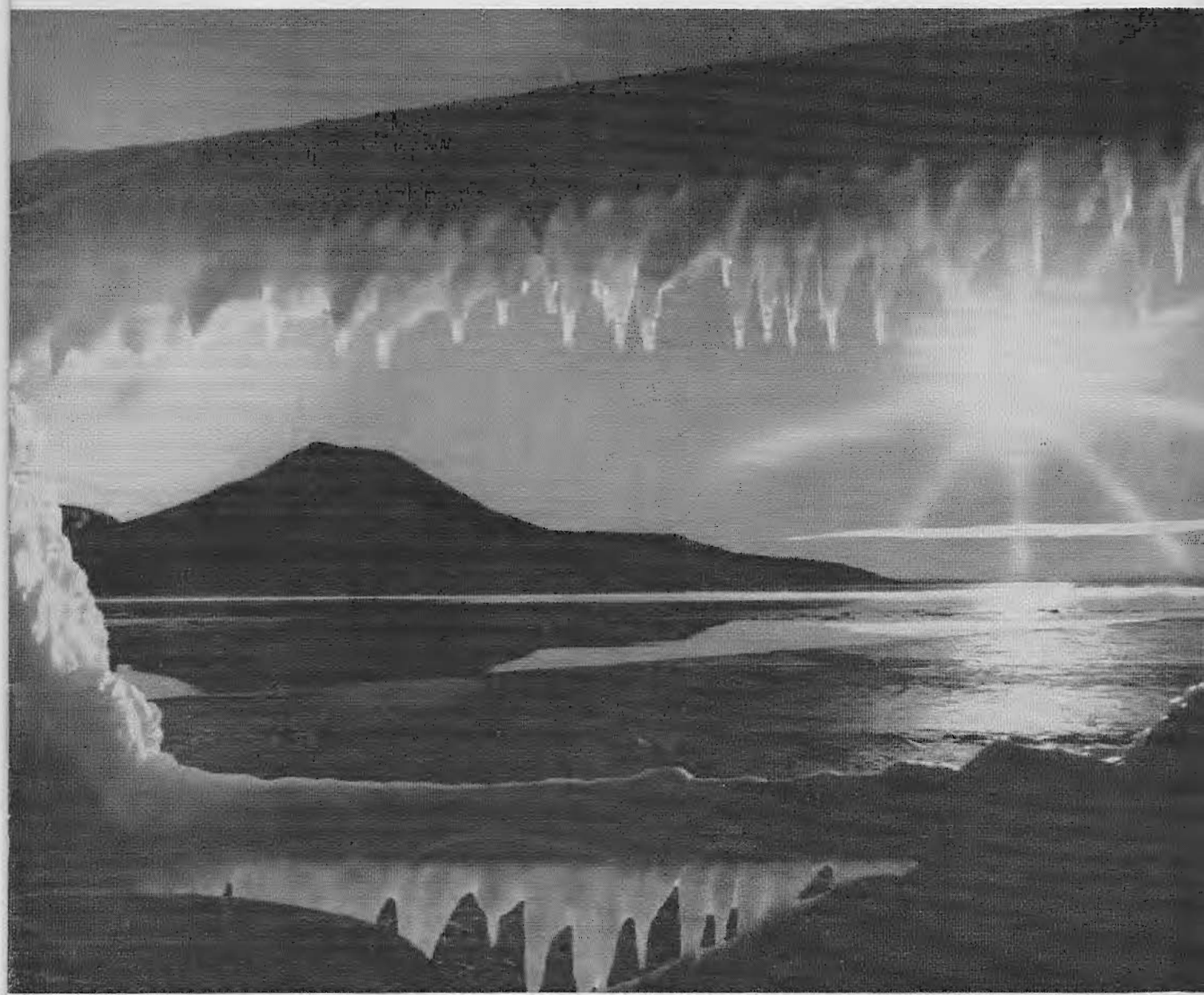
PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

UNITED STATES COAST GUARD

Vol. 21, No. 2 • February 1964

CG–129



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.

LCDR N. B. Binns, USCG, *Editor*
T. A. DeNardo, *Assistant Editor*

CONTENTS

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

THE ENEMY

I am more powerful than the combined armies of the world: I have destroyed more men than all the wars of the nation. I massacre thousands of people in a single year. I am more deadly than bullets and I have wrecked more homes than the mightiest of guns. I steal in the United States alone over $500,000,000 each year. I spare no one and I find my victims among the rich and the poor alike, the young and the old, the strong and the weak; widows and orphans know me to their everlasting sorrow; I loom up in such proportions that I cast my shadow over every field of labor. I lurk in unseen places, and do most of my work silently; you are warned against me yet you heed me not. I am relentless, merciless, and cruel. I am everywhere; in the home, on the streets, in the factory, at railroad crossings, on land, in the air, and on the sea. I bring sickness, degradation, and death; yet few seek me out to destroy me. I crush, I maim; I devastate; I will give you nothing and rob you of all you have. I am your worst enemy. I am carelessness.

—Courtesy *Seamen's Safety Guide*

DIST. (SDL NO. 78)
A: a aa b c(2); remainder (1)
B: n(35); c(16); e(5); f(4); h(3); g(2); remainder (1)
C: a b (less Quonset Pt.) c d e f g i m o u (1)
D: i(5); a b c d e f g h k l q r (1)
E: o(New London only) (1)
F: p(13)
List 141M
List 111

TRANSPORTATION OF DANGEROUS CARGOES

By CAPTAIN G. C. STEINMAN, USCG
Assistant Chief, Merchant Marine Technical Division, Headquarters

THE SINKING OF the open-hopper-type barge *Wychem 112* with 1,100 tons of chlorine in the Mississippi River, and 6 other casualties involving the loss of barges carrying hazardous chemicals, has required a reassessment of existing Coast Guard regulations covering the bulk movement of dangerous cargoes. The general areas being considered are:

1. General acceptability of open-hopper-type barges carrying bulk chemicals.
2. Use of trained personnel on board chemical tank barges.
3. Cargo manifests or information boards.
4. Controlling the movement and location of barges in tows.

The Chemical Transportation Advisory Panel and the Western Rivers Panel are industry groups established to advise the Coast Guard on matters affecting maritime safety in their respective areas of interest. A Committee of Western Rivers and the Chemical Transportation Advisory Panel were designated to work with the Coast Guard, in an advisory capacity, to develop proposed standards for safe transportation of dangerous cargoes on inland waters.

The first matter for consideration by the panels consisted of proposed regulations for open-hopper-type barges carrying dangerous cargoes. The corrective action prescribed in the proposed regulations was to be carried out in three separate phases:

1. Operating requirements for existing open-hopper-type barges to become effective 30 days after publication in the Federal Register.
2. Changes in design standards and operational requirements for new barges.
3. Study of existing barges to determine whether they could be continued in service or modified to meet the new safety standards.

SPECIAL OPERATING REQUIREMENTS

As a result of the discussions between the panels and the Coast Guard, it was agreed that phases 2 and 3 should be held in abeyance, and that

immediate consideration be given to the proposed operating requirements for existing open-hopper-type barges. By this procedure, more time would be allowed for consideration of proposed changes with respect to structural modification to existing open-hopper-type barges and the design requirements for new barges. The implementation of special operating requirements for the existing barges would, it was felt, provide the immediate safeguards needed to minimize the possibility of future sinkings of open-hopper-type barges carrying dangerous cargoes. These special operating requirements for open-hopper-type barges were published in the Federal Register of February 1, 1963, and became effective March 1, 1963.

These emergency regulations currently provide an immediate and effective means of governing the operation and navigation of open-hopper-type barges carrying dangerous cargoes so that the possibility of loss by swamping or "diving" is lessened. The main provisions of these regulations require open-hopper-type barges carrying dangerous cargoes to be placed in a protective position within a tow, void spaces and bilges to be pumped free of water, hatch covers secured at all times, control of towing speed when barge cannot be located in a protected position, and special placards to identify these barges. They are considered interim measures only. All new barges built to the revised structural requirements, and existing open-hopper-type barges, when suitably modified, or accepted by the Coast Guard without modification, will be exempt from the provisions of the special operating requirements.

STRUCTURAL MODIFICATION TO EXISTING OPEN-HOPPER-TYPE BARGES

Since the special operating requirements were originally published as interim regulations to remain in effect until such time as the existing open-hopper-type barges are reviewed and considered acceptable without the modification, or modified to the satisfaction of the Commandant, a study of such barges was undertaken through the cooperation of the American Waterways Operators. Detailed questionnaires were circulated by the AWO to a predetermined list of owners and/or operators of open-hopper-type barges with the request that the replies be returned to Coast Guard Headquarters. All of the data from the questionnaires, received to date, have been collated by the Merchant Marine Technical Division Staff. The data will be used as a basis for determining the extent of structural modification to each specific barge or group of similar barges. A seven-man task group representing Manufacturing Chemists Association, Compressed Gas Association, American Waterways Operators, American Petroleum Institute, A Shipyard, The Chlorine Institute, and the American Bureau of Shipping will work with the Coast Guard in evaluating the questionnaire replies and redrafting the proposed structural modifications. In any event, however, final structural modifications to existing barges will await the development of the design standards for new barges.

STRUCTURE DESIGN AND OPERATING REQUIREMENTS FOR NEW BARGES

The original draft of the Coast Guard proposal for design requirements for new barges prescribed a single-design concept for all barges carrying dangerous commodities, irrespective of the degree and nature of the hazard of the commodity. The proposed barge design was intended to provide the highest degree of integrity of hull structure. Subsequent review indicated that this requirement would be unrealistic for certain commodities exhibiting a lesser degree of hazard to operating personnel and to the public. Following this line of reasoning, the original design requirements for new barges were revised to provide three design concepts consistent with the degree and nature of the hazard of the commodity to be carried.

An amended draft of the structural and operating requirements for new barges, based on a gradation of hazard, was submitted to the Western Rivers Dangerous Cargo Committee, as well as to the Chemical Transportation Advisory Panel, for review and comment. At a joint meeting of these two groups on September 5, 1963, the draft was discussed in some detail. Because of the large number of participants at the meeting, agreement on an acceptable draft could not be reached. However, it was agreed that a task group be set up to work directly with Coast Guard in resolving the more controversial items. This task group met with Coast Guard representatives, and after thorough and painstaking discussion agreement in principle was reached as to the following design and operating requirements for new barges:

1. Each barge carrying dangerous cargoes will be assigned a barge type number whose design requirements would be consistent with the degree and nature of the hazard of the commodity to be carried.

2. The barges will be classed as Type I, II, or III, in descending order of hazard of commodity as follows:

(a) *TYPE I BARGE*

Barges classed as Type I are those intended to carry commodities which require the maximum preventive measures to preclude the uncontrolled release of the cargo to the waterways and/or atmosphere.

(b) *TYPE II BARGE*

Barges classed as Type II are those intended to carry commodities which require special protective measures to preclude uncontrolled release to the atmosphere, but whose uncontrolled release to the waterway does not constitute a long-lasting public or operating personnel hazard, although local and temporary pollution may occur.

(c) *TYPE III BARGE*

Barges classed as Type III are those intended to carry commodities of sufficient hazard to require a moderate degree of control.

