PROCEEDINGS
OF THE MARINE SAFETY COUNCIL

GEORGE WASHINGTON, Prefident of the United States of America.

TO ALL WHO SHALL SEE THESE PRESENTS, *GREETING.*

KNOW YE, That repoſing ſpecial Truſt and Confidence in the Integrity, Diligence and good Conduct of Hopley Yeaton of New Hampshire ~ ~ ~ ~ ~ ~ I DO APPOINT him Master ~ of a Cutter in the Service of the United States, for the Protection of the Revenue; and do authorize and empower him to execute and fulfil the Duties of that Office according to Law; AND TO HAVE AND TO HOLD the ſaid office, with all the Rights and Emoluments thereunto legally appertaining, unto him the ſaid Hopley Yeaton ~ ~ during the Pleaſure of the Preſident of the United States for the Time being.

IN TESTIMONY *whereof I have cauſed theſe Letters to be made Patent, and the Seal of the United States to be hereunto affixed.*

GIVEN *under my Hand, at the City of Philadelphia, the* Twenty firſt ~ *Day of* March ~ *in the Year of our Lord one thouſand ſeven hundred and ninety* one, *and of the Independence of the United States of America the* Fifteenth.

G. Waſhington

By the President

H. Knox

DEPARTMENT OF TRANSPORTATION UNITED STATES COAST GUARD

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PROCEEDINGS

OF THE MARINE SAFETY COUNCIL

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FRONT COVER

The front cover is a copy of the first commission in the U.S. Revenue Cutter Service which later became the U.S. Coast Guard. The commission, signed by George Washington on March 21, 1791, appointed Hopley Yeaton of New Hampshire as master of a revenue cutter. The second signature is that of Thomas Jefferson, Secretary of State in Washington's Cabinet.

BACK COVER

The U.S. Revenue Cutter *Pickering* was one of the first 10 cutters built to form the earliest seagoing service of the United States, presently known as the U.S. Coast Guard. Fitted out in Boston, the *Pickering* was a 50-ton cutter armed with four guns. She made 10 captures during operations in the protection of U.S. commerce from the French in the West Indies in 1798 and 1799. She was permanently transferred to the Navy on May 20, 1799.

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Lists TCG–06, CG–13, CG–20

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

maritime sidelights

TIAC MEETING

A meeting of the Towing Industry Advisory Committee will be held in Seattle, Washington, on 4–5 March 1976. The meeting will be held at the Edgewater Inn, Pier 67, 2411 Alaskan Way. The meeting is open to the public. Additional information concerning the meeting may be obtained by writing:

Commandant (G–CMC/81)
U.S. Coast Guard
Washington, D.C. 20590

EPIRB SUBSTITUTION

Inspected vessels whose Certificates of Inspection are endorsed for a route which is limited to not more than 20 miles from a harbor of safe refuge may carry a VHF radiotelephone in lieu of an Emergency Position Indicating Radiobeacon (EPIRB). Although the regulations authorizing this substitution do not differentiate between required VHF installations and installations maintained on a voluntary basis, both must comply with Federal Communications Commission requirements.

The FCC has advised the Coast Guard that vessel operators who voluntarily install VHF equipment are permitted by the FCC to install and license VHF radiotelephone stations. There is no FCC requirement that such voluntary stations be inspected by that agency. An FCC station license together with a bill of sale or other document indicating that the VHF radiotelephone is a type accepted by the FCC, satisfies Coast Guard requirements for compliance with FCC rules.

OPERATION SAIL

On 4 July 1976, the United States of America will celebrate its 200th birthday. To help New York celebrate this event a project called Operation Sail 1976 has arranged for over 250 of the world's two-, three-, and four-masted sailing vessels to visit New York Harbor and parade under sail on 4 July 1976. These sailing ships will come to New York from all over the world.

In conjunction with Operation Sail 1976, the U.S. Navy has invited 90 maritime nations to send destroyer-class ships to form, at anchor, the International Naval Review line, for the Operation Sail vessels to parade past. The review line of anchored naval vessels will stretch the length of the 18 mile parade route from the Varrazano Narrows Bridge to the Spuyten Duyvil Bridge.

The Sea Parade is scheduled to begin at 1000, on 4 July 1976. Over 250 sailing vessels will parade from the Verrazano Narrows Bridge, through the harbor, and on up the Hudson River to the Spuyten Duyvil Bridge, with the CGC *Eagle* in the van. The overall length of the parade formation, including the spacing between vessels, will be 12 miles. The Sea Parade will last approximately 6 hours.

Over 10,000 spectator craft are expected to view this event. To assist in the large marine endeavor, Coast Guard Reserve personnel, auxiliary units, and power squadron units will be utilized.

Because of the many sailing and naval vessels expected in New York Harbor, normal harbor operations will have to be curtailed. Harbor anchorages will be restricted to naval vessels and no commercial vessel traffic will be allowed on 4 July 1976.

Operation Sail 1976 in conjunction with the International Naval Review promises to be one of the most spectacular events of the Bicentennial.

VESSEL MANEUVERING SIMULATION MODEL

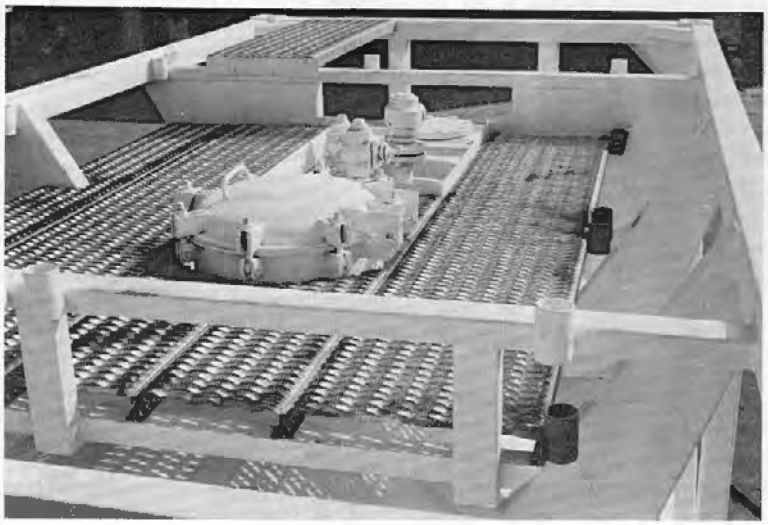
A digital computer maneuvering model, developed under a Coast Guard contract, has been submitted to the Office of Research and Development. The model is the result of several years of work by Dr. Haruzo Eda of Stevens Institute of Hoboken, N.J. It makes possible the simulation of a vessel's transit through a channel of variable direction and water depth. The vessel's hydrodynamic coefficients and the channel features are required as input. An autopilot is used to "steer" the vessel. The model will be tested for probable use by the Coast Guard in deep water ports and collision, ramming, and grounding prevention related projects.

NOOIAC MEETING

A meeting of the National Offshore Operations Industry Advisory Committee will be held in San Francisco, California on May 25–26. The meeting will be held at the Travel Lodge At The Wharf, 250 Beach Street. The meeting is open to the public. Additional information may be obtained by writing:

Commandant (G–CMC/81)
U.S. Coast Guard
Washington, D.C. 20590

by LCDR F. H. Halvorsen



As short a time ago as 1960, only a few specialized types of portable tanks were accepted by the Coast Guard for use in packaged movement of hazardous liquids aboard vessels. One tank, the DOT 51 specification portable tank was a land tank having a minimum design pressure greater than 100 psig. Additionally, tanks of unique design, but not built to any particular specifications, or built to modified highway tank truck specifications, were in marine use for a wide range of products. For example, potable spirits were transported in tanks generally designed to the ASME Pressure Vessel Code. Except for the DOT 51 specification portable tank each of these tanks was approved for carriage aboard merchant vessels on a case by case basis.

A third type of tank was the gravity tank or pressure vessel tank designed and constructed in accordance with Coast Guard regulations (46 CFR 98.35) for carriage of combustible liquids aboard vessels.

A more recent development in tank design was the specialized Marine Portable Tank (MPT) for use essentially by the offshore oil exploration industry. In addition to its use as a package, the MPT can be filled and discharged while aboard Coast Guard inspected and certificated vessels. The MPT is authorized to carry certain combustible, flammable, and corrosive liquids. In some designs of the MPT, an engine and pump is integral to the tank unit. The design requirements for the MPT are found in 46 CFR 64 (Subchapter F). The MPT regulations apply to portable tanks constructed after October 1, 1974, which are intended for the carriage of combustible liquids or dangerous articles by vessel *only*. The

PORTABLE TANKS

requirements for the MPT are consistent with the Intergovernmental Maritime Consultative Organization's (IMCO) standards for portable tanks. An excellent description of these tanks can be found in a paper by Henn and Colby: "A New Improved Portable Tank for the Marine Industry", SNAME presentation, Biloxi, Miss., 27 September 1974. [*See the December 1974 issue of the* PROCEEDINGS.]

