–1–63). F.R. 2–13–65.
269	Rules and Regulations for Nautical Schools (5–1–63). F.R. 10–2–63, 6–5–64.
270	Rules and Regulations for Marine Engineering Installations Contracted for Prior to July 1, 1935 (11–19–52). F.R. 12–5–53, 12–28–55, 6–20–59, 3–17–60.
293	Miscellaneous Electrical Equipment List (6–1–64).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–60, 11–3–61, 4–10–62, 4–24–63, 10–27–64.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (2–3–64) F.R. 6–5–64.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

CHANGES PUBLISHED DURING APRIL 1965

The following has been modified by Federal Register:
CG–190, Federal Register, April 21, 1965.

U.S. GOVERNMENT PRINTING OFFICE:1965