3. In general, the Type III barge carrying commodities of the lowest degree of hazard would be designed in accordance with the conventional requirements for hull structure, subdivision and stability as presently prescribed in the Tank Vessel and Cargo Vessel Regulations. The Type II barge design would permit the barge to retain positive buoyancy and stability after flooding of any single compartment resulting from holing in the side or bottom shell plating. For

ABOUT THE AUTHOR

CAPTAIN STEINMAN, who holds the degree of Mechanical Engineer from City College of New York, served with the U.S. Army Corps of Engineers during World War II, attaining the rank of lieutenant colonel. In 1948 he accepted a commission in the Coast Guard and was assigned to the Merchant Marine Technical Division at Headquarters. At the present time Captain Steinman is serving as Assistant Chief of that Division. This article on transportation of certain dangerous cargoes and some of the problems connected therewith is extracted from a speech delivered at the 1963 annual meeting of the Western Rivers Advisory Panel.

Courtesy of Diamond Chemical

collision protection, the cargo tanks on Type II barges will require at least a 3-foot clearance from the sides and box ends, and a 25-foot clearance from the headlog at the bow. For Type I barges, the subdivision and stability requirements would permit the barge to retain positive buoyancy and stability after any two compartments are flooded, resulting from holing in the side or the bottom shell plating anywhere in its length without limitation as to location. For Type I barges, the collision protection feature will require a clearance for the cargo tanks of at least 4 feet to the sides and box ends, and 25 feet to the headlog at the bow.

4. In order to provide protection against sinking due to swamping or diving, all barges of Types I, II, and III will be required to be constructed with rakes and coamings as follows:

(a) A suitable bow form designed to be consistent with the maximum speed at which the barge is towed. In integrated tows, only the lead barge will be required to comply with this requirement.

(b) All barges of the open-hopper type must be fitted with suitable coamings around the hopper space and an additional plowshare breakwater on the forward rake.

5. For Types I and II barges, the maximum hull bending stresses are prescribed under an assumed grounding condition such that the forward rake bulkhead rests upon a pinnacle at the water surface.

6. The following *Special Operating Requirements* are prescribed for all type barges:

(a) *Minimizing Free Surface Effects*

All void spaces (except those used for ballasting) and the bilges are required to be substantially free of water. Except when otherwise considered necessary for inspection or pumping, all hatch covers and other hull closure devices for void spaces and hull compartments, other than the cargo spaces, are required to be closed and secured at all times.

(b) *Placards*

Placarding will be required to provide the following information: (1) Identification of cargo; (2) description of the principal characteristics of the cargo with respect to fire, health, and reactivity hazards.

(c) *Information Board*

Information board would require posting of the following information: (1) Instructions on the operation of special equipment, (2) the emergency procedures and precautions to be observed in the event of equipment breakdown or the uncontrolled release of the cargo in the waterway and atmosphere, and (3) firefighting procedures and precautions to be observed in the event of a fire occurring on or in the vicinity of the barge.

(d) *Surveillance*

All barges containing dangerous cargoes are required to be under constant surveillance. While under tow, a watch of each unmanned barge would be required to be maintained from the towing vessel. When a barge is moored, it would be required to be under the surveillance of a watchman or trained employee or other competent person responsible for the security of the barge and for keeping unauthorized persons off the barge.

(e) *Manning*

Barges equipped with machinery, the satisfactory operation of which is considered necessary to maintain safety of the cargo, such as refrigeration, reliquefaction, etc., may be required to be manned, if in the judgment of the Officer in Charge, Marine Inspection, such manning is necessary for the protection of the life and property and for the safe operation of the barge.

For unmanned barges, the towing vessel shall have on board at all times, while towing, at least one person qualified in the emergency procedures for any dangerous cargo which is being carried in bulk on the barge. During cargo transfer operations, the owner or operator of the barge must insure that a person especially qualified to handle such cargoes is on duty to perform the transfer operations. The proposed regulations will require that persons qualified in the handling of dangerous cargoes must also qualify for a Tankerman's Certificate endorsed for the specific product for which he is trained to handle.

7. Each dangerous cargo proposed for bulk transportation under the provisions of the new regulations for barges will be carried in a hull-barge type designed and constructed consistent with the degree and nature of the hazard of the commodity. The selection of the required barge type for each cargo will be determined by the Commandant.

The current thinking appears to line up the named cargoes in barge type as follows:

Type I Barge—Ethylene oxide, carbon disulfide, Class B or C poisons, chlorine, phosphorus, and anhydrous hydrofluoric acid.

Type II Barge—Propane, butane, butadiene, ethylene, and anhydrous ammonia.

Type III Barge—The corrosive liquids such as hydrochloric acid, sulfuric acid and nitric acid, and the combustible or flammable liquids not otherwise specified for Type I or II barges which may have a Reid vapor pressure over 25 psi absolute.

These listings are presented here for guidance only, and are by no means to be considered as final. It is not the intent to list them by name in the proposed regulations. This will be left to the discretion of the Commandant.

It must be emphasized that the proposed regulations for new barge design and operation are still in draft stage. It is anticipated that the new barge regulations will be included in the agenda for the next public hearing scheduled for March 23, 1964. The proposed effective date for these new regulations has been tentatively set for July 1, 1964.

SOUTHERN ILLINOIS UNIVERSITY STUDY

The Coast Guard has taken several actions recently to complement and supplement the work of the industry advisory groups in the field of dangerous cargo transportation. One of these is a study contract with the Southern Illinois University for a research project looking into operating practices for possible improvements in safety in river transportation of dangerous cargoes. The broad objective of this investigation is to determine problem areas for further study and offer possible solutions where appropriate. This project was designated "Operation Riversafe" by the university and divided into phases for accomplishment.

Phase I was a preliminary phase mainly directed to organization of the group who would be doing the research and preparing the way for industry participation and assistance. During this phase, which is now completed, many companies and industry organizations were contacted and they agreed to assist in the undertaking.

Phase II, which is presently in progress, is essentially a gathering and digestion of information. This information will be derived from several sources: Conferences and meetings such as the Safety Coordinating Conference held on the Carbondale campus in September 1963; discussions with special groups such as the river pilots; and individual conferences with representatives of interested companies and industry associations. As presented at the Safety Coordinating Conference, the following are considered to be the primary objectives of the study:

1. Survey of problem areas in the inland waterway transportation of dangerous cargoes.

2. Recognition and identification of related efforts in this field by other groups.

3. Identification of the essential corrective measures related to each problem area.

4. The proposed means to implement such measures.

To date, the following seven problem areas have been identified as requiring survey by the university:

1. *Rules of the Road*—An advisory panel to the university has been set up within the framework of the research project to recommend changes in the applicable Rules of the Road.

2. *Ports and Terminals*—Emergency plans in the event of a major catastrophe—evacuation, cleanup, etc.

3. Public relations.

4. Standards of construction and maintenance.

5. Emergency training of personnel.

6. Cargo identification.

7. Data processing.

A major contribution to Phase II is anticipated from the application of the data-processing techniques to the case histories of casualties to vessels on the inland waterways. The university has set up a comprehensive form for recording all pertinent data regarding such casualties. From these completed forms, punchcards will be made that can be machine processed to yield a great variety of casualty data for analysis and conclusions.

TOXICITY AND HAZARD RATING

The Coast Guard has been aware of the great increase in the volume and complexity of dangerous cargoes moved by water under its jurisdiction and the corresponding increased potential hazard to the public resulting from this expansion in recent years. It is recognized that the accidental, uncontrolled release of toxic chemical cargoes in our inland waterways and atmosphere could possibly result in pollution problems endangering the public health and safety. In an effort to protect the public from the hazards of a contaminated water supply, the Coast Guard is reviewing the entire operation of water transportation of dangerous commodities.

To keep abreast of these developments, a number of steps have been taken by the Coast Guard to determine needs for major changes in our current regulations, as well as a possible need for new legislation. One of our major steps is the establishment of a Coast Guard Special Task Group charged with the responsibility of developing new regulations recognizing a new chemical classification system which would reflect the unique hazardous properties of chemicals and relate these properties to applicable design and operating criteria.

The basic problem of the proper Federal regulation of water movement of chemicals stems from the difference in the properties and characteristics of chemicals as compared to the conventional petroleum product. The water movement of the everyday petroleum hydrocarbons has been adequately covered by regulation under the Tanker Act and the Tank Vessel Regulations. The hazard recognized in these products is essentially one of fire or explosion, and the standards providing for their safe transportation are based on the variation in their flashpoint and vapor pressure. However, the rapidly growing water movement of chemicals and petrochemicals bring with it a need to reclassify these commodities under different hazard concepts, since toxicity and chemical stability or reactivity were additionally significant properties over and above the fire hazard.

Under consideration at the present time by the Coast Guard is a proposed classification system which would group potential hazards in three broad categories: Health (toxicity); reactivity (chemical stability); and fire (flashpoint and explosion range). Within these broad groupings, the hazard rating will be further classified by a Hazard Index numeral of 1 through 4 or possibly 5, depending upon the degree of hazard presented by each chemical within the group. In this manner, it is anticipated that the design, construction, and operating requirements prescribed by the revised regulations would provide the necessary degree of protection against the potential hazards of each of the new chemicals.

The problems encountered in determining hazard ratings for bulk dangerous cargoes for water shipment is not unique with the Coast Guard. This is a current "headache" for the chemical industry in each phase of handling the commodity-production within the plant, tank farm storage, and transportation. Since we do not profess to be experts in the field of toxicology, we have enlisted the services of three outside groups to advise us. The first is a task group set up by the Chemical Transportation Advisory Panel. This task group has proposed a tentative assignment of toxic ratings to all the chemicals listed on the Coast Guard Navigation and Vessel Inspection Circular No. 4-63 which classified all dangerous commodities that have been proposed for bulk water movement.

To obtain unbiased, authoritative assistance in the relatively narrow field of "toxicity," the Coast Guard has become a sponsor of the Advisory Center on Toxicology of the National Research Council-National Academy of Sciences. We are asking this group to recommend criteria and standards for classifying toxic hazards in bulk water transportation, to recommend ratings for specific commodities, and to keep the Coast Guard abreast of new developments in the field of toxicology.

For the third source of help, we have asked the U.S. Public Health Service to develop a classification system and recommend ratings for a long list of materials based upon their hazard to water and air pollution.

The scientific complexities in shipping today, enhanced with the use of specialized vessels and cargoes, are generally considered to be beyond the skills of any one group. This makes it abundantly clear that the Coast Guard cannot "go it alone" in carrying out the statutory responsibilities for the safe movement of dangerous cargoes by water. We must look to industry and other sources for advice and guidance. In this respect the Western Rivers Panel, through the fine efforts of its Committee on Dangerous Cargoes, has been very helpful to the Coast Guard in our joint endeavor to maintain a high degree of safety in this important area of river transportation.

DANGEROUS CARGO REGULATIONS IN PAPERBOUND VOLUME

The Coast Guard's Regulations for Dangerous Cargoes in effect on January 1, 1964, are now printed in a paperbound volume. Shipowners, officers, and others interested are urged to purchase these regulations.

The Division of Federal Register, the National Archives, General Services Administration, publishes this pamphlet annually with separate semiannual supplements, usually available in July of each year. These regulations are the official version of parts 146 and 147 of Title 46, Code of Federal Regulations. Since these regulations are a "sales" publication, they are not available at local Coast Guard offices.

Copies of this volume entitled "Title 46, Code of Federal Regulations, containing parts 146 and 147" (Subchapter N—Dangerous Cargoes), may be obtained as a sales publication from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price $2.50.