As the quantity and variety of hazardous materials transported in portable tanks increased, the need for more more comprehensive tank specifications became evident. Requirements for transporting less dangerous commodities, such as alcohol, in the DOT 51 specification portable tank imposed an undue economic burden on industry. It was felt that an acceptable degree of safety with certain commodities could be obtained with tanks having much lower maximum allowable working pressure (MAWP) ratings than the 100 psig required for the DOT 51 portable tank.

To accomplish this end, with the additional benefit of assuring international acceptance of tanks constructed in the U.S., the Coast Guard undertook, on both the national and international level, the development of specifications for portable tanks.

Internationally, in 1966, we approached the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization (IMCO) and attempted to develop requirements that would be accepted internationally. In 1970 IMCO adopted specifications for a portable tank as part of its Dangerous Goods Code. These specifications were for a portable tank with a design pressure of between 25 and 43 psig. Recent modifications to this code, initiated by the United States, provide for a low pressure tank with a MAWP rating of between 14.2 and 25 psig, and for a compressed gas tank with a MAWP rating of 100 psig or greater. Although the tank specifications which were evolved by IMCO were not entirely consistent with what the United States was seeking, the slight variances offered no difficulty.

Nationally, the Coast Guard brought together a group within the Chemical Transportation Industry Advisory Committee (CTIAC). This is an advisory group to the Commandant of the Coast Guard consisting of members of industry. Qualified individuals from the chemical industry, portable tank manufacturers, and ocean carriers were requested to develop minimum requirements for the safe transportation by water of chemicals in portable tanks. Since these tanks would be transported by other modes, the efforts of this group were coordinated with the appropriate officials in the Federal Highway Administration and Federal Railroad Administration. Our input to CTIAC was coordinated with our efforts in IMCO.

This paper will now review the proposed intermodal tank regulations that were developed by the CTIAC working group.

Status. It is important to note that the Intermodal Tank Regulations to be discussed in this paper have not yet been published as proposed rules. They are currently undergoing final review preparatory to publishing in the Federal Register as a Notice of Proposed Rulemaking. When the specifications for the tank are adopted as a final rule, they will be included in Title 49, Code of Federal Regulations, Part 178.

General Description of the Intermodal Tank Regulations.—By definition, an intermodal (IM) portable tank is a cargo-carrying unit which is not permanently attached to the transport vehicle. This tank is designed to be lifted, in the loaded condition, on and off the transport vehicle. The tank is fitted with devices permitting its ready handling from one mode of transport, such as by railway, highway, or water, to another. Generally, the tanks are supported within an 8 foot by 8 foot by 20 foot (or 40 foot) frame constructed in accordance with international standards for intermodal freight containers. This frame features standardized corner fittings which permit lifting and securing of the tank by the same means employed in the handling of the more common closed-type intermodal freight container. Use of standardized frame dimensions permits the tanks to be stacked and stowed on container ves-

sels in complete compatibility with the closed freight containers.

Portable tanks must be designed so that the center of gravity of the loaded tank is located within the dimensions of the lifting fittings, and is centered so that no lifting fitting is loaded in excess of its rated capacity. The lifting fittings must be so positioned that the tank must be approximately horizontal during handling. The maximum allowable gross weight of the IM portable tank is 55,000 pounds.

The intermodal portable tank satisfies all requirements of the Intergovernmental Maritime Consultative Organization's (IMCO), International Maritime Dangerous Goods Code, Part 13, for type 1 and type 2 portable tank containers. The IMCO type 1 tank has a 25 to 48 psig maximum allowable working pressure, and the type 2, a 14.2 to less than 25 psig maximum allowable working pressure. The proposed U.S. standard includes two separate tank designs, the IM 100 tank and the IM 101 tank. The maximum allowable working pressure of the IM 100 tank is less than 15 psig and the maximum allowable working pressure for the IM 101 tank is from 15 psig to 48 psig. The 15 psig breakpoint is to insure that the IM 101 tank can be inspected and stamped in accordance with the ASME Pressure Vessel Code. Thus, an IM 101 tank may be IMCO type I or type II depending on the maximum allowable working pressure of the tank.

The specification 100 IM portable tank (maximum allowable working pressure of less than 15 psig) must be designed and constructed using section VIII, division I of the ASME Code as a guide, except as limited, modified, or replaced by the specification. Practically, it is anticipated that the lower maximum allowable working pressure of 14.2 will be used to meet minimum IMCO type II tank standards, although a lower maximum allowable working pressure is permissible. The specification 101 IM portable tank (maximum allowable working pressure of at least 15 psig but no more than 48 psig) must be designed and constructed in accordance with section VIII, division I and case 1598 of the ASME Code,

Materials unable to withstand exposure to fire, such as aluminum, magnesium, and plastics, are prohibited.

except as limited, modified, or replaced by the specification. The inspection, tests, stamping, and reports must be as required by section VIII, division I and case 1598 of the ASME Code. Case 1598 will be discussed later in the paper.

Materials of construction include most grades of steel and certain nonferrous metals. Materials unable to withstand exposure to fire, such as aluminum, magnesium, and plastics are specifically prohibited.

Containment. A requirement of total product containment is the generally accepted international philosophy for portable tank design. Thus, the portable tank must be capable of providing total product containment under all normal operating conditions. In addition, the tank must be capable of maintaining its integrity during a controlled release of cargo under fire exposure conditions. The minimum tank design pressure considered necessary to insure total product containment is known as the total containment pressure (TCP).

The prime variable that must be considered in the design of the intermodal portable tank, as with any pressure vessel, is the maximum allowable working pressure (MAWP). In the case of the portable tank, the MAWP must be at least equal to the total containment pressure of the commodity to be transported in the tank. The total containment pressure measured at the top of the tank, and normally expressed as a gage pressure, is given as the sum of the vapor pressure of the commodity at 122° F and a dynamic pressure allowance of not less than 5 psig. The total containment pressure required for a tank intended to transport a given commodity may be increased by the Department of Transportation. This increase in total containment pressure is to insure an adequate margin of safety for especially hazardous materials.

Minimum shell and head thicknesses are specified to insure adequate protection against puncture or other damage. Portable tanks 6 feet or less in diameter must have shells and heads of not less than $\frac{3}{16}$-inch thickness if constructed of material listed in part UCS (Carbon steels) of section VIII, division I of the ASME Boiler and Pressure Vessel Code (ASME Code), and 11 gauge (0.1196 inches) if of material listed in part UHA (high alloy steels), or of UNF (nonferrous metals), of the ASME Code. Portable tanks greater than 6 feet in diameter must have shells and heads of not less than ¼-inch thickness if of material listed in Part UCS, or of 9 gauge (0.1495 inches) if of a material listed in part UHA or UNF of the Code. Reductions in these minimum thickness requirements are permitted provided additional tank damage protection is provided.

To allow for the conditions expected in normal transportation, hypothetical dynamic loadings must be imposed on the tank simultaneously as follows:

(1) 2 g vertical down load acting at the center of the tank with the tank loaded.
(2) 1 g longitudinal load acting at the cener of the tank with the tank loaded.
(3) 1 g transverse load acting at the center of the tank with the tank loaded.

The stress calculated in the shell is the sum of the stress induced by the internal pressure and that induced by the simultaneous application of the above dynamic loadings. This total design stress must in no case exceed

the allowable stress listed in the ASME Code for the material of construction at the design temperature of 122° F. In addition to the ASME Code ,the analyzed stress at the test temperature (150 percent of the MAWP) must not exceed 75 percent of the specified minimum yield stress, or 37.5 percent of the specified minimum tensile strength, whichever is lower.

Corrosion Allowance. Corrosion allowances are required for portions of tanks especially susceptible to thinning by corrosion, erosion, or mechanical abrasion during the expected service life of the tank under the conditions normally encountered in transportation. Corrosion allowances are unnecessary if corrosion resistant materials are employed. The normal corrosion allowance required is 1/16 inch, however, this may be increased for tanks intended to transport unusually corrosive commodities. All valves and gaskets must be made of material compatible with the commodity transported.