SAFE LOADING OF SMALL BOATS

By Cdr. R. I. Price, USCG

Chief, Hull Arrangements Branch, Headquarters

THE FOLLOWING ARTICLE is taken from a paper presented by Commander Price at the 1963 meeting of the Small Craft Section of the National Safety Congress.

The growth of recreational boating in the United States since World War II is nothing less than a national phenomenon. According to latest estimates, some 7½ million pleasure boats were in use this last summer by 40 million Americans. On the happy side of this growing family sport are the new interests, new jobs, new opportunities and industries it has brought into being. On the not-so-happy side are the accidents and fatalities befalling those who have failed to exercise a seaman's caution and respect for the forces of wind, water, and gasoline. Never have so many entered so blithely and with so little preparation into an activity in which experience is so important. Seamanship does not come with the bill of sale; it is rather a matter of time and education. But for the water safety programs of the American Red Cross, Coast Guard Auxiliary, Power Squadrons, to name a few of many organizations which are making the effort to convert landsmen into seamen, the casualty record in pleasure boating might be much worse than it is.

Actually, while boating has been growing, fatalities have tended to remain constant at about 1,100 per year. This is indicated by the boating statistics which the Coast Guard is obliged to keep under the Federal Boating Act of 1958. That act also charges the Service with analyzing such statistics and with recommending and promoting corrective practices toward the elimination of boating accidents. The trouble with statistics is that they tend to press the human aspects out of a situation. Nowadays we are too inclined to play the "numbers game" of statistics, forgetting that each life lost and each serious injury casts a tragic shadow over many other lives. The sum total of tragedy is greater than we recognize.

Despite the educational efforts, too many people—perhaps from too great familiarity with it as an automobile fuel—do not have sufficient respect for the capabilities of gasoline in the enclosed spaces of a boat.

Fire and explosion accidents remain high as an injuries source. Similarly, the longstanding courtesies of the water, the Rules of the Nautical Road, are being ignored, and collision injuries are rising. These are injuries. In the fatality column, the most recent compilation, for 1962, shows that three types of accident continue to be the basis of the major percentage of fatalities. On figure 1 you see that about 40 percent of all boating fatalities occurred from capsizings, 20 percent from falls overboard, and about 10 percent from sinkings. In other words, 70 percent of fatalities are stability related.

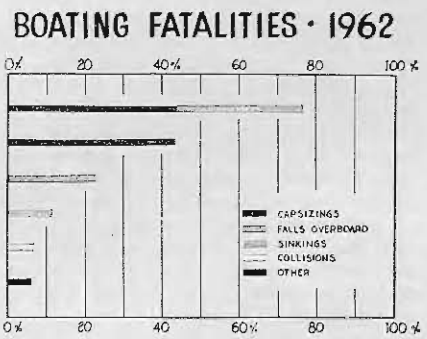


Figure 1

Now regarding boating statistics, we feel fatalities are the more reliable figures because they must be reported. We do know that the accident situation must be worse than the record shows. Statistics never indicate the lucky break that made the difference between an accident and a near accident. Furthermore, many an accident goes unreported. I should also point out that the classification of casualties is based upon the evidence of the disaster after the fact, as seen by an investigator, and in many of the cases there are no witnesses.

BEHIND THE STATISTICS

It is therefore difficult to see a pattern from statistics alone. To get behind the statistics, I have personally reviewed over 300 of the 1962 fatalities of the types mentioned, and it is apparent to me that the common denominator is inadequate stability, because of overloading or improper loading. These instability accidents which throw people unexpectedly into the water, confused and helpless, make for the most fearful reading, especially when overloading is involved. Whole families have been wiped out in a single incident.

One revealing remark which was made by survivors in several cases was, "Everything happened so fast and there we were in the water." Until he has experienced instability, even a seemingly knowledgeable boatman may have the idea that his boat is going to sink slowly, while he, the captain, first leads the passengers to safety, and then goes down with the ship. There must be some such illusion to explain why the life preservers we insist upon do not find their intended use, because contrary to popular opinion, the operator involved in boating fatalities is more likely to be a man in his 30's, head of the household, than a teenager.

CONTRIBUTING FACTORS

There are a great many factors which contribute to lack of stability of a boat, and it is not surprising that the weekend sailor does not understand them. From the 30th Chapter of Proverbs, 18th and 19th verses: "There be three things which are too wonderful for me, yea, four which I know not: The way of an eagle in the air, the way of a serpent upon a rock, the way of a ship in the midst of a sea, and the way of a man with a maid". In 3,000 years we have made some progress with the first two of these things which puzzled Solomon. Ornithologists and aerodynamicists can explain the eagle's flight, and herpetologists and zoologists can shed light on reptile movement.

HUMAN ELEMENT

But from there on, progress has been limited. Naval architects now understand ship behavior in the static condition quite well, and the dynamic action of the sea and the seakeeping ability of ships—reasonably well. As to the last of the Biblical problems—the man and maid—this is in the realm of human behavior—still the least understood. Where the indeterminates of human behavior and ship response are combined as in boat loading and stability, we have a problem of considerable complexity.

One can try to be scientific and analyze small boat's stability with the same principles applied to larger vessels, but the information is of limited value because of the unreliability of the human factor.

In a large cargo vessel, cargo weight is a known quantity. Properly stowed, the cargo is fixed in the ship for the

duration of the voyage. Weight changes occurring result from the consumption of fuel, water, and stores. When you do have cargo shifting in a major vessel, the result is dramatic. (Remember the *Flying Enterprise*?)

In a large passenger vessel, despite the number of passengers, their effect on the ship as they move about is small because their total weight is not significant with respect to the total weight of the ship. The consumption of fuel, water, and stores is, of course, very high, and it is sometimes necessary to compensate on a long voyage by ballasting.

PASSENGER WEIGHT FACTOR

In a small excursion vessel or ferry, passenger weight becomes more significant. There was an item in the paper last month, dateline Venice, Italy. A ferry boat with 700 tourists was nearly capsized by a beer bottle. The bottle was thrown from a passing freighter and smashed on the deck railing of the ferry. A woman on the ferry, hit by a flying chip of glass, screamed and half of the 700 ran to the opposite side, listing the vessel badly to starboard and compelling the captain to order full emergency starboard to swing the ship in a counterbalancing arc.

So you can see by the time we get to talking about small boats, the weight of the human cargo is a major consideration, and at the same time a weight whose behavior it is impossible to predict.

ABOUT THE AUTHOR

COMMANDER PRICE graduated from the Coast Guard Academy in 1945. His seagoing experience includes progressive assignments as Engineer Officer and as Commanding Officer of Coast Guard cutters. Included in his career training are 3 years of postgraduate study in Naval Architecture and Marine Engineering at MIT, where he was awarded the degree of Naval Engineer in 1953. At the present time Commander Price is assigned to Headquarters as Chief, Hull Branch, Merchant Marine Technical Division.

WEATHER CONDITIONS

In discussing boat stability, weather conditions must be considered. Weather and sea state have a great deal to do with the adequacy of stability. Much more is required of a seagoing vessel than of one in coastal or harbor service, near to a port of refuge. Small boats are designed for use in good weather and relatively calm waters. With the wake thrown up by careless boaters passing close aboard, even calm water is hard to define for a small boat. In foul weather and rough water, the wisest course for a small boat owner is to a snug harbor in front of the TV set.

Considering loading as it relates to stability, addition of any weight decreases the amount of freeboard and increases the chance of taking water aboard. In that respect, adding weight decreases stability. On the other hand, stability can be improved greatly by locating the weight low in the boat, evenly distributed on the centerline and in the middle of the boat. Stability is also reduced if the weight is located too far aft or too far forward, especially if it raises either end out of or nearly out of the water. Excessive trimming is much like trying to stand on one foot when you could stand on two. If the added weight is located high in the boat or to one side of centerline, stability is likewise impaired.

The types of load could be sorted into three general categories—solids, liquids, and people.

Solids are the preferred load. They tend to be placed low in the boat and small boats can carry a large amount of deadweight safely if it is properly distributed.

Liquid appears as water in the bottom of the boat. Though low in the boat, loose or free-surface water is a free-roaming thief. It not only steals from available freeboard as a weight addition, but also from the wedge of buoyancy which restores equilibrium of the boat when it heels or trims.

And then there are people—a difficult cargo, high in the boat, but similar in behavior to free-surface water. People stand up, walk aft, walk forward, climb up, sit on the gunwale. When the weather acts up—they slip, slide, fall, lurch, and lean over the rail. You could really make a strong case for seat belts in a boat.

STABILITY VERSUS INSTABILITY

We have been talking about stability in terms of individual static changes and how they affect the boat in repose.

Instability situations often take a boat's occupants unaware because the changes are many, dynamic, and related. One of the simplest situations occurs when the operator or a passenger, who has been standing up while the engine is started, is toppled as the boat shoots forward or slews to one side. Falling, his weight on the gunwale capsizes the boat. This is both a stability problem and a demonstration of Newton's first law of motion.

In other situations, passing waves change the balance between the forces of buoyancy and gravity, setting the boat in motion as it seeks to restore equilibrium. Water splashes in at points of low freeboard, making the deck slippery underfoot. Unsecured cargo, passengers, and bilgewater tend to shift to the low side. Or perhaps the boat is underway, taking spray over the bow and the passengers shift aft to avoid it. Or maybe the operator has been running at high speed, throwing up a great "roostertail" of a wake, and suddenly cuts the throttle, allowing his wash to overtake him.

I am sure you all understand the influence of the height of the center of gravity on stability. This is much the same effect as you find in a rocking chair. An additional, very important, but less easily understood aspect of stability—that business of standing on one foot that I mentioned earlier—is the area of the waterplane. The waterplane is the hole which the boat pushes out of the water's surface. Here's a fish-eye view of the bottom of the boat. You can see from figure 2 one more clue to the importance of proper loading as regards stability. Very simply, a loading condition in which the waterplane area is large is a more stable condition. When you have water in the bilge, some of this area is lost. To appreciate the significance of the waterplane, look at it this way: most boats have two conditions of equilibrium—one is right side up—and the other is upside down. As the waterplane area diminishes, you are getting close to the "changeover" point between these two conditions.

A CASE HISTORY

After reviewing the fatality reports, I had thought to write a composite accident account to illustrate the interaction of the various elements affecting stability. Then I came upon the following case which proves that life can be more convincing than art.

This unfortunate capsizing occurred in Long Island Sound during summer. The weather at the time was clear with a moderate wind. The water was choppy. The boat involved was of

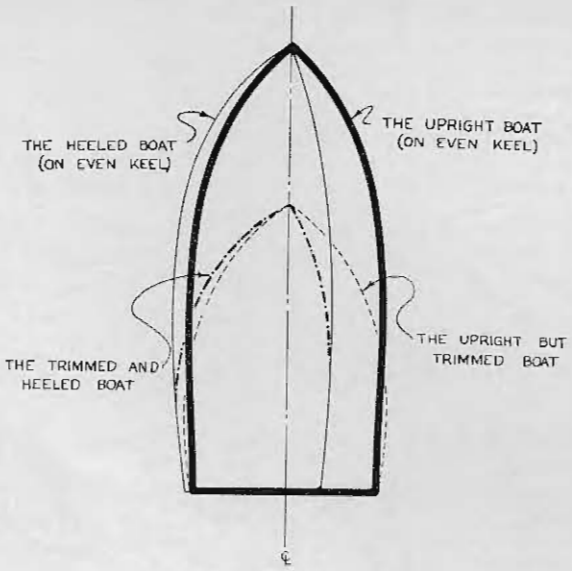


Figure 2

lapstrake construction, with plywood planking, 16 feet in length, by 6 feet in beam. There were two transverse seats with backs aft of the forward deck, and an open area between the after seat and the motor, which was 35 hp. Seven persons of one family, all adults, two of them women, crossed the west end of Long Island Sound in the boat for a picnic, at midday. At 9 p.m. that evening the group got underway for the return home. Having run about one-half mile from shore they struck a floating object and sheared the propeller pin. They drifted in the dark while attempting repairs. Two of the men worked on the engine, the other persons were seated forward. While at work on the engine, water occasionally slopped aboard through the outboard motor cutout. An accumulation of 6 inches brought the level above the floorboards. At about 9:45 p.m., the passengers suddenly noticed the water and excitedly stood up to grab for the life preservers. The sudden movement caused the loose water to shift and the boat capsized to port.

There were sufficient life preservers on board, consisting of three or four adult and three child-size life preservers, plus four buoyant cushion-type life preservers. Only one of the party was a competent swimmer, and he brought the others back to the overturned boat. The life preservers were used by the passengers, but it is not known in what manner except that one of the women, who was 7 months pregnant and who we'll call Jane, had one of the adult preservers. Three persons held onto the bowline. Jane and her husband held onto the overturned boat.

The swimmer went to round up the last person who was drifting holding to one of the gasoline tanks. The swimmer was also looking for the waterproof rescue kit which was in the boat but had not been made fast and had drifted away.

When the swimmer returned to the boat with the last of the party, he found that Jane had slipped from the boat. He swam about, found her unconscious, and brought her back to the boat where they waited until about 10:30 p.m. when they were rescued by a police patrol boat. Efforts were immediately made to revive Jane, but she did not respond to oxygen or artificial respiration. Physicians were unable to save the child.

This tragic episode is a true account directly from the investigator's report, except for the omission of names, and a little editing for brevity. In its way it is a classic from which many lessons in boating safety can be drawn, besides those bearing on stability.

RULES FOR BOATOWNERS

But the boatowner doesn't think in terms of stability. He doesn't want a course in Naval Architecture for Little Folks. He needs simple rules—seamanship rules. Here is a list which should be driven home in any educational effort:

Secure cargo for sea before getting underway
Keep bilges dry
Stow cargo low and keep passengers seated
Distribute cargo and passengers evenly
Heed weather advisories
Don't lie broadside to a sea or wake
Don't overload

The last injunction, "don't overload," is like being against sin. Some 26 States out of 43 having boat-numbering programs have laws prohibiting overloading, and any number of counties have ordinances. But very few give the boatowner a clue as to when his boat may be overloaded.

We need to remember that in loading the boat, the operator is often subject to powerful group pressure from his passengers even if his better judgment is working. To expect the novice operator to say, "Stop! There are too many!" or a casual passenger to say, "Let me out!" without some guide to the boat's capacity is asking a lot of human nature. Crowd pressure overcomes reason. No one likes to be called "Chicken!"

We think it would be helpful to have a conspicuous, simple statement of the number of persons, and of the total weight, such as the Capacity Plate shown in figure 3 would furnish.

Note that the statement is so many persons, but not more than so many pounds. This is not such a novel idea. You can find a similar injunction in

RECOMMENDED CAPACITY PLATE

STATE OF FLORIKANA

Loadings shown are based on calm water in protected areas.

THIS ___ FT. ___ IN. BOAT MAY ACCOMMODATE UP TO ___ PERSONS PROVIDED TOTAL WEIGHT OF PERSONS, ENGINES, FUEL, AND EQUIPMENT DOES NOT EXCEED ____ LBS.

RECOMMENDED HORSEPOWER ___
HULL NUMBER _____

Figure 3

717-233—64——2

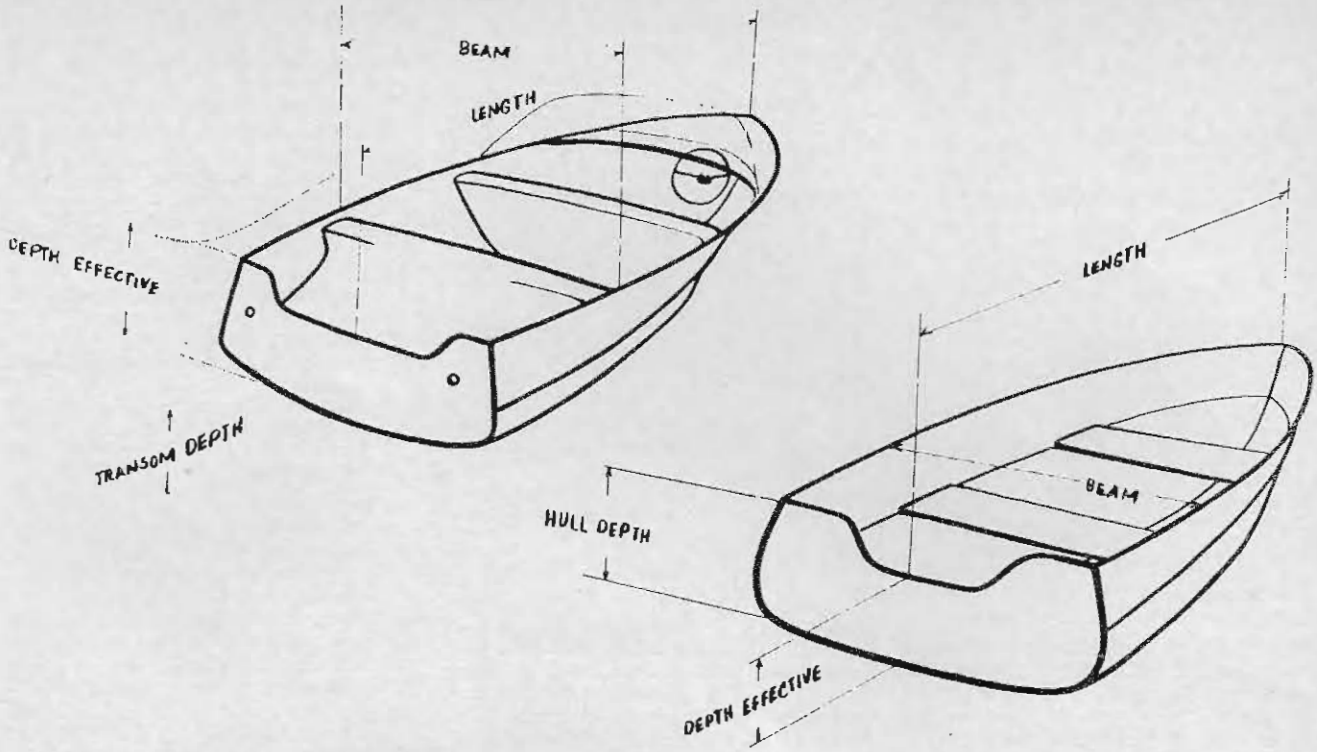


Figure 4

a building elevator. A capacity in persons is simple and positive, and can be readily applied by any passenger to protect himself. He should have no difficulty comprehending a capacity in persons regardless of age, size, shape, sex, or weight. As I endeavored to show, persons are a stability problem as well as a weight problem. And they are a factor in terms of whole numbers.

Consider, for example, 150 pounds in the form of (*a*) sandbags, (*b*) one adult, (*c*) two subteenage children, (*d*) three 6-year-olds. The weight is unchanged, but the safety hazard clearly increases as unpredictability increases. Children are a special problem in this respect.

The interest span of youngsters is short. They are not impressed with, or aware of any limitations on movement when in a boat. For these reasons, children should be considered to be the equivalent of adults for safety and loading purposes. The more unpredictable the individuals the operator has to cope with, the less safe is his boat.

Because of the variety of uses to which a boat may be put it is also necessary to express the weight capacity in pounds. The operator would then adhere to whichever of the two criteria sets the lower limit in a particular situation.

ENGINE WEIGHT VERSUS HORSEPOWER

One of the important variables is the size engine a boat carries. The popularity of water skiing has created a demand for more powerful engines than many boats are intended for. If we ignore the question of horsepower and think only of the engine's weight, we find that the combined engine and fuel weight for engines less than 25 hp., runs about 125#. Above that point, although the weight per horsepower declines, the larger engine uses more fuel—we go farther faster—and another fuel tank is acquired, adding another 50#. Get beyond 60 hp., and we need a battery to start the engine, another 65#. By now, all told we are up to 300–400# or more. This weight is well aft in the boat, sort of like having "Man Mountain" Dean sitting on the transom.

OPEN TRANSOM

And while we're at the transom we need to consider the important difference between a boat with an open transom cutout and the same boat fitted with a self-bailing engine well. Figure 4 shows the difference in appearance of two boats of similar hull form. Any water which enters the left-hand craft through the transom notch drains overboard, while the right-hand craft retains the water as free-surface bilge water. This is a very important and not fully appreciated detail. Swamping due to flooding over the stern through an unprotected transom notch is a very common occurrence. In setting the capacity for these two boats we should obviously give more credit to the type with an effective engine well.

ALLOWABLE TOTAL WEIGHT

The question remains, How to determine the number of persons and the allowable total weight?

To deal with the considerable problem of 7½ million boats already existing, we have evolved two very simple rules. The number of persons is determined from the expression $\frac{L \times B}{15}$, where L is the overall length and B is the maximum width, dimensions in feet and tenths of feet. This readily calculated expression gives quite reasonable results for a wide variety of boat types. Although the results are empirical, note that the two dimensions which have greatest influence on stability are used. Secondly, the allowable weight in pounds may be determined from the expression $7.5\times$

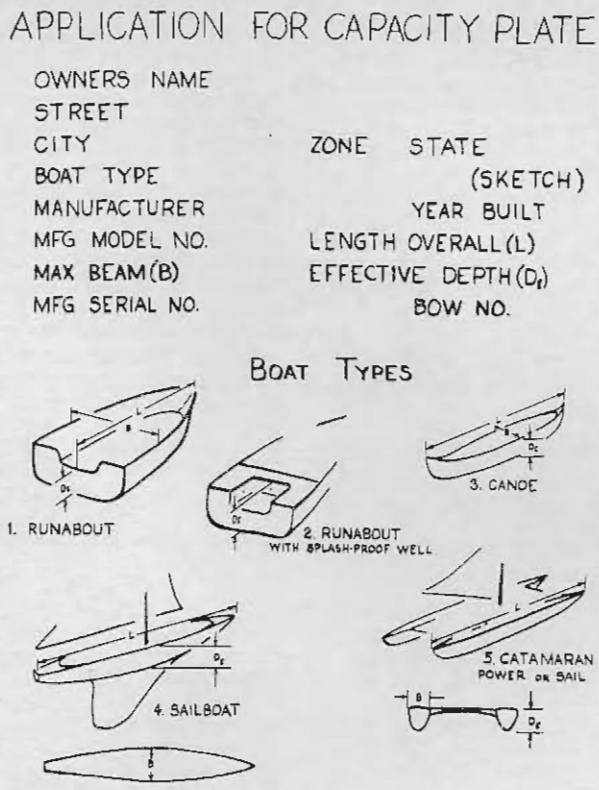


Figure 5

$L \times B \times De$, which also gives very good results over a wide range of boats:

> **TOTAL WGT IN POUNDS = 7.5 × L × B × De**
> **Where De is the minimum effective depth of the boat, to take account of low transom cutout or credit an acceptable engine well. All dimensions in feet and tenths of feet.**

Pursuant to our instruction from the Congress under the Federal Boating Act of 1958 to foster uniformity of boating laws, rules, and regulations among the several States, the Coast Guard has been working closely for some time with a special committee of the American Boat & Yacht Council to develop more technically correct capacity criteria. The American Boat & Yacht Council represents all interests of the boating industry and has as its objective the development of an advisory code of safety standards and recommended practices for recreational boating. This special committee on safe loading has thus far developed criteria for boats under 26 feet in length, which include such basic construction details as the amount of decking and the transom design.