Protection of Tanks, Valves, and Accessories. No specific requirements pertaining to the arrangement of valves or piping are included in the specifications, however, protection must be provided to prevent the tank or its appurtenances from mechanical damage under normal conditions encountered in transportation. In addition, all filling and discharge valves must be fitted with a positive means of closure to guard against unintentional opening.

Additional specific protection requirements are imposed on tanks intended for highway use.

Additional specific protection requirements are imposed on tanks intended to be transported by highway. These include:

(1) Rear end collision protection;

(2) Overturn protection;

(3) Additional valve and piping requirements intended to minimize the possibility of product release in the event of an accident.

Openings in Tanks. Shell and head penetrations must be designed as required by the ASME Code and Code case 1598 where applicable. Tanks must be provided with manholes to permit complete internal inspection. Manholes on tanks with an internal capacity of over 500 gallons must not be less than 15 inch by 23 inch elliptical or 18 inch circular opening. Tanks with capacities of 500 gallons or less need only have a manhole sufficiently large to permit entry by men and equipment necessary to inspect and maintain the tank. All manholes or inspection ports must be equipped with safety devices which prevent the cover from opening when under pressure.

Each IM portable tank must be equipped with a minimum of one pressure relief device.

Pressure Relief Devices. Each IM portable tank must be equipped with a minimum of one pressure relief device. Acceptable devices include spring-loaded relief valves, frangible discs, or fusible elements; except that fusible elements are not permitted on the specification IM 101 tank. Tanks with an internal capacity of 500 U.S. gallons or greater must be fitted with at least one spring-loaded relief valve which may be supplemented with frangible discs or fusible elements. Spring-loaded relief valves are not required on tanks having a capacity of less than 500 gallons when a frangible disc is employed. Relief devices must be installed so as to be in direct communication with the vapor space, constructed so that they cannot be readily rendered inoperative, and arranged for unrestricted discharge without impingement on the tank. Spring-loaded relief devices must be designed and constructed to open without simmering at the set pressure and to reseat without chattering after a blowdown of not less than 10 percent of the set pressure. Fusible elements must have an operating temperature of between 230° F and 250° F and must not be shielded from sources of external heat.

The recommendations of the IMCO Dangerous Goods Code for the construction of portable tanks require that the primary relief device be set to discharge at 125 percent of the maximum allowable working pressure. This is in conflict with the requirements of the ASME Code which requires that the valve be set at the maximum allowable working pressure. To resolve this conflict, an interpretation of the ASME Code was requested outlining the conditions under which these tanks could be constructed and inspected in accordance with the ASME Code; but with alternative rules governing the set pressure and capacity of the tank's relieving devices. The result was ASME Code case 1598. ASME Code case 1598 basically states that the relief device can be set at 125 percent of the maximum allowable working pressure upon meeting certain construction requirements in addition to those in ASME Code. This permits the IM 100 and IM 101 to meet IMCO relieving device standards and still be in accordance with the ASME Pressure Vessel Code.

Pressure relief devices on portable tanks having a capacity less than 500 gallons must be set to discharge between 25 percent and 50 percent above the maximum allowable working pressure.

Portable tanks in excess of 500 gallons require a spring-loaded pressure relief device which must be set at a nominal pressure of 125 percent of the maximum allowable working pressure. When an additional spring-loaded relief valve is used to achieve the required emergency venting capacity, the combined capacity of

the valves must be sufficient to prevent the pressure from exceeding 150 percent of the MAWP. When a frangible disc is used to supplement the capacity of a spring-loaded device it may be set to burst at 150 percent of the MAWP.

Vacuum relief devices, when utilized, must provide total product containment and must be set to operate at a nominal pressure differential of 3 psi. When a vacuum relief device is not employed, the tank must be designed to withstand a 6 psi external pressure.

As required by the Code, spring-loaded relief devices must have sufficient capacity to precent the pressure from increasing above 110 percent of the set pressure (137.5 percent of the MAWP) under ambient conditions, but as a minimum, 1 standard cubic foot per minute (SCFM) per 30 square feet of tank surface area. The required emergency relief capacity necessary to protect the tank under fire conditions must be determined by one of two means: either the Compressed Gas Association's method for calculating emergency venting capacity of uninsulated portable tank containers, or from precalculated values for hexane using the CGA method.

Tank Mountings and Lifting Arrangements. In general, the IM portable tank will be mounted within a standardized freight container frame, however, skids or suitable devices are acceptable means of mounting and securing the tanks. All tank mountings, skids and hold-down lugs must be designed to support the fully loaded tank when subjected to accelerations of 2g, 1g, and 1g in the vertical, longitudinal, and transverse directions, respectively, without exceeding 80 percent of the specified minimum yield stress listed in the Code for the materials of construction.

Each portable tank must undergo a test to insure that the fully loaded tank will not deflect such that it contacts surfaces not intended for its support, and that no permanent deformation results from those deflections. In addition, each portable tank design must be tested to insure that no damage is sustained as a result of loads induced during normal handling and securing of the tank.

Inspection and Testing. In addition to the tests previously described for framing and mounting arrangements, each tank must undergo both the initial shop inspection and periodic inspections and tests.

The IM 101 tank is required to undergo initial inspection in accordance with the requirements of the ASME Code including all tests, stamping, and reports. The IM 100 is required to undergo initial inspection using the ASME Code as a guide, however, the manufacturer alone is responsible for all testing, inspection, and maintenance of records. In all cases, a hydrostatic test to 150 percent of the MAWP is required.

A corrosion resistant metal identification plate must be attached to the tank.

Periodic inspections at intervals of 5 years are required to be conducted by an authorized testing and repair facility. This inspection must include a hydrostatic test of 150 percent of the MAWP in addition to specific requirements listed in the tank specifications. Midperiod inspections are also required to be conducted by an authorized testing and repair facility. The midperiod inspection consists basically of an internal and external examination of the pressure vessel, and examination of all piping, valves, supports, and tank appurtenances.

Tank Marking. A corrosion resistant metal identification plate must be permanently attached to the tank and readily accessible. The plate may not be painted so as to obscure the markings and must provide the following information:

D.O.T. specification number . . .
Manufacturer's name . . .
Manufacturer's serial number . . .
Date of manufacture . . .
Tank material and specification number . . .
Lining Materials . . .
Maximum allowable working pressure . . . psig
Test pressure . . . psig
Coil maximum allowable working pressure . . . psig
Capacity . . . U.S. gallons
Maximum gross weight . . . lbs.
Empty weight . . . lbs.
Inspecting agency . . .
Original hydrotest date and witness identification . . .
Certificate date . . .
Tank retested at . . . psig on . .

In addition, each identification plate for an IM 101 tank must bear the notation: "For Transportation of Bulk Liquids Only—Case 1598."

Let us now consider the requirements fnr stowing an intermodal portable tank aboard a vessel. Due to the particular hazards of the contents of the tank and chemical compatibility with other cargo aboard the vessel, restrictions are placed on stowage location.

Stowage for Hazard. Aboard a vessel, experience and reason dictate that materials with particular properties must be stowed on deck in the open. The particular products include extremely toxic liquids, highly flammable materials, and extremely corrosive materials. Some materials, whose untimely release might be catastrophic, are required to be stowed inboard at least one-fifth (B/5 the maximum beam of the vessel. Some such materials are acetaldehyde (a liquefied flammable gas), bromine (a corrosive and toxic liquid) and aluminum alkyls (pyroporic liquids). Accident review has indicated that most collisions penetrate must less than B/5 inboard (usually less than a few feet) and these materials would be safe in almost every conceivable accident situation.

Some products, whose potential release could be tolerated, are allowed to be stowed underdeck. Such materials include combustible liquids with flashpoints above 150° F (open cup), and which are water soluble. The water soluble requirement for the combustibles is based on the presumption that the spill can be easily and safely washed, collected in the bilge system, and pumped overboard.

One additional class of materials requires special attention. These are materials which are heat sensitive. As a result of exposure to heat the product may begin polymerization or self oxidation. The result may be rupture of the tank or spontaneous detonation of the tank's contents. Such materials must be stowed underdeck and away from heat sources such as the machinery space bulkheads or boiler or engine uptakes.

Stowage for Compatibility. Portable tanks must be stowed aboard a vessel for purposes of compatibility with other products. Incompatible products are those which if inadvertently mixed will cause a hazardous reaction. Such a reaction may produce sufficient chemical energy to autoignite flammable or combustible materials, evolve a toxic or flammable gas, or produce a highly corrosive liquid. At any rate, mixing of certain products is unacceptable and must be prevented.

The classes of compatibility stowage are: *NO RESTRICTION, AWAY FROM, SEPARATED FROM, SEPARATED BY A COMPLETE COMPARTMENT OR HOLD FROM,* and *SEPARATED LONGITUDINALLY BY AN INTERVENING COMPLETE COMPARTMENT OR HOLD FROM.* Portable tanks containing materials not permitted by the regulations to be stowed in the same compartment or hold with each other, may not be stowed adjacent to each other unless separated by a water tight steel deck or bulkhead.

Damage Control. When an intermodal tank containing large quantities of flammable or combustible liquids is transported on a vessel, special firefighting agents must also be carried on the vessel. These agents are for use in the event of a spill, leak, or fire from the intermodal tank. This is a relatively new concept on general cargo vessels or container vessels which for years have carried products with unusual fire hazards with only the vessel's fixed water system and small portable foam or dry chemical units for protection. The special agents include mechanical-type foam systems, polar solvent-type foam systems, dry chemical systems, and a regular water firefighting system.

The quantity of each type of special agent which must be carried aboard a vessel depends on the total amount of hazardous liquid carried. For total quantities of hazardous materials up to 126,000 gallons, portable systems are satisfactory. For total quantities of hazardous materials in excess of 126,000 gallons, an approved fixed foam or dry chemical system is required. Foam and dry chemical systems are interchangeable.

The requirement for polar foam and mechanical foam may not be interchanged.

However, the requirement for polar foam and mechanical foam may not be interchanged, and, if required by the specific hazardous materials carried, both polar foam and mechanical foam must be carried. The maximum quantity of foam concentrate which must be carried is a quantity sufficient to provide 500 gallons per minute foam for a period of 15 minutes through a fixed system.

At present, only about 50 hazardous materials will be authorized to be carried in intermodal portable tanks. This short list does not limit the use of portable tanks to these products alone. The list was drawn up from those hazardous materials which are now transported in portable tanks on board a vessel, and those additional hazardous materials manufacturers have indicated they might carry in the future. A representative list of materials for carriage in the IM 100, IM 101, and DOT 51 tank together with the required total containment pressure follows:

Certain special requirements are required for hazardous materials with unusual properties.

	Total containment pressure (psig)
IM 100 portable tank:	
Butyraldehyde	14.2
Ethanol	14.2
Methanol	14.2
Propyl acetate	14.2
Xylenes	14.2
IM 101 portable tank:	
Acetic acid, glacial	15
Allyl alcohol	25
Chloroanilime	25
Hydrogen peroxide	25
Pentanes	35
DOT–51 portable tank:	
Acetaldehyde	100
Aluminum alkyls	175
Carbon disulphide	100
Methyl bromide	250
Methyl chloride	150

Special Requirements. Certain special requirements are required for hazardous materials with unusual properties. An example of some of these requirements for specific hazardous materials are listed together with other information in tabular form. The table is essentially as will be found in the regulations.

With the promulgation of the regulations for the intermodal tank, the American shipper will have available to him an economical tank which will be accepted intermodally within the United States, and also in the international marine mode. The remaining problem will be the development of consistent requirements for the European land mode, or any other desirable market area.

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lessons

from casualties

At approximately 0909 on 3 October 1973, the tankership *Texaco North Dakota,* en route from Tampa, Fla. to Port Arthur, Tex., in ballast, suffered an explosion in the aft pumproom resulting in severe structural damage and the loss of main propulsion and auxiliary power. Three crewmembers lost their lives and three others were injured.

The weather at the time of the casualty was clear, with a slight sea, bright sunlight, and good visibility. The wind was from the southeast approximately 12 to 15 knots. The air temperature was 79° F, the sea temperature was 83° F, and the barometric pressure was steady at 30.05″.

On the 27th and 28th of September 1973, the *Texaco North Dakota* loaded a mixed cargo consisting of gasolines, diesel oil, and aviation jet fuel at the refinery docks of Texaco, Inc., Port Arthur, Tex. On 28 September 1973, the vessel was then shifted upriver to the Texaco refinery docks at Port Neches, Tex. Final loading operations at this installation were completed upon unloading cargoes of asphalt and "C" grade fuel oil.

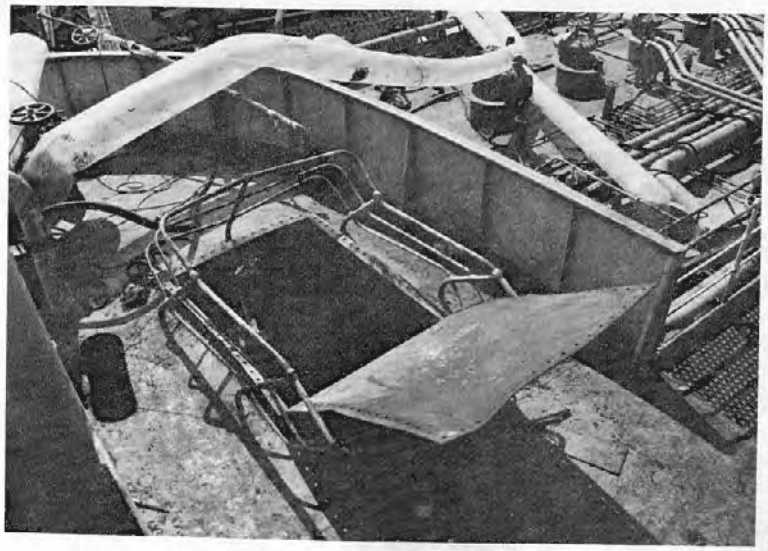
The vessel has a unique tank system in that center tanks Nos. 5 and 6 have been modified by the installation of a centerline bulkhead resulting in four tanks across in this area. The wing tanks opposite the center tanks Nos. 7, 8, and 9 have been divided by transverse bulkheads forming two wing tanks per side for each of the center tanks. The center tanks are numbered 1 through 9 and the wing tanks are numbered 10 through 21. All tanks are numbered from forward to aft.

Upon completion of the loading at Port Neches, the *Texaco North Dakota* took departure from Sabine Pass, Tex., bound for Tampa. The vessel had on board 18,167 tons of cargo and with necessaries the total dead weight was 19,119 tons. The resultant was a draft forward of 31′ 3″, aft of 33′ 6″ and a mean of 32′ 4½″.

On 1 October 1973, the SS *Texaco North Dakota* arrived in Tampa after a routine passage from Port Neches. Discharging operations were commenced at approximately 1550 on 1 October 1973, and were completed at approximately 0830 on 2 October 1973 without incident or any abnormalities noticed during the discharge period.

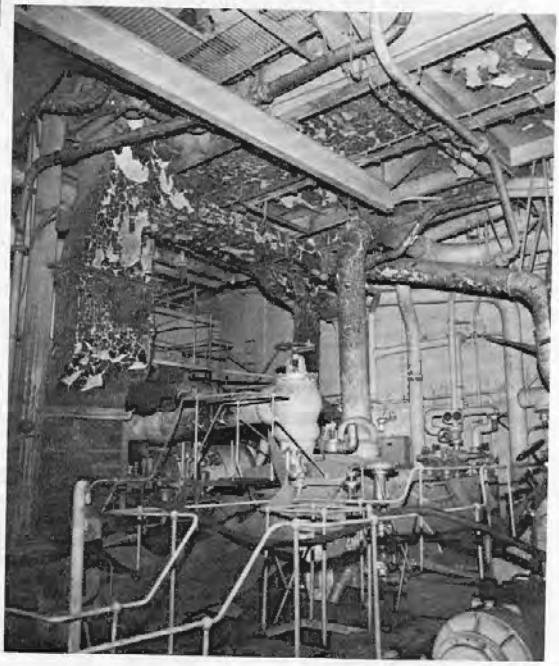
The sailing board was posted at 0200, 2 October 1973, indicating a sailing time of 1030 that day. At the appointed time, the vessel was in readiness to sail, excepting that one crewmember, third assistant engineer, had failed to return from shore leave. The sailing was delayed until 1045 during which time the master consulted with the chief engineer regarding this matter. It was their consensus that the vessel could be safely navigated from Tampa to Port Arthur without the services of a third assistant engineer. The master advised the Marine Inspection Office, Port Arthur, by letter of his decision. It was agreed that the other two assistant engineers, a first and a second, would stand 6 hour watches overlapping the 8 to 12 watches normally stood by the third assistant; the chief engineer would relieve as necessary for meals. The vessel thus departed its berth in Tampa at 1045, 2 October, 1973.

Prior to the departure of the vessel from its berth in Tampa, the ballasting of No. 2 cargo tank was com-



Blown hatch cover over the pump room on the 01 deck. The force of the explosion can be seen by the twisted safety railing surrounding the hatch opening.