This work has been in process for 2 years and the results are now being drafted. A report should shortly be issued to the boating industry for additional comments, before final action is taken.

The method of determining the allowable total weight involves determining the cubic capacity of the boat and then applying to that volume a percentage which is dependent upon the design features of the craft. The procedure is to be applied by boat manufacturers and should foster improvements in design. The ABYC committee has also included provision for a simple stability test to verify the calculated allowable load.

In addition to the new models, it would also be possible to apply the ABYC procedure to many of the existing boats. As a public relations gesture, boatbuilders could issue tables of past model numbers giving capacity data. Such material could be released through boating dealerships. Where the boatbuilder's figures are not available to the boatowner, the simple formulae would be applied. In a particular loading situation, the operator would obey whichever value, number of persons or total weight, sets the lower limit.

CAPACITY PLATES

With these industry-developed capacity criteria there should be an end to conflicting overloading clauses and we would have loading guidelines recognized in all States. Figure 5 is an application form of a type which might be used to garner the necessary information when the boat is numbered if capacity plates should be installed.

This tracks the suggestion of a man in San Mateo, Calif., which we received last summer.

> DEAR SIR: I have just read in the paper about another near tragedy on the bay where five persons were in a 15-foot boat and just last week seven persons lost their lives in a 14-foot boat.
>
> I think it high time the Coast Guard took action to control the number of persons these amature [sic] sailors carry in their boats.
>
> I know it would be impossible to check every boat leaving the dock, but a person accepting a ride in a boat should know its capacity and so be allerted [sic] to the fact he is placing himself in a dangerous situation.
>
> Large ships are protected from overloading by the Plimsoll mark and life boats on large ships have the number of persons they can carry stenciled on their sides. Pleasure boats should have some such protection against overloading.
>
> I would suggest when the license number is issued the safe load in pounds and the number of persons be determined and

WHAD'YA MEAN UNSAFE ? THIS BOAT'S BRAND NEW!

it be required this information be stenciled under the license number.

I would have a child classed as a person. This would simplify enforcement and give added protection to the child.

With this information plainly visible a person would think twice before accepting a ride in an overloaded boat.

As you can see—John Q. Public is ahead of us. A capacity plate would make the boat operator aware that there are such things as overloading and overpowering, and could be an important part of the boating educational program.

SEAMANSHIP AND EDUCATION

Small boat loading and stability are only faintly scientific; remember, we are dealing with people. There is no guarantee that a given boat, even under reasonable loading and operating conditions, cannot be swamped or capsized or sunk from want of seamanship. You cannot make anything foolproof. Boating safety is still influenced most by the boat operator. A boat capacity plate would only be one contribution toward safe practice.

Loading information must assume that the craft is of normal design in average condition, and that it is to be used within the wind and weather limitations of a small boat.

The water is not man's natural habitat. When he ventures forth on it, for business or for pleasure, he must practice the special group of safety rules that is seamanship. This is why the Coast Guard continually stresses boating education. With more positive capacity information available to the boatowner, and with more emphasis in the educational programs on the importance of preserving stability, let us hope to see, with the next boating season, a decrease in fatalities as still more Americans discover the world of pleasure boating.

SLEEPY-TIME WATCH

BY ARTHUR E. WILLS
UNITED STATES P. & I. AGENCY

In a case recently brought to our attention, a T-2 tanker was in a Far Eastern port with a full load of fuel. During the evening, engineroom bilges were pumped. When dry at 7:40 p.m., the bilge pump was secured. The independent bilge suction valve and the main bilge suction valve were left open, both being nonreturn valves. Apparently, the independent bilge suction valve did not seat fully, possibly due to scale or other obstruction in the line.

The 8–12 oiler made his rounds at 8 p.m., and upon his return at 8:15, the watch engineer did likewise. The oiler inspected again at 9 p.m. Each time inspected, the bilges showed water—"nothing unusual," though. At 9:30 p.m., the cargo pump stopped. At the same time, when the unlicensed junior watch engineer went to dump some "refuse water" into the bilges, they and the motor pump well were found to be flooded. The three main pumps and the two electric stripping pumps were made inoperative by the water and discharge was held up for 39 hours before the least affected pump could be put back into commission.

Investigation was held into why the bilge alarm had not sounded. It was found that because of very heavy weather encountered during the trip east, the bilge alarm had been sounding repeatedly, although frequent checks found the bilges "OK." Later evidence indicated that there had been water in the pumproom bilges which caused the alarm to sound. On this particular vessel there are no separate alarms for the various bilges and all alarms are on a common circuit. If one alarm sounds, it is necessary to check the after pumproom, motor well, forward engineroom bilge, and after engineroom bilge to locate the trouble.

So, unknown to the chief engineer, the watch engineers turned off the bilge alarm for the last 2 weeks of the voyage. Upon arrival in calmer waters, they forgot to turn it on again.

It is more reprehensible, but we all know that securing bilge alarms in bad weather is not entirely an infrequent practice. Occasionally forgetting to turn them on again is inevitable. The story related above shows what can happen as a result. As a matter of fact, this episode brings out so many items of faulty procedure that we are reminded of one of those safety pictures which carry the caption, "How many things wrong can you find in this picture?"

If the bilge alarms were a pest and they wanted to turn them off, why not get the chief's permission? Then he could carry the burden of remembering to see that they were turned on again. Alternatively, why not have kept the bilges dry so that the alarms would not have sounded off?

Then again, when the bilges were pumped dry in port, why not close the suction valves? If the preceding watch was too lazy or forgetful to do this, why should not the oncoming watch engineer check to his own satisfaction all valves and machinery and close valves if necessary, when relieving the watch? This is his duty, in his own protection and for the safety of the vessel.

Pumping bilges in harbor is a practice which has gotten a lot of tankers in trouble, even though the bilges pumped were not cargo bilges.

Worst of all in this episode is the fact that at least three "inspections" were made of the bilges without noting that the pump motor well was flooding, as it must have been at the time in question. Ships can flood with appalling speed to a hopeless point, sometimes. The only protection against such a catastrophe, besides the bilge alarm, is frequent and conscientious inspection. Routine tends to dull human faculties, but experienced and competent personnel are expected to be superior to this tendency and to remain alert and thorough at all times when carrying out repetitive chores, as well as more challenging duties. WHEN THE SEA STARTS COMING UNINVITED INTO YOUR SHIP, YOU'RE IN TROUBLE!

MARITIME SIDELIGHTS

There were 911 vessels of 1,000 gross tons and over in the active oceangoing U.S. merchant fleet on December 1, 1963, 5 less than the number active on November 1, 1963, according to the U.S. Department of Commerce. There were 11 Government-owned and 900 privately owned ships in active service. These figures did not include privately owned vessels temporarily inactive. They also exclude 27 vessels in the custody of the Departments of Defense, State, Interior, and the Panama Canal Company.

There were four less active vessels and two more inactive vessels in the privately owned fleet. Two freighters, *Christopher Lykes* and *Mayo Lykes*, were delivered from construction. Two freighters, *American Angler* and *Barbara Lykes*, were exchanged from the Government fleet to the private fleet, while the *Alcoa Polaris* and *Diana B* were turned in to the Government. Two Liberty ships, *Malden* and *Concord*, were converted to barges; the T3 tanker *Capri* was dismantled, and the tanker *Dynafuel* was a marine casualty. This made a net loss of 2 in the total of 977. Of the 77 privately owned inactive vessels, 3 passenger ships, 10 freighters, and 2 tankers were being repaired or converted. The others were laid up or temporarily idle.

⚓ ⚓ ⚓

The Third Session of the Assembly of the Intergovernmental Maritime Consultative Organization (IMCO) met in London from 16 to 25 October 1963. Provisions for two international conferences resulted, one to be held in the spring of 1965 regarding Facilitation of Travel and Transport, and the other in the spring of 1966 to develop a new Convention on Load Lines. In addition, it will be recommended to the various nations, including the United States, that they adopt a new system of tonnage measurement with regard to shelter deck ships which will permit a higher degree of safety without affecting economic considerations. All of the foregoing were sponsored and strongly supported by the United States.

CAPT. E. C. BAUMAN, Master of the Steamer *Benjamin F. Fairless*, points to the 1,001,248 man-hours recorded on the Award of Merit which was presented recently by the National Safety Council. The figure represents some 15 years of operation by the vessel without a disabling injury to her crew. This is the first time that a vessel in the Pittsburgh Steamship Division of U.S. Steel, and only the second time in Great Lakes recorded safety history, that a ship has reached 1 million man-hours without a disabling injury to a crewmember.

Three men were out duck hunting along the St. Lawrence River last fall. Carefully they set out their decoys in the river and sat back to await results—which were not long in coming. A vessel, underway in the river, drew abeam of the decoys—a burst of gunfire broke out from the ship, bullets landing all around the "stakeout." The vessel, unidentified, moved majestically on its way; the duck hunters, not so majestically, moved on their way—hurriedly.

⚓ ⚓ ⚓

The largest all-aluminum barge constructed to date has been launched recently at Avondale Shipyards, New Orleans. The 195-foot vessel, it is estimated, can carry 14 percent more cargo at the same 8-foot 6-inch draft as a similar barge constructed of steel. The barge will be used for transporting a variety of chemical cargoes on inland waterways.

The Maritime Administration recently has awarded a research and development contract for the design and construction of a self-regulating marine steam generator. A small turbine mounted between the superheater passes of the boiler will sense the steam flow to the main propulsion unit and automatically regulate the output of fuel and air needed to produce the required amount of steam.

⚓ ⚓ ⚓

Commercial freight tonnage on the Tennessee River for the first 10 months of 1963 exceeded 12 million tons—a record for that period. If this trend is continued, the total for 1963 will exceed 14 million tons, with the previous high listed as 13.1 million tons in 1962. Freight carried in October on the river topped 1.4 million tons, the largest total recorded for a single month.

nautical queries

DECK

Q. What precaution should be observed to prevent electrocution or shock to personnel as well as sparking when portable extension electric lights, portable electric power tools, or appliances are used?

A. When portable electric extension lights, portable electric power tools, or appliances are used, they should have a three-wire conductor, one wire serving as a ground in event of short circuit.

Q. What is the purpose of equalizing valves fitted where tanks are divided by a longitudinal bulkhead? How would you maintain them and in what position should they be kept?

A. Equalizing valves are fitted in longitudinal bulkheads dividing tanks to prevent unsymmetrical flooding of the vessel with respect to the centerline in event of damage to the tank shell when no liquid cargo is in the tank. Equalizing valves, when fitted, should be maintained in operating condition. When the tanks are empty or used for dry cargo, the valves should be open (in most cases).