The interior of the engineroom shows extensive fire damage to interior piping and ducting.



The staterooms adjoining the port passageway on the 01 deck show extensive interior damage.

menced. During the period while the vessel was being assisted in maneuvering away from the dock, ballasting was secured. After the tug was released, ballasting was resumed and continued until No. 2 center tank was filled approximately 8 feet from the top. No. 2 center tank was then designated as the slop tank to receive discharges from any tank cleaning conducted during the voyage to Port Arthur.

Once outside the harbor, the cleaning and ballasting of No. 4 center and No. 18 port and starboard cargo tanks was commenced. This operation was completed and pumping was secured at approximately 2000 that evening. The vessel then had a calculated draft of 11′ 6″ forward and 19′ 6″ aft, the mean being 15′6″. Under the existing conditions, the vessel ran well during the night.

On the morning of 3 October 1973, the vessel was on course 274° True, with the main engine turning 91.8 rpm, corresponding to a sea speed of approximately 17 knots. The morning meal was served and the deck and engineroom watches were relieved. As of 0800, the third mate was the deck watch officer, and the quartermaster was standing by the helm with the steering on automatic pilot. In the engineroom the first assistant engineer was on watch, standing the first half of the 8 to 12 watch, and was actively engaged in making repairs to the lube oil purifier located at the floor plate level of the engineroom on the port side of the main engine. The oiler on watch was monitoring the plant status at the main engine throttle controls located on the platform level and in the forward starboard area of the engineroom. The fireman/watertender on watch was attending to his routine duties in the firing aisle between the boilers in the fireroom. The wiper was also in the engineroom, engaged in the duties of his rating.

The master and the other crewmembers were about the vessel either at rest or engaged in routine matters.

Shortly after they had begun washing No. 16 starboard cargo tank, crewmen noticed that the slops were not being removed by the cargo pump and were building up in the bottom of the tank. They stopped the washing and observed the slops, which after a short while appeared to recede. They again commenced washing the tank and after a period of another few minutes the slops again began building up in the bottom of the tank. The washing was secured at this time and the first pumpman was advised that the tank washings were not being removed.

The pumpman evaluated the problem and decided that the pump had lost its suction and it would therefore need to be primed to restore suction. He felt this could be accomplished by connecting a portable salt water service-hose line to the pump piping system. Whereupon, he stopped the pump and descended to the grating level next above the lower level. It was his intention to install a universal hose coupling in the drain connection located in the horizontal section of 12-inch diameter pump discharge piping from the No. 3 main cargo pump between the nonreturn discharge valve and the tee connecting this line with the vertical riser to the main deck and the recirculating-filling line valve. Upon determining the pipe size for this drain connection, he then went on deck and obtained a proper sized fitting. He returned to the drain connection in the pumproom and removed one of the pipe plugs in the ¾″ diameter tee fitting on the horizontal section of the pump discharge line. Upon removal of the pipe plug, static pressure in the riser sprayed gasoline and wetted his clothing. Without first replacing the pipe plug, he immediately left the pumproom and went to his quarters to change his clothes and cleanse his burning skin. The liquid in the riser was Texaco Sky Chief gasoline, the last product which was discharged using No. 3 main cargo pump and the same product last carried in the No. 16 starboard cargo tank.

At about 0900, the second pumpman went into the engineroom looking for the first assistant. The oiler told him that the first assistant was repairing the lube oil purifier located on the floor plate level. It was the pumpman's purpose to obtain a replacement valve to complete the repair to the heating coil piping system.

One of the crew had come forward to the shelter deck area to tell the bosun that his chipping gun was not working. He was told to go get it and bring it back so that it could be repaired. The seaman returned to where he had been working and at this time his work partner said, "I smell gas, let's quit chipping for the time being." The bosun, in the meantime, came out to check on the work at the crossheaders, he heard a rumbling sound like thunder. He thought that it was the steam-driven air compressor in the pumproom that was malfunctioning, so he ran aft to shut the compressor down. He tried to enter the aft pumproom through the port door in the deckhouse but, because of the intense heat, he was forced back and clear of the door. Moments later, at approximately 0909, a violent explosion rocked the vessel.

The heart of the explosion occurred in the lower level and on the port side of the aft pumproom. The force carried away the forward bulkhead of the aft pumproom in way of No. 9 center tank, and portions of the after bulkhead of the pumproom on the port and starboard sides in way of the engineroom below the fuel oil

settling tank. The machinery access hatch located atop the pumproom deckhouse was blown upward and laid back to starboard. Massive amounts of distortion occurred to the associated bulkheads, deck plating, framing, piping, ducting and fittings. The concussion carried into the machinery spaces and thence upward and out through the machinery casing doors into the crew quarters, destroying numerous partition bulkheads and doors. The flash of the explosion was seen emanating from the openings in the deckhouse of the pumproom and through the engineroom and fireroom. This was followed by heavy black smoke. The intense heat scorched the paint work in these spaces. However, secondary fires of any significant nature did not follow.

Upon sensing the explosion, the master ran from his cabin to the ship's bridge and asked the officer on watch what had happened. The watch officers replied it sounded like an explosion in the engineroom. It was noted that the propeller shaft tachometer was indicating a gradual decrease in rpm's. The master immediately set off the general alarm, attempted unsuccessfully to put the engine order telegraph on "Stop", and ordered the radio officer to send a distress call and notify the Coast Guard of the ship's position and situation. He then went on the aft deck and organized the crew into a firefighting detail. Going further aft, he met the chief engineer and learned that attempts to enter the engineroom had been unsuccessful due to extreme heat and smoke, and that the vessel had lost all power available from the emergency generator. He then ordered the chief steward to determine if any men were missing. Shortly thereafter, he was notified that three men could not be accounted for.

Since there was no apparent fire in the engineroom or pumproom, all portable firefighting equipment was kept in readiness in event of a fire breaking out and a "reflash" watch was set. Thereupon the master returned to the bridge and, upon being informed that two men were seriously injured and burned he requested via radio that the Coast Guard dispatch a helicopter to evacuate these crewmen. Shortly, a report came forward that one of the missing men had been blown overboard. A lifeboat was then ordered made ready and launched to conduct a search. Later, when a search party was able to enter the engineroom, the bodies of the missing men were found and the boat was recalled. Prior to the lifeboat being taken back aboard, an external survey of hull damage was made which proved negative.

At the time of the explosion, the fireman/watertender was standing his normal watch in the fireroom, the oiler was at his station on the throttle platform. The fireman was knocked unconscious and thrown to the floor plates in the corner of the fireroom. When he recovered consciousness, the fireroom was full of smoke. He found a ladder and attempted to climb up, but was forced back by heavy smoke. He then found another ladder which led aft and up to the steering engineroom and made a successful escape to the main deck via this route. The oiler tried to escape aft through the fireroom, but this route was blocked by heat and smoke, so he went down below to the floor plate level on the starboard side and then went aft through the shaft alley and finally made his way to the main deck. After they arrived on the stern they were wrapped in blankets for shock and the oiler's hands were soaked in ice water. Both men were taken to the hospital in the midships house and were later evacuated from the vessel by Coast Guard helicopter and taken to the New Orleans Public Health Service Hospital.

The chief mate was in the ship's office in the midships house at the time of the explosion. He ran out of the office and, looking aft, saw a flash of fire come out of the starboard side of the pumproom. He set off the general alarm outside the third mate's room and ran aft along the catwalk to the pumproom. Realizing there was no fire in the pumproom, he went into the upper level and looked around. He then went inside the after deckhouse and obtained a self-contained breathing apparatus. He attempted to descend to the lower levels of the pumproom to determine whether anyone was there, but the extreme heat and dense smoke prevented him from doing so. He then received a walkie-talkie from the second mate and went to the upper level of the engineroom. Again, the heat and smoke prevented him from going below to look for shipmates. Shortly thereafter, he took charge of the lifeboat to search for the crewmember reported overboard. Upon his return, he obtained a large portable signal light from the bridge and went to the aft pumproom. This time he was able to descend to the lower level and determine that there was no one in this space.

The chief engineer was walking from his bedroom to his office on the starboard side of the after deckhouse on the boat deck when the explosion occurred. His first impression was that an explosion had occurred in the engineroom and he attempted to enter through the machinery casing door from the starboard passageway but was unable to do so due to the heat and smoke. He then went down to the next level and tried to enter and again was unable to do so. He went out on deck and saw that the machinery access hatch atop the pump-

room was blown upward and realized the explosion had been in the pumproom. He then went up on the weather deck and instructed some of the crew to render first aid to the injured. Later, when the machinery spaces had sufficiently cooled and cleared of smoke, he and the second assistant engineer entered and secured the boilers, sea valves, and other machinery for the safety of the vessel.

The second mate was asleep in his stateroom in the midships house at the time of the explosion. When he emerged from the deckhouse he saw smoke and steam on the after deck; he returned to his room, picked up a flashlight, and proceeded aft where he met the chief mate on the catwalk. He then went forward again, obtained walkie-talkies for himself and the chief mate and went to the bridge to inform the master that they were going to attempt to enter the engineroom. After being involved in various activities, he checked the pumproom for fire again and then decided to release CO_2 into the pumproom to prevent a reflash. He pulled the control cable for the aft pumproom cylinder bank; however, he did not follow the posted instructions and pull the control cable for the pumproom valve which would have released the CO_2 into the pumproom.

The bodies of the three crewmen initially not accounted for were found in the engineroom. The first was found near the machine shop, the second was found on the forward end of the LP turbine, both on the platform level. The third body was found near the lube oil separator on the floor plate level.

The master decided to transfer ashore for safety those crewmembers he considered unnecessary for manning the vessel under tow. At 2140 on 3 October 1973, as the vessel lay dead in the water, 15 crewmembers and the bodies of the deceased were disembarked to the M/V *Melissa*. Bodies were removed to McCleary Funeral Home, Morgan City, La. The deputy coroner for St. Mary Parish, La., determined the immediate cause of death to be extensive third degree burns as a consequence of the explosion.

At 2325, the *Texaco North Dakota* was taken under tow by the M/V *Cindy* and commenced an uneventful journey to Alabama Dry Dock and Shipbuilding Company at Mobile, arriving safely there the afternoon of 5 October 1973.

Among the conclusions of the Coast Guard Marine Board of Investigation were the following:

That there is evidence that *Texaco North Dakota* was in violation of 46 U.S.C. 222 in that the vessel was being navigated without the services of a third assistant engineer as required by the Certificate of Inspection.

That there is no evidence of misconduct, culpable inattention to duty, neglect, or other willful violation of law or regulation on the part of any licensed or certificated persons, or that any failure of inspected material or equipment contributed to the casualty.

That there is no evidence that any inspector, officer of the Coast Guard, or other officer or employee of the United States caused or contributed to the cause of this casualty.

That the lack of supervision on the part of the chief mate of the activities of the first pumpman and the bosun in regard to the aligning of the pumps and piping system associated with the tank cleaning operation was a contributory cause of the circumstances which created an explosive atmosphere in the aft pumproom.

That the pumproom on the *Texaco North Dakota* is no different than the pumproom on other tank vessels; that due to the required cargo transfer operations of the vessel there is a necessity on occasion to drain or discharge flammable or combustible liquids in small amounts into the bilges; and that this is an accepted practice in a space which, by regulations, is considered to be hazardous and is so treated.

That the erratic performance of No. 3 cargo pump while being used to pump out No. 16 starboard cargo tank was incorrectly evaluated by the pumpman in that it is more probable that the piping systems between the pump and the No. 2 center cargo tank were misaligned.

That the exact source of ignition could not be ascertained by the Board and thus it would be futile to expound theories.

The Commandant, in his review, identified several factors which contributed to the accident. As a result of his review, the Coast Guard has published proposed regulations which would prohibit the deliberate drainage of cargoes into the pumproom bilges and prohibit the use of air compressors in pumprooms. Also, the Coast Guard is studying the need for regulations on the operation of pumproom ventilation systems. The National Transportation Safety Board concurs in these proposed Coast Guard actions.

The Safety Board also believes that any cargoes which are capable of producing toxic and explosive vapors in areas where persons work must be prohibited to provide a safer working environment for crewmembers. It is technically feasible to devise a system to direct any discharge, whether accidental or deliberate, into containers that will not ventilate into working areas. The products in the containers could then be transferred to holding tanks until they could be discharged at shore facilities.

HERITAGE

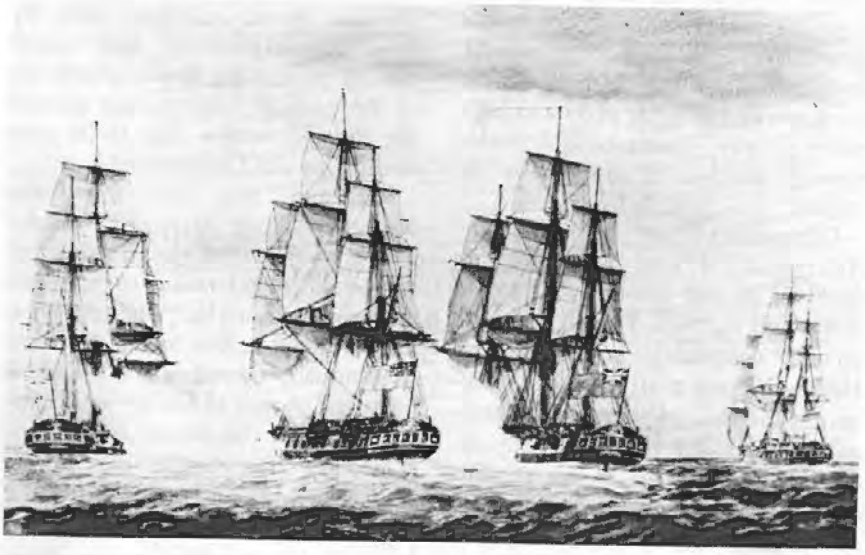
The man destined to become the first Coast Guard officer joined the infant Continental Navy on September 28, 1776, mere weeks after the signing of the Declaration of Independence. That day Hopley Yeaton mounted the gangplank of the newly constructed frigate *Raleigh,* located upstream of Portsmouth, New Hampshire, and signed on as a third lieutenant.

Previously, this New Englander had demonstrated his patriotic fervor for the American Revolution by joining the Sons of Liberty, raising and leading a company of soldiers, and commanding a privateer. Now, he further showed his dedication to the cause of freedom by turning his back on the lucrative occupation of privateering, where he served as a captain, to accept a position equivalent to an ensign today.

Ironically enough, just about the time that the Declaration of Independence was being signed, he and his privateer ship were captured by the British. Captain Yeaton and his crew were spared the horror of an English prison only because an American ship soon recaptured their privateer.

Once safely back on American soil, Yeaton promptly joined the 32-gun *Raleigh*. Her first mission was to sail to France in company with the 24-gun *Alfred* on a two-fold assignment of harrassing the enemy's commerce whenever possible, and returning with military supplies needed by the struggling revolutionists.

One particularly dramatic encounter took place on their outward voyage as they approached the European coast. During the stormy afternoon of September 2, 1777, they sighted and closed in on a small, but heavily laden British merchant vessel named *Nancy*. When she wisely decided not to resist, the American prize crew boarded her with such swiftness that they even seized the ship's copy of the British codes before it could be tossed overboard. Determined questioning soon revealed that the *Nancy* had dropped out of a convoy escorted by four warships just the previous day because of the bad weather.



Seizing their opportunity, the American ships immediately bent on their heavy suits of sails in pursuit of the convoy. The following day they caught up with it. Leaving the slower *Alfred* behind, the *Raleigh*, her gunports down and guns housed, joined right in with the convoy as if she were a British frigate. The British Commodore's signals were returned correctly, thanks to the *Nancy*'s code book.

Only when alongside the 14-gun sloop-of-war *Druid* did the *Raleigh* break out the Continental colors and demand her surrender. When met with an astonished refusal, Lieutenant Yeaton and his fellow officers directed their gun crews to fire a shot into the *Druid*'s rigging for each of the Thirteen States. They then unleased a devastating broadside that left 7 dead and 26 seriously wounded on the battered *Druid*.

The remaining British warships, meanwhile, had banded together, always keeping between the helpless convoy and the attackers. This tactic doomed the Americans' hope of defeating them piecemeal and then capturing the larger ships in the convoy. Finally, during the violent squall, the *Raleigh* and *Alfred* broke off and set course for France. Here they loaded up with the supplies and munitions for the return trip.

On the homeward journey, however, they had time only to destroy one small British ship before disaster struck. Two sails were sighted on March 9, 1778, and the *Alfred* closed in. No mechantmen these, but two British warships, the *Ariadne* of 20 guns and the *Ceres* of 16 guns. Although badly outgunned, the *Alfred* put up a spirited defense before being forced to strike her colors. The *Raleigh*, meanwhile, was already hulled down to the leeward. She immediately put on all sail before the wind to escape and save her precious cargo, now greatly increased in value through the loss of supplies by the *Alfred*.