There may be cases where the unsymmetrical flooding is less dangerous than the increased free surface effects from leaving the valve open, and the trim effect as well as reduction in reserve buoyancy due to the additional quantity of water must be considered.

Q. The distance to the sea horizon in nautical miles is approximately equal to 1.15 times the square root of the height of eye.

Without referring to a table and basing your answer on the foregoing statement, determine the approximate distance to the horizon for an observer whose height of eye is—

a. 49 feet

b. 64 feet

A. a. 8.05 miles

b. 9.2 miles

Q. Your vessel is on course 050° True at a speed of 9 knots.

At 0400 a vessel is observed on the PPI scope bearing 020° True at a range of 10 miles.

At 0406, the vessel is observed bearing 022° True at a range of 8 miles.

a. Assuming that both your vessel and the vessel observed maintain course and speed, determine the distance between your vessel and the vessel observed at their closest point of approach.

b. Determine the course and speed of the vessel observed.

c. Determine the course to alter to at 0412, which will clear the other vessel by 2 miles in the minimum length of time without changing your speed.

CANDIDATES MAY USE ANY METHOD TO OBTAIN SOLUTION. SHOW ALL WORK

NOTE: Maneuvering boards will be furnished upon request of candidates for solving of problem.

A. a. The distance between your vessel and the vessel observed, at their closest point of approach, assuming that course and speed were held, would be 1.4 mile at 0429.

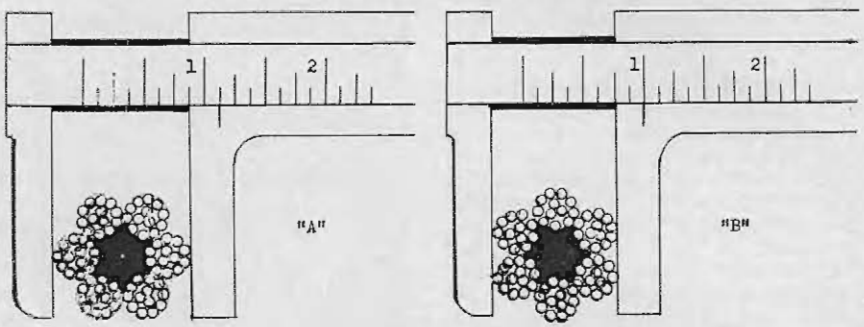
b. The course of the vessel observed is 169.3° True.

The speed of the vessel observed is 14.3 knots.

c. The course to alter to at 0412, which will clear the other vessel by 2 miles, in the minimum length of time, without change in your speed, is 032.8° True. (Neglecting advance and transfer.)

BLOCKS AND TACKLES

Q. a. Would you measure wire rope as at "A" or "B" in the sketch?
b. What minimum factor of safety should be used with wire rope?



A. a. "A"
b. Five (5)

ENGINE

Q. Explain in detail how to set the safety valves on a boiler so as to operate at the allowable pressure.

A. (1) Check boiler steam gage with test gage or gage testing machine. (2) Gag all valves on the boiler except the one to be set. (3) Disconnect hand lifting gear, remove key and cap from top of valve spindle. (4) Turn compression screw right handed (down) to increase spring pressure and consequently to increase the lifting pressure of the valve. (5) Handle fires to increase steam pressure in boiler to lifting pressure. Note pressure on steam gage at which safety valve lifts and also pressure at which it reseats. (6) Readjust compression screw up or down and test again with steam until correct lifting pressure is obtained. (7) Set up compression screw nut. (8) The difference between lifting and reseating pressures (blowdown) should be about 3 percent of set pressure. If the difference in pressures, noted on the steam gage, was greater than this, back out the adjusting ring lockpin, insert a small screwdriver or other instrument through the hole and turn the adjusting ring until it has moved down a small amount. Replace lockpin. (9) Test again with steam and readjust the adjusting ring until by trial and error, the proper blowdown has been obtained. (10) Gag this valve and go ahead with the same procedure on the other valves of the same boiler until all have been adjusted. (11) Replace caps and keys. Connect up hand lifting gear and test hand lifting gear to see that all valves lift by hand. When shaft is rotated the system of levers lifts up on the cap, which is keyed to the valve spindle. As the valve spindle is also keyed to the valve, the valve is lifted from its seat. The hole through the end of the cap key is for the U.S. seal to prevent unauthorized persons from tampering with the safety valve setting.

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

ADDRESS REPLY TO:
COMMANDANT
U.S. COAST GUARD
HEADQUARTERS
WASHINGTON, D.C. 20226

MVI–3
24 May 1963

Commandant's Action
on
Marine Board of Investigation; explosion and fire on board the Tank Barge *NBC–883* at Carlyss, Louisiana, on 22 September 1962, with loss of life

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

At about 0900 CST on 22 September 1962, the Tank Barge *NBC–883*, while being gas-freed preparatory to hot work in connection with hull repairs, exploded with resultant fire. The vessel, moored starboard side to a gas-freeing pier at Carlyss, La., was being cleaned by three shipyard employees at the time of the explosion. As a consequence, the three men lost their lives and the vessel sustained extensive material damage.

The *NBC–883*, an unmanned inspected tank barge certificated for lakes, bays, and sounds, 671 gross tons, was equipped with six cargo tanks, Number 1 port and starboard, Number 2 port and starboard, and Number 3 port and starboard. Access to each tank was by means of an expansion trunk 42 inches in diameter, 24 inches above the main deck, equipped with an oval manhole cover fitted with securing bolts and wing nuts. A cylindrical diesel oil tank (30′ x 5′) was mounted over each of the Number 2 tanks. The last cargo transported by the vessel had been benzene.

Cleaning operations started at about 0115, 22 September 1962, commencing in Number 3 starboard tank with a crew of four men. Equipment utilized included a plastic garden hose for washing down, a self-priming centrifugal pump powered by an explosion-proof 220 volt electric motor mounted on a rubber tired chassis, a ventilation unit constructed of two steel drums welded end to end with an air nozzle mounted in the center, and an extension light equipped with a 100 watt bulb, vapor globe, and bronze metal guard. The pump motor was operated by shore power through a three-conductor insulated cable. The ventilating unit, receiving air through a rubber hose from ashore, was designed to permit suspension within the access manhole. Due to the absence of eye witnesses, it could not be ascertained what tank was in process of being cleaned at the time of the explosion. Each of the original four laborers was relieved at various intervals during the early morning hours by the three men who subsequently lost their lives in this casualty. The extension light, 110 volt shore-powered, was found in Number 2 starboard tank following the casualty. However, upon examination of structural damage it was ascertained that the bulkhead separating Numbers 2 and 3 starboard tanks had been driven into Number 2 starboard tank.

REMARKS

In view of structural conditions found after the casualty, it is considered likely that the initial explosion occurred within the original confines of Number 3 starboard tank.

While a concentration of benzene vapors undoubtedly supplied the explosive mixture causing this casualty, any determination as to the source of ignition must be purely conjectural based upon the limited facts available. However, assuming the initial explosion to have occurred in Number 3 starboard tank, a source other than the extension light must be found. A probable source can be found in the makeshift ventilating device used by the repair facility. As described in the testimony, this device was hung in the tank opening by nonconducting cord or line. The air connection was made with a rubber air hose. Hence, the steel drum device was effectively insulated from any grounding means. The introduction of compressed air through a pipe nozzle set up ideal conditions for a build-up of a static charge on the case of the exhauster. Under these conditions it is a distinct possibility that a static spark may have jumped the gap between the drum and the barge structure. Alternatively, the steel drum may have struck the side of the expansion trunk when the laborers were engaged in removing it.

It is to be noted that the motor and pump unit, mounted on rubber tires, was not provided with a grounding connection and thus the unit was isolated from the barge. This condition, in addition to presenting another possible source of static discharge, introduced serious personnel shock hazards.

The use of a nonapproved portable extension cable on board the subject barge constitutes evidence of a violation of regulations in Chapter 1 of Title 46, Code of Federal Regulations prescribed pursuant to R.S. 4417a, as amended (46 USC 391a) (Tanker Act). However, since it is unlikely that this extension cable caused the casualty, no useful purpose would be served by referring this case to the U.S. Attorney for criminal prosecution for a technical violation of regulations.

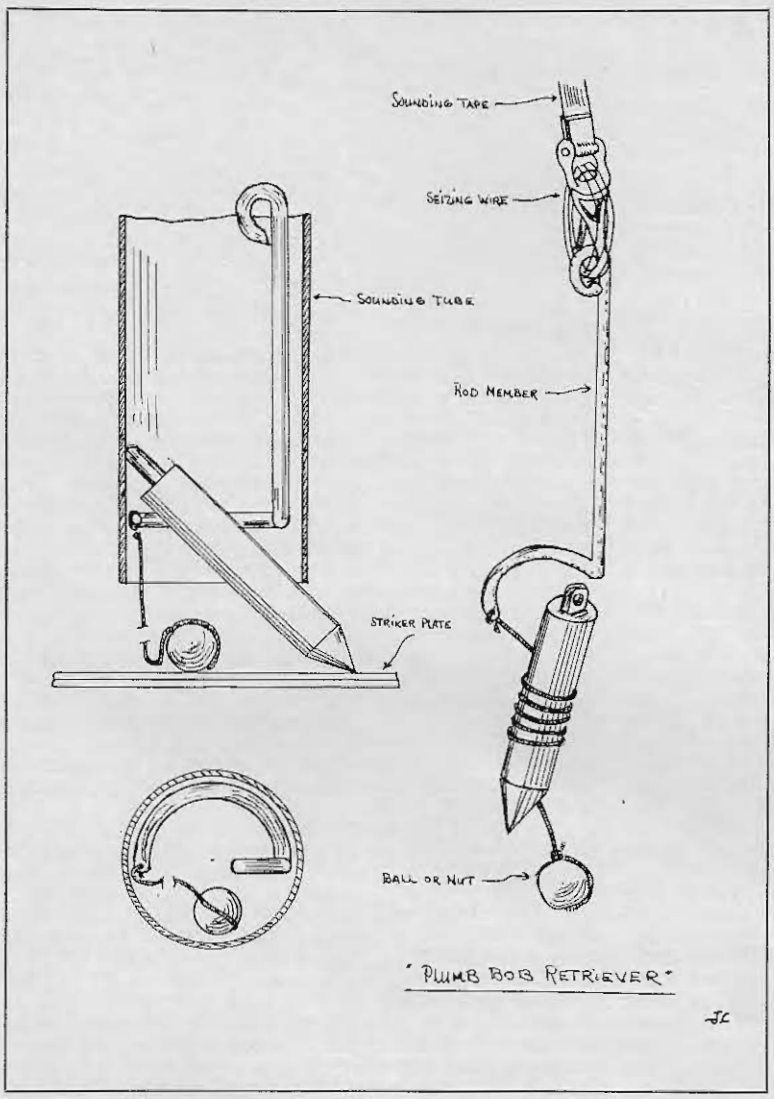
Regardless of whether or not the aforementioned unauthorized light may have been a contributing factor, this casualty points to the possible need for additional precautionary measures to be exercised during preliminary cleaning operations incident to gas-freeing. In this connection, the adequacy of existing Coast Guard regulations governing the safe operation and repair of tank vessels is currently being studied. If found indicated, appropriate action will be initiated.