Outrunning her pursuers, the *Raleigh* sailed into Portsmouth in April 1778 and promptly unloaded these vital supplies. Within a month, a new commander came aboard. Hopley Yeaton and the other members of the *Raleigh*'s crew were fortunate indeed, for their new skipper, Captain John Barry, by his exploits during his naval career would earn for himself the honorary title of "Father of our Navy." But several months were to slip by before the *Raleigh* could put to sea again, for repairs were in order.

Hopley Yeaton—never one to remain inactive—took this opportunity to enlist as a private in the 1,200-strong brigade of New Hampshire Volunteers. It had formed for an expedition to Rhode Island, where Maj. Gen. John Sullivan was attempting to evict the British. These volunteers marched to Rhode Island, remained about 3 weeks, and then returned.

Yeaton rejoined his ship immediately upon his return to Portsmouth, and early on the morning of Septemtember 25, 1778, the frigate sailed forth, fully refitted and rearmed. Shortly after noon, she ran into two British warships, which promptly gave chase. For 2 days, the 50-gun *Experiment* and the 20-gun *Unicorn* cracked on sail in pursuit of the *Raleigh*. Then, on the 27th, the wind suddenly died.

With all hope of escape gone, Captain Barry ordered his ship about, planning to first disable the lightly armed *Unicorn* and then outrun the heavier *Experiment*. When only a quarter of a mile separated them, both ships discharged broadsides. For about an hour, Yeaton and the other officers rallied their gun crews, while cannons roared and men died. By then the *Experiment* had closed enough to add her heavy broadsides to the carnage taking place aboard the *Raleigh*, where close to 30 men already lay dead or maimed.

Realizing that his ship was doomed, Captain Barry broke off the action and headed the *Raleigh* towards shore, intending to run her aground and burn her, while the crew fled to safety in the forest. All went as planned, except that the small party left aboard to fire her were captured before the flames could consume her. Eventually, the British refurbished her and added her to the fleet battling the Americans. Yeaton, however, along with Captain Barry and the crew, managed to reach Boston safely.

There, Yeaton signed on aboard the Continental Navy frigate *Deane*. This warship during the following year captured or assisted in the capture of nine vessels. During the winter of 1779–1780, she took four more. Sometime thereafter, Yeaton departed the *Deane*, thus ending his Revolutionary War career.

The next decade found Yeaton returning to his normal peacetime occupation as a merchant ship captain. On a few occasions, however, his activities prompted him back into the pages of history. While on a trip to France in 1785, he met Thomas Jefferson, who gave him some gifts to deliver to a friend back home. When George Washington made his first trip to New England as President, Yeaton served as his honorary coxswain during a boat excursion in Portsmouth Harbor in November 1789.

On August 4, 1790, the newly created Congress of the United States authorized the construction of 10 cutters to patrol the Atlantic Coast and prevent smugglers from landing contraband cargoes. Thus was born the lusty ancestor of the present day Coast Guard.

On March 21, 1791, President Washington signed Hopley Yeaton's commission that made him the first Coast Guard officer and the commander of the revenue cutter *Scammel*. It also made him the first commissioned seagoing officer of the United States, for the U.S. Navy would not be established until 1798. Eighteen years later, at the age of 70 and failing in health after so many faithful years of service to his country, Yeaton submitted his resignation and left the Service on December 31, 1809. Within 3 years, he died peacefully in bed and was buried in North Lubec, Maine. ⚓

October 19, 1975 marked a historic day for the U.S. Coast Guard and the Coast Guard Academy. A memorial service and public dedication ceremony was held honoring the Coast Guard's first officer, Captain Hopley Yeaton.

Captain Yeaton served honorably in the U.S. Revenue Marine Service, forerunner of the present U.S. Coast Guard. He commanded several cutters, patrolling the Maine and New Hampshire coasts. He retired at age 70 to live on his farm in Lubec, Maine, where he died and was buried in May 1812.

Yeaton's remains were disinterred and transported to the Coast Guard Academy on board the 295-foot training bark *Eagle*.

The slate monument dedicated to Captain Yeaton bears the intricate carvings and inscriptions of the Great Seal of the United States, and the cutters *Scammel* and *Raleigh*, two of the ships on which Captain Yeaton served.

COAST GUARD RULEMAKING

(Status as of 1 January 1976)

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
BOATING SAFETY							
Lifesaving devices on white water canoes & kayaks (CGD 74–159) comment period extended 6–12–75	2–4–75		7–15–75	X			
Safe loading and safe powering standards (CGD 73–250)	3–6–75		4–21–75			9–23–75	3–23–76
Inboard safe loading standard (CGD 74–83)	3–6–75		4–21–75			8–13–75 Corrected 11–5–75	2–9–76
Boats and associated equipment (CGD 75–110)	9–19–75		11–5–75	X			
BRIDGE REGULATIONS							
Cheesequake Ck., NJ (CGD 73–162)	8–10–73		9–11–73			10–22–75	11–24–75
Chicago River, IL (CGD 74–137)	6–3–74		7–16–74	X			
Coney Island Creek, NY (CGD 74–300)	1–29–75		3–4–75			11–6–75	12–8–75
Matanzas River, FL (CGD 75–024)	1–29–75		3–4–75	X			
Fox River, WI (CGD 75–035)	2–6–75		3–7–75	X			
Mystic River, MA (CGD 75–053)	3–27–75		4–29–75	X			
West Palm Beach Canal, FL (CGD 75–070)	3–27–75		4–29–75	X			
Illinois River, IL (CGD 75–060)	4–1–75		5–6–75	X			
Passaic River, NJ (CGD 75–052)	4–4–75		5–6–75			12–19–75	1–19–76
Snake R. & Clearwater R., Lewiston ID & Clarkston, WA (CGD 75–099)	4–30–75		6–10–75			12–3–75	1–5–76
Coosaw R., SC (CGD 75–087)	5–5–75		6–9–75			11–6–75	12–8–75
Duwamish Waterway, WA (CGD 75–097)	5–13–75		6–30–75	X			
Gulf Intracoastal Waterway, LA (CGD 75–131)	6–18–75		7–22–75	X			
Tombigbee River, AL (CGD 75–153)	8–5–75		9–5–75	X			
Clearwater Pass, FL (CGD 74–299)	8–12–75		9–12–75	X			
Deep River, WA (CGD 75–172)	9–8–75		10–17–75			11–21–75	12–31–75
Harlem R., East R., & Gowanus Canal, NY (CGD 75–181)	10–1–75		10–31–75	X			
AIWW Hallendale, FL (CGD 74–257)	10–15–75		11–14–75	X			
Indian River, FL (CGD 75–180)	10–30–75		12–2–75	X			
Chehalis River, WA (CGD 75–179)	11–4–75		12–9–75	X			
Bayou Grosse Tete, LA (CGD 75–215)	11–21–75		12–31–75	X			
Old Fort Bayou, MS (CGD 75–214)	11–21–75		12–31–75	X			
Norwalk River, CT (CGD 75–216)	11–21–75		12–31–75	X			
St. Lucie River, FL (CGD 72–168)	11–21–75		12–31–75	X			
Tacoma Harbor, WA (CGD 75–195)	11–21–75		12–31–75	X			
Lake Champlain, VT (CGD 75–222)	12–8–75		1–9–76				
Dutch Kills, NY (CGD 75–231)	12–22–75		2–5–76				
HAZARDOUS MATERIALS							
Sodium sulfide solution and sulfur dioxide (CGD 73–275)	7–16–74 Corrected 9–5–74		12–5–74	X			
Portable tanks, proposed DOT specifications (CGD 74–292)	6–9–75	7–1–75	7–16–75			11–7–75	12–31–75
Dangerous cargo labeling (CGD 75–050)	6–18–75	7–16–75	7–31–75	X			

COAST GUARD RULEMAKING—Continued

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
MARINE ENVIRONMENT AND SYSTEMS (GENERAL)							
Pipelines, lights to be displayed (CGD 73–216)	9–19–74 Corrected 10–18–74	10–21–74	11–4–74	X			
Oil and hazardous substance liability (CGD 73–185)	12–4–74		1–16–75	X			
Mooring barges on the Mississippi (CGD 74–185)	2–4–75	2–19–75	3–17–75			12–3–75	1–2–76
Deepwater ports (CGD 75–002); corrected 5–19–75	5–7–75	New Orleans 6–6–75	6–23–75			11–10–75 Corrected 12–15–75	11–17–75
Demarcation line, Guayanilla Bay, PR (CGD 73–287)	6–18–75		8–4–75	X			
MERCHANT MARINE SAFETY (GENERAL)							
Bulk Dangerous Cargoes, Inspection of Barges (CGD 73–271)	3–11–74	4–15–74	4–30–74	X			
First Aid Certificates (CGD 73–272)	4–2–74		6–15–74				
	Supp. Notice 12–1–75		1–16–76				
Carriage of Solid Hazardous Materials in Bulk (CGD 74–13)	5–15–74	7–16–74	8–31–74	X			
Load line regulations rail height adjustment (CGD 74–164)	10–4–74		11–15–74	X			
Construction and equipment of tank vessels (CGD 74–127); advance notice 9–5–74	4–21–75	5–21–75	6–5–75	X			
Licensing and certificating; apprentice mate endorsement (CGD 74–226); Comment period extended 3–7–75	1–23–75		4–9–75	X			
Oceanographic vessels (CGD 75–031)	6–12–75		7–28–75			10–15–75	11–17–75
Specifications for inflatable life rafts (CGD 75–040)	8–1–75		9–15–75			12–17–75	1–19–76
Metal borings, shavings, turnings, and cuttings (CGD 75–133)	8–1–75		9–15–75	X			
Marine occupational safety and health standards (CGD 75–101); Advance notice; comment deadline extended 12–11–75	8–11–75		1–15–76				
Tank vessels; air compressors, cargo handling room bilges CGD 75–017)	8–13–75		9–29–75	X			
Load line fee schedule (CGD 75–139)	8–15–75		9–29–75			12–8–75	1–8–76
Civil penalty procedures (CGD 75–123)	9–11–75		10–27–75	X			
Vessel inspection regulations (CGD 75–074)	9–16–75		10–31–75	X			
Fire hydrants and hose (CGD 74–60)	9–23–75		11–10–75	X			
Electrical cable splicing (CGD 74–305)	10–8–75		11–24–75	X			
Tank vessels in domestic trade (CGD 75–201); corrected 10–22–75; comment deadline extended 11–20–75	10–14–75		12–1–75				
Great Lakes pilotage rates (CGD 75–175)	10–31–75		12–1–75	X			
Fire and boat drills on passenger vessels (CGD 75–009)	12–17–75		1–26–76				
Structural fire protection (CGD 75–032)	12–22–75		2–5–76				

NOTE: This table which will be continued in future issues of the Proceedings is designed to provide the maritime public with better information on the status of changes to the Code of Federal Regulations made under authority granted the Coast Guard. Only those proposals which have appeared in the Federal Register as Notices of Proposed Rulemaking, and as rules will be recorded. Proposed changes which have not been placed formally before the public will not be included.

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 Saturday, Sunday, and 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 will be furnished by mail to subscribers, free of postage, for $5.00 per month or $50 per year, payable in advance. The charge for individual copies is 75 cents for each issue, or 75 cents for each group of pages as actually bound. Remit check or money order, made payable to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

CG No.	TITLE OF PUBLICATION
101	Specimen Examinations for Merchant Marine Deck Officers (Chief Mate and Master) (1–1–74).
101–1	Specimen Examinations for Merchant Marine Deck Officers (2d and 3d mate) (10–1–73).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (4–1–72). F.R. 7–21–72, 12–1–72, 11–14–74, 6–18–75.
*115	Marine Engineering Regulations (6–1–73). F.R. 6–29–73, 3–8–74, 5–30–74, 6–25–74, 8–26–74, 6–30–75.
123	Rules and Regulations for Tank Vessels (1–1–73). F.R. 8–24–73, 10–3–73, 10–24–73, 2–28–74, 3–18–74, 5–30–74, 6–25–74, 1–15–75, 2–10–75, 4–16–75, 4–22–75, 5–20–75, 6–11–75, 8–20–75, 9–2–75, 10–14–75, 12–17–75.
169	Rules of the Road—International—Inland (8–1–72). F.R. 9–12–72, 3–29–74, 6–3–74, 11–27–74, 4–28–75, 10–22–75.
172	Rules of the Road—Great Lakes (7–1–72). F.R. 10–6–72, 11–4–72, 1–16–73, 1–29–73, 5–8–73, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75, 10–22–75.
*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 (3–1–73).
*176	Load Line Regulations (2–1–71). F.R. 10–1–71, 5–10–73, 7–10–74, 10–14–75, 12–8–75.
182	Specimen Examinations for Merchant Marine Engineer Licenses (1–1–74).
182–1	Specimen Examinations for Merchant Marine Licenses (2d and 3d Assistant) (4–1–75).
184	Rules of the Road—Western Rivers (8–1–72). F.R. 9–12–72, 12–28–72, 3–8–74, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75, 10–22–75.
190	Equipment List (8–1–72). F.R. 8–9–72, 8–11–72, 8–31–72, 9–14–72, 10–19–72, 11–8–72, 12–5–72, 1–15–73, 2–6–73, 2–26–73, 3–27–73, 4–3–73, 4–12–73, 4–26–73, 6–1–73, 8–1–73, 9–18–73, 10–5–73, 11–26–73, 1–17–74, 2–28–74, 3–25–74, 4–17–74, 7–2–74, 7–17–74, 9–5–74, 10–22–74, 11–27–74, 12–3–74, 12–30–74, 1–15–75, 1–21–75, 2–13–75, 2–19–75, 3–18–75, 3–19–75, 4–9–75, 4–16–75, 5–1–75, 5–7–75, 6–2–75, 6–25–75, 7–22–75, 7–24–75, 8–1–75, 8–20–75, 9–23–75, 10–8–75, 11–21–75, 12–11–75, 12–15–75.
*191	Rules and Regulations for Licensing and Certification of Merchant Marine Personnel (6–1–72). F.R. 12–21–72, 3–2–73, 3–5–73, 5–8–73, 5–11–73, 5–24–73, 8–24–73, 10–24–73, 5–22–74, 9–26–74, 3–27–75, 6–2–75, 7–24–75, 8–13–75, 12–11–75.
*200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68, 4–30–70, 10–20–70, 7–18–72, 4–24–73, 11–26–73, 12–17–73, 9–17–74, 3–27–75, 7–28–75, 8–20–75, 12–11–75.
*227	Laws Governing Marine Inspection (3–1–65).
239	Security of Vessels and Waterfront Facilities (5–1–74). F.R. 5–15–74, 5–24–74, 8–15–74, 9–5–74, 9–9–74, 12–3–74, 1–6–75, 1–29–75, 4–22–75, 7–2–75, 7–7–75, 7–24–75, 10–1–75, 10–8–75.
*257	Rules and Regulations for Cargo and Miscellaneous Vessels (4–1–73). F.R. 12–22–72, 6–28–73, 6–29–73, 8–1–73, 10–24–73, 12–5–73, 3–18–74, 5–30–74, 6–24–74, 1–15–75, 2–10–75, 8–20–75, 12–17–75.
*258	Rules and Regulations for Uninspected Vessels (5–1–70). F.R. 1–8–73, 3–2–73, 3–28–73, 1–25–74, 3–7–74.
*259	Electrical Engineering Regulations (6–1–71). F.R. 3–8–72, 3–9–72, 8–16–72, 8–24–73, 11–29–73, 4–22–75.
*266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69, 8–20–75.
268	Rules and Regulations for Manning of Vessels (12–1–73).
293	Miscellaneous Electrical Equipment List (7–2–73).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (7–1–72). F.R. 7–8–72.
323	Rules and Regulations for Small Passenger Vessel (Under 100 Gross Tons) (9–1–73). F.R. 1–25–74, 3–18–74, 9–20–74, 2–10–75, 12–17–75.
329	Fire Fighting Manual for Tank Vessels (1–1–74).
439	Bridge-to-Bridge Radiotelephone Communications (12–1–72). F.R. 12–28–72, 3–8–74, 5–5–75.
467	Specimen Examinations for Uninspected Towing Vessel Operators (10–1–74).

CHANGES PUBLISHED DURING DECEMBER 1975

CG–176, Federal Register of December 8.
CG–123, 257, & 323, Federal Register of December 17.
CG–190, Federal Registers of December 11 & 15.
CG–191 & 200, Federal Register of December 11.

*Due to budget constraints or major revision projects, publications marked with an asterisk are out of print. Most of these pamphlets reprint portions of Titles 33 and 46, Code of Federal Regulations, which are available from the Superintendent of Documents. Consult your local Marine Inspection Office for information on availability and prices.

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