With regard to the Board's recommendation that the information in this investigation be referred to the U.S. Department of Labor pointing toward a possible violation of regulations within the purview of that agency, it is considered that Coast Guard regulations are paramount on inspected vessels. However, recognizing their interest in casualties of this nature, the Commander, Eighth Coast Guard District is directed to furnish a copy of the record in this case, together with a copy of the Commandant's Action, to the local representative, U.S. Department of Labor for his information.

Where not in conflict with the foregoing, the record of the Marine Board of Investigation is approved.

D. McG. MORRISON,
Vice Admiral, U.S. Coast Guard,
Acting Commandant.

LOOSE PLUMB BOBS



A suggestion for retrieving a loose plumb bob from the bottom of a tank sounding tube has been submitted by Capt. James Connor, U.S.A. He has applied for a patent on the device but offers it freely to all who might find a use for it.

The equipment required is composed of a rodlike member having the shank portion equipped with an eye and the other end with a circular form extending perpendicularly and having a radius of curvature slightly less than that of the radius of the sounding tube. A line or string of approximately 18 inches in length is attached to the extremity of the curved portion of the rod and a suitably size ball or nut secured to the free end.

The rod member, with line and nut attached is secured to a sounding tape, the swivel and hook of which are properly secured with seizing wire to prevent free swiveling, and lowered into the sounding tube. Upon reaching the bottom of the tube, the tape is then rotated or twisted approximately 25–50 turns which causes the weighted line to be wrapped around the loose plumb bob. After wrapping is completed the tape and plumb bob should be withdrawn with a steady strain maintained upon the tape to prevent inadvertent unwrapping.

AMENDMENTS TO REGULATIONS

[EDITOR'S NOTE.—The following regulations have been promulgated or amended since the last issue of the PROCEEDINGS. A complete text of the regulations may be found in the Federal Register indicated at the end of each article. Copies of the Federal Register containing the material referred to may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402]

Title 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER N—DANGEROUS CARGOES [1]

[CGFR 63–80]

PART 146—TRANSPORTATION OR STORAGE OF EXPLOSIVES OR OTHER DANGEROUS ARTICLES OR SUBSTANCES, AND COMBUSTIBLE LIQUIDS ON BOARD VESSELS

Miscellaneous Amendments

Pursuant to the notice of proposed rulemaking published in the Federal Register of February 2, 1963 (28 F.R. 1052–1058), and February 16, 1963 (28 F.R. 1510–1511) and the Merchant Marine Council Public Hearing Agenda dated March 25, 1963 (CG–249), the Merchant Marine Council held a public hearing on March 25, 1963 for the purpose of receiving comments, views and data. Item VIII f. contained proposed changes regarding dangerous cargoes and included a proposal designated "Detailed Regulations Governing Poisonous Articles—Radioactive Materials" (CG–249, pages 220–246). It was announced at the public hearing and in the Federal Register document published in the Federal Register of May 30, 1963 (28 F.R. 5378), that final actions with respect to these proposals were deferred so that the requirements of the Interstate Commerce Commission and the Coast Guard will be in agreement when published. The ICC notice of proposed rulemaking on this subject was published in the Federal Register on April 19, 1963 (28 F.R. 3876–3888), ICC Change Notice No. 58, Docket No. 3666, service date July 12, 1963. All comments, views and data that have been received are now being evaluated and it may be some time before agreement may be reached regarding these proposals. However, it is deemed necessary to recognize and prescribe requirements regarding fissile materials and a new section, designated 46 CFR 146.25–21, is added

by this document. This proposal was originally set forth in the Public Hearing Agenda (CG–249, pages 222, 227) as 46 CFR 146.25–20(b), and 146.25–27. No comments were received by the Coast Guard or ICC pertaining to these requirements for fissile material. In view of the fact that fissile materials present a criticality hazard that is not recognized by the present regulations and a serious potential hazard exists as more of these materials are being transported by water, it is deemed necessary and vital to safety to publish these fissile material regulations which recognize this hazard and contain requirements designed to prevent accidental criticality.

The other changes contained in this document are editorial in nature. The title for the subchapter is changed to indicate the character of the regulations in 46 CFR Parts 146 and 147. Subpart numbers are assigned to the various subparts in order to conform to the format used in this chapter of the Code of Federal Regulations. Chart "A" in 46 CFR 126.29–99 is changed to correct a typographical error. This document contains no material based on ICC Change Orders.

(Federal Register of December 3, 1963)

Title 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER B—MERCHANT MARINE OFFICERS AND SEAMEN

[CGFR 63–83]

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

Subpart 10.02—General Requirements for All Deck and Engineer Officers' Licenses

SUBCHAPTER D—TANK VESSELS

PART 38—LIQUEFIED INFLAMMABLE GASES

Subpart 38.10—Piping, Valves, Fittings and Accessory Equipment

PART 40—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR CARRYING CERTAIN INFLAMMABLE OR COMBUSTIBLE DANGEROUS CARGOES IN BULK

Subpart 40.05—Ethylene Oxide

MISCELLANEOUS AMENDMENTS

The Act of September 23, 1963 (Public Law 88–128; 77 Stat. 164) amended the Act of August 1, 1939 (46 U.S.C. 242–248), to provide that professional nurses may be registered as staff officers in the United States Merchant Marine. Section 1 amended the provisions of section 242 in Title 46, U.S. Code, by adding professional nurses as the sixth grade of registered staff officers. Section 2 amended section 243 in Title 46, U.S. Code, by changing the last sentence thereof to include professional nurses. The law states that applicants for registry as surgeons or professional nurses shall be required to possess valid licenses as physician and surgeon or professional nurse issued under the authority of a State or Territory of the United States, the Commonwealth of Puerto Rico, or the District of Columbia. The purpose of the amendments to 46 CFR 10.25–3, 10.25–7(f) and 10.25–9(a) in this document are to implement the provisions in the Act of August 1, 1939, as amended by the Act of September 23, 1963.

An examination on the subject "Rules of the Road" must be taken by a person renewing his license as a master, mate or pilot when such officer has not served under the authority of his license within the 3 years next preceding the date of application for renewal, or if he has not been employed in a position closely related to the operation of vessels during such 3-year period. In order to provide consistency in administration, the amendment to 46 CFR 10.02–9(e)(2) adds a sentence which will specifically permit an applicant after a second failure in an examination on the "Rules of the Road" to be reexamined after a lapse of one month from the date of the last failure. This action is also consistent with the practice that an applicant who does not have sea service is now required to wait only a minimum of 30 days between examinations.

The regulations regarding liquefied inflammable gases and ethylene oxide were published in the Federal Register of October 8, 1963 (28 F.R. 10772–10782), as Coast Guard document CGFR 63–45, and Federal Register document 63–10614. In 46 CFR 38.10–15 (28 F.R. 10777), regarding safety relief valves for liquefied inflammable gases, the description of the value "F" for formulas 1 and 2 contains an exception regarding "fireproofing credit" and the word "of" should be "or" so that the phrase will read "* * * fireproofing material of recommended thickness, or a metal screen wall * * *." In 46 CFR 38.10–20(c)(1) (28 F.R. 10777) regarding the marking of the maximum capacity of the tank equipped with liquid level gaging devices, two important commas were omitted and the text is revised to "* * * Marked on the tank, system nameplate, or gaging device; * * *." In the fifth sentence in 46 CFR 40.05–40(a) (28 F.R. 10780), regarding valves, fittings and accessories for ethylene oxide, a list of materials which should not be used are set forth but the word "not" was omitted. Therefore, this sentence is corrected by inserting after the word "shall" the word "not" so that it will read "* * * Mercury, silver, aluminum, magnesium, copper and their alloys shall not be used for any valves, gages, thermometers, etc. * * *"

It is hereby found that compliance with the Administrative Procedure Act (respecting notice of proposed rulemaking, public rulemaking procedures thereon and effective date requirements) is unnecessary and therefore exempted by specific provision in section 4 of such Act (5 U.S.C. 1003).

(Federal Register of December 13, 1963)

Title 33—NAVIGATION AND NAVIGABLE WATERS

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER D—NAVIGATION REQUIREMENTS FOR CERTAIN INLAND WATERS

[CGFR 63–82]

PART 82—BOUNDARY LINES OF INLAND WATERS

Delaware Bay and Tributaries

The purpose of the amendment to 33 CFR 82.25 in this document is to bring the description of the boundary into agreement with present aids to navigation. The Delaware Bay Ap-

[1] Title as amended by this document.

proach Lighted Whistle Buoy "D" was discontinued. This change relocates the boundary line through the South Shoal Lighted Bell Buoy 4 (Atlantic Coast Light List No. 1773), which marks the southwestern extremity of Overfalls Shoal. This change will utilize a point of land and a buoy which are readily identifiable by persons on large vessels using the main channel to and from Delaware Bay.

ATLANTIC COAST

§ 82.25 Delaware Bay and Tributaries.

A line drawn from Cape May East Jetty Light to Cape May Harbor Inlet Lighted Bell Buoy 2CM; thence to South Shoal Lighted Bell Buoy 4; thence to the northernmost extremity of Cape Henlopen.

(Federal Register of December 13, 1963)

Title 46—SHIPPING

Chapter I—Coast Guard, Department of the Treasury

SUBCHAPTER M—BULK GRAIN CARGOES

[CGFR 63-84]

PART 144—LOADING AND STOWAGE OF GRAIN CARGOES

Subpart 144.10—General Requirements

Subpart 144.30—Vessels Shifting Ports

MISCELLANEOUS AMENDMENTS

The handling, stowage and transportation of loose grain in bulk quantities on board cargo vessels of 500 gross tons or over and passenger vessels when on international voyages are subject to specific provisions in Chapter VI of the 1948 Safety of Life at Sea Convention. By Executive Order 10402 (17 F.R. 9917), the Department of the Treasury (Coast Guard) is directed, in relation to the fulfillment of the obligations undertaken by the Government of the United States of America, to perform those functions and duties prescribed in this Convention which coincide with Coast Guard functions and duties already directed or authorized by law.

The administration of statutory functions with respect to inspection and certification of merchant vessels is assigned to the United States Coast Guard. Section 391 of Title 46, U.S. Code, provides in part the Coast Guard shall determine that every steam vessel "submitted to inspection is of a structure suitable for the service in which she is to be employed." This responsibility is extended to other categories of vessels by provisions in sections 367 and 404 of Title 46, U.S. Code, and by section 198 of Title 50, U.S. Code.

To implement the 1948 Safety of Life at Sea Convention, the regulations in 46 CFR Part 144 describe requirements applicable to the loading, stowage and transportation of bulk grain cargoes on board both United States cargo vessels of 500 gross tons or over and passenger vessels and to similar foreign vessels when belonging to countries signatory to or adhering to the 1948 Convention when under United States jurisdiction. The amendment to 46 CFR 144.10-10 extends the application of the bulk grain cargo regulations to cargo vessels of 500 gross tons or over and passenger vessels on coastwise voyages and to such vessels loading at the Great Lakes ports for coastwise (domestic) voyages or international voyages other than Great Lakes voyages. Vessels when on voyages to or from United States Great Lakes ports which do not cross a line in the Bay of St. Lawrence drawn from Cap de Rosiers to West Point, Anticosti Island, and on the north side of Anticosti Island following the 63d meridian are considered to be on Great Lakes voyages. The amendment to 46 CFR 144.30-1(c) extends the application of requirements governing the shifting of vessels with part cargoes of loose grain in bulk to include such vessels loading on the Great Lakes, but shifting while partially loaded to other Great Lakes ports and/or St. Lawrence River ports, for voyages through the Bay of St. Lawrence which cross a straight line drawn from Cap de Rosiers to West Point, Anticosti Island, and on the north side of Anticosti Island following the 63d meridian. These regulations will now apply to all United States flag cargo vessels of 500 gross tons or over and passenger vessels, and to similar foreign vessels subject to the 1948 Convention or to other vessel inspection or certification laws. Such vessels also must either engage in or intend to engage in ocean or coastwise voyages, including voyages starting or stopping at Great Lakes ports which are other than Great Lakes voyages. This extension in application is necessary to provide a standard of safety for such vessels engaged in coastwise voyages or when loading at the Great Lakes ports for ocean or coastwise voyages. These minimum safety standards are presently required for other vessels carrying grain cargoes but starting from other than Great Lakes ports. The scope of application is consistent with the enforcement procedures now being followed to insure a uniform standard of safety.

(Federal Register of December 24, 1963)

EQUIPMENT APPROVED BY THE COMMANDANT

[EDITOR'S NOTE.—Due to space limitations, it is not possible to publish the documents regarding approvals and terminations of approvals of equipment published in the Federal Register dated December 3, 1963 (CGFR 63-78). Copies of these documents may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402.]

ARTICLES OF SHIPS' STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from December 1 to December 31, 1963, 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

Radiator Specialty Co., General Office and Factory, 1400 West Independence Blvd., Charlotte 8, N.C., Certificate No. 587, dated December 13, 1963, SOLDER SEAL RUST-RAIDER.

AFFIDAVITS

The following affidavits were accepted during the period from November 15, 1963, to December 16, 1963:

Newport News Shipbuilding & Drydock Co.,[1] Newport News, Va., FLANGES, CASTINGS, FORGINGS & BOLTING.

Trent Tube Co., East Troy, Wis. PIPING & TUBING.[2]

Swepco Tube Corp., One Clifton Blvd., Clifton, N.J., PIPE & TUBING.[2]

Resistoflex Corp., Woodland Rd., Roseland, N.J., FITTINGS.[3]

Alloy Tube & Pipe Corp., 1015 Frio St., Houston 11, Tex., PIPE & TUBING.[4]

La Favorite Rubber Mfg. Co., 275 Wagaraw Rd., Hawthorne, N.J., FITTINGS.[5]

Babcock & Wilcox Co., P.O. Box 230, Beaver Falls, Pa., FITTINGS & FLANGES.

---

[1] Delete in the Formerly Approved Affidavit Section of CG-190.

[2] Stainless-steel fusion welded, conforming to ASTM Specification A-312-62T for use in Class II piping systems only.

[3] Acceptance applies only to Teflon flexible couplings, models 6904, 6905, and 6906 limited to Class II piping systems with pressure/temperature maxima established in manufacturer's specification RES-90.

[4] Stainless-steel fusion welded, conforming to ASTM Specification A-312-62T and A-358-62T for use in Class II piping systems only.

[5] Acceptance applies only to rubber expansion joints limited to Class II piping systems with maximum temperature of 180° F and maximum pressure as prescribed by manufacturer's bulletin No. 982.

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications that are directly applicable to the Merchant Marine are available and may be obtained upon request from the nearest Marine Inspection Office of the United States Coast Guard. The date of each publication is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–58).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (3–1–63), F.R. 8–20–63, 10–26–63.
123	Rules and Regulations for Tank Vessels (1–2–62). F.R. 5–2–62, 9–11–62, 2–6–63, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–8–63, 10–26–63, 12–13–63.
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.
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.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (7–2–51).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (9–1–60).
176	Load Line Regulation (7–1–63).
182	Specimen Examinations for Merchant Marine Engineer Licenses (12–1–59).
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.
190	Equipment Lists (4–2–62). F.R. 5–17–62, 5–25–62, 7–24–62, 8–4–62, 8–11–62, 9–11–62, 10–4–62, 10–30–62, 11–22–62, 11–24–62, 12–29–62, 1–4–63, 1–8–63, 2–7–63, 2–27–63, 3–20–63, 4–24–63, 6–11–63, 6–15–63, 6–22–63, 6–28–63, 8–10–63, 10–16–63, 11–23–63, 12–3–63.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (7–1–63). F.R. 9–18–63, 12–13–63.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (7–1–58). F.R. 3–30–60, 5–6–60, 12–8–60, 7–4–61, 5–2–62, 10–5–62, 9–13–63.
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 (8–1–61). F.R. 11–3–61, 12–12–61, 8–8–62, 8–31–62, 11–15–62, 1–30–63, 3–27–63, 5–29–63, 6–4–63, 10–9–63.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (1–2–62). F.R. 5–2–62, 9–11–62, 12–28–62, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–26–63.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (11–1–62). F.R. 2–1–63, 2–6–63, 3–13–63, 4–4–63, 5–30–63, 8–20–63, 9–6–63, 10–2–63, 10–26–63.
258	Rules and Regulations for Uninspected Vessels (9–1–61). F.R. 1–20–62, 4–24–62, 5–2–62, 9–11–62, 5–14–63, 9–6–63.
259	Electrical Engineering Regulations (12–1–60). F.R. 9–23–61, 9–30–61, 5–2–62, 9–11–62, 8–20–63, 9–6–63.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–62). F.R. 9–11–62, 12–24–63.
268	Rules and Regulations for Manning of Vessels (2–1–63).
269	Rules and Regulations for Nautical Schools (5–1–63). F.R. 10–2–63.
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 (6–1–62).
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.
323	Rules and Regulations for Small Passenger Vessels (Not More Than 65 Feet in Length) (6–1–61). F.R. 9–11–62, 10–5–62, 12–28–62, 1–22–63, 9–6–63.
329	Fire Fighting Manual for Tank Vessels (4–1–58).

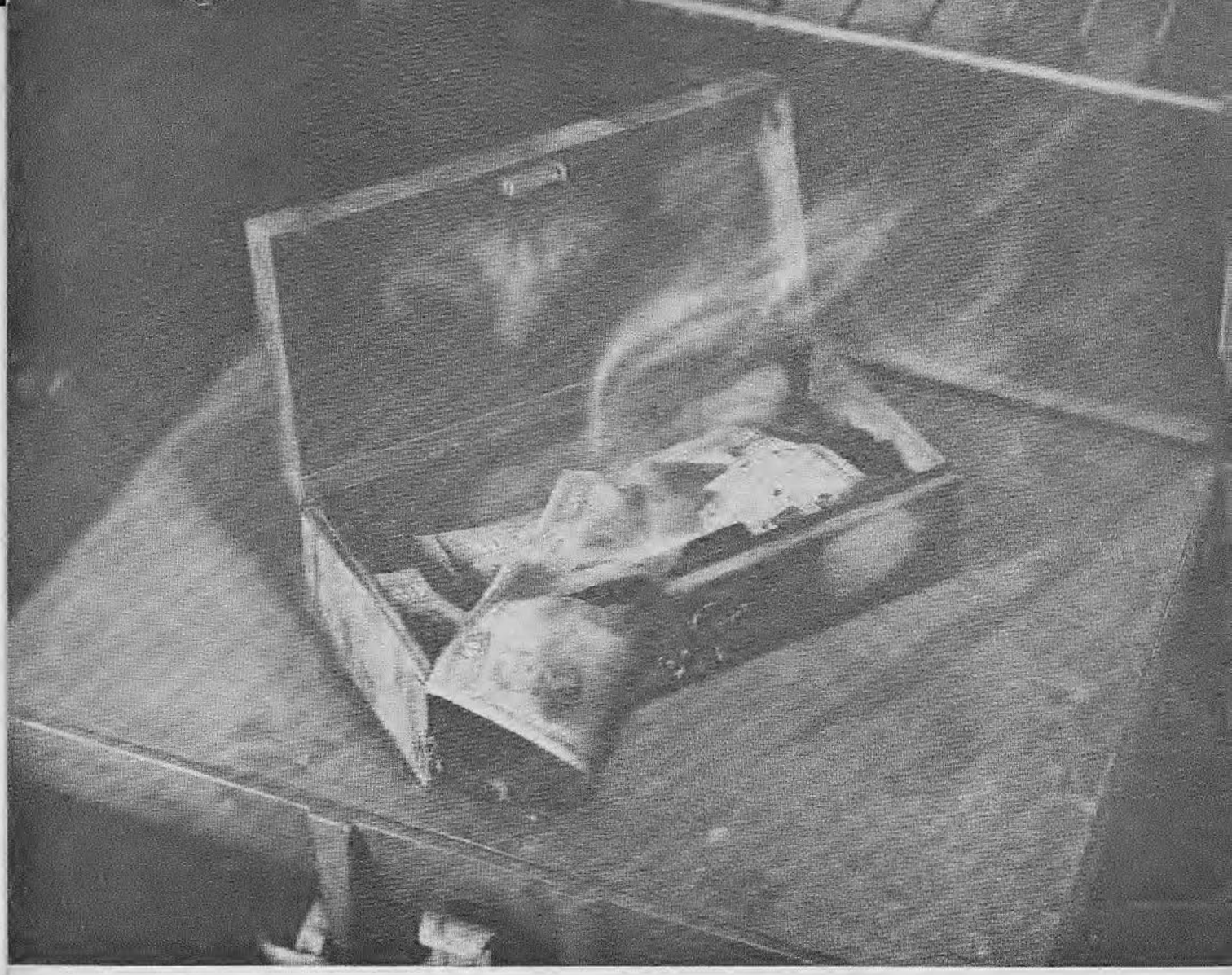
Official changes in rules and regulations are published in the Federal Register, which is printed daily except Sunday, Monday, and days following holidays. The Federal Register is a sales publication and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. It is furnished by mail to subscribers for $1.50 per month or $15 per year, payable in advance. Individual copies desired may be purchased as long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue and 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, 1964, are now available from the Superintendent of Documents, price: $2.50.

CHANGES PUBLISHED DURING DECEMBER 1963

The following have been modified by Federal Registers:

CG–190, Federal Register, December 3, 1963.
CG–123, CG–169, and CG–191, Federal Register, December 13, 1963.
CG–266, Federal Register, December 24, 1963.

U.S. GOVERNMENT PRINTING OFFICE:1964



Why Mrs. White never lights the oven any more -without looking inside first

Irene White of Oakland, Maine, still tells this one on her husband, Clayton.

It seems that on moving day Clayton thought it would be a good idea to put his Savings Bonds and other valuable papers in a safe place. He picked the oven.

Like most safe places, it was completely forgotten. Until next morning when they lit the stove—and Clayton smelled something burning.

The story has a happy ending, though. Clayton sent the charred remains of the Savings Bonds to the Treasury Department and received new ones in exchange.

The Treasury keeps a microfilm record of every U.S. Savings Bond sold. So a Bond can never be *really* destroyed, no matter what happens.

This important fact is just one of the reasons why millions of American families own Savings Bonds. As they provide for their personal security they add to the security of their country, too. For the strength of Americans is the strength of America.

Why not put part of your savings in U.S. Savings Bonds. Do it regularly, at your bank, or on the Payroll Savings Plan where you work, and see if you don't feel pretty good about it.

Quick facts about U.S. Savings Bonds

- You get $4 for every $3 at maturity
- You can get your money anytime
- Your Bonds are replaced free if lost, destroyed or stolen
- You can save automatically on Payroll Savings

Help yourself while you help your country – BUY U.S. SAVINGS BONDS