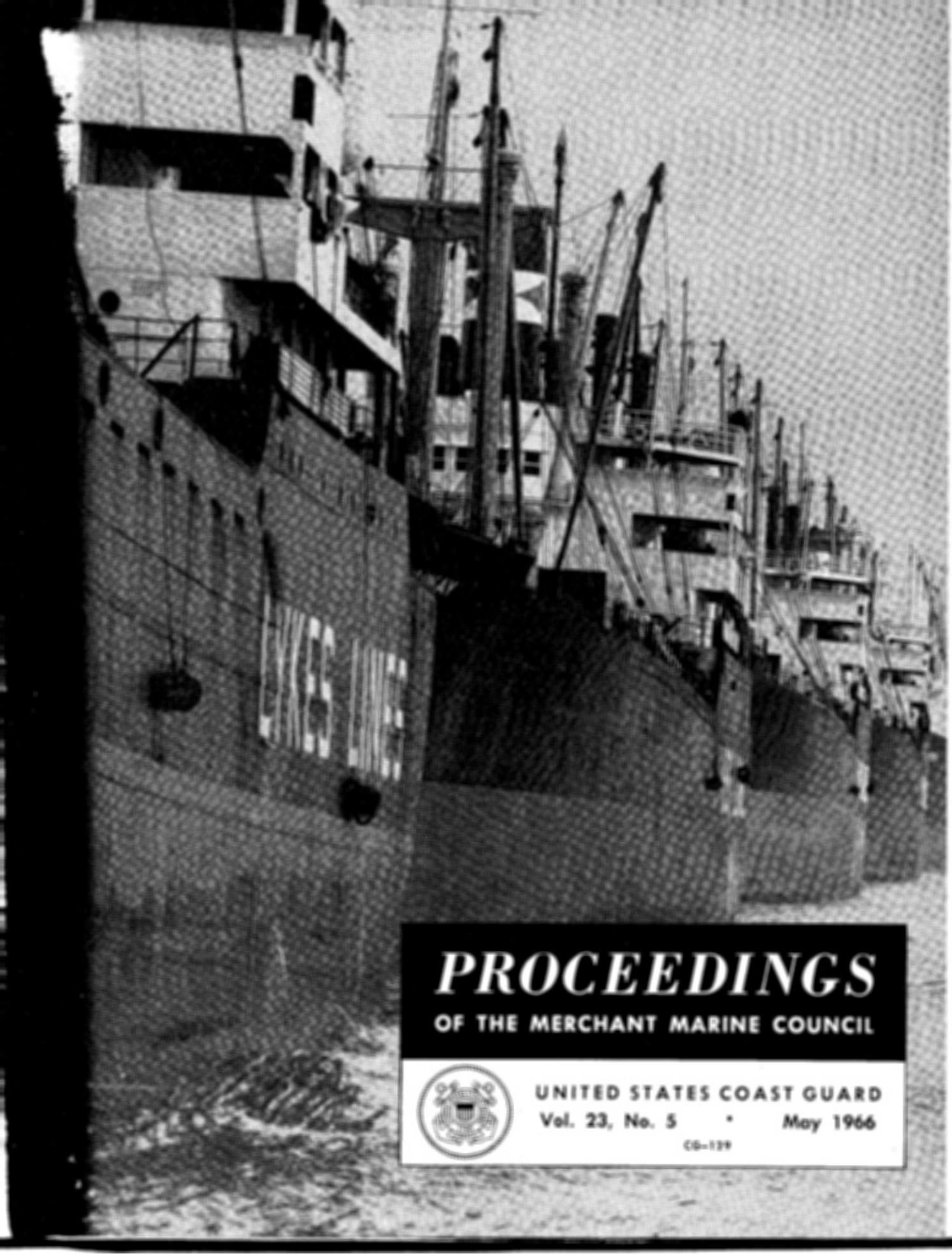

PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

UNITED STATES COAST GUARD

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IN THIS ISSUE . . .

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

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COVERS

FRONT: Lykes Bros. vessels in line at New Orleans. *Courtesy Lykes.*

BACK: The *Yarmouth Castle* Burns. Photo taken by a crewmember of the M/V *Finnpulp*.

DIST. (SDL NO. 82)
A: a b c d e w(2); f g h i j k l m n o p q r s t u v(1)
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PROCEEDINGS

OF THE

MERCHANT MARINE COUNCIL

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Lieutenant A. J. Arnett, USCG, *Editor*
T. A. DeNardo, *Assistant Editor*

Public Hearing

THE COMMANDANT, U.S. Coast Guard has announced the general acceptance of the recommendations of the Merchant Marine Council, regarding proposals revising the Navigation and Vessel Inspection Regulations. The Merchant Marine Council held its Annual Session on 21–24 March 1966.

The proposals to revise the Navigation and Vessel Inspection Regulations were set forth in two volumes of the Merchant Marine Council Public Hearing Agenda, CG–249.

Indicative of the interest in the proposals was the attendance of 62 persons representing all facets of recreational boating, labor unions, and shipping interests. Over 940 written comments were received on various proposals under consideration.

The proposals considered concerned: (1) Recreational boating; (2) Small passenger-carrying vessels; (3) Dangerous cargoes; (4) Bulk dangerous cargoes; (5) Electrical engineering; (6) Manned platforms; (7) Inspected vessels; (8) Manning of uninspected vessels; (9) Rules of the Road; (10) Tank vessels; (11) Merchant marine officers and merchant seamen; and (12) User charges for certain services. The Merchant Marine Council in Executive Session considered the oral and written comments received at the Public Hearing on 21 March and the additional 940 written comments submitted, containing over a thousand suggestions for changes in the proposals. The proposals as recommended by the Merchant Marine Council were submitted to the Commandant, U.S. Coast Guard, for approval and publication in the Federal Register as soon as possible.

The Merchant Marine Council recommended the following proposals be approved as set forth in the Agenda and published in the Federal Register:

Item No.	*Subject*
Ib.	Boating accidents, reports and statistical information.
IIIb.	List of explosives and other dangerous articles and combustible liquids.
IIIh.	Detailed regulations governing corrosive liquids.
IIIi.	Detailed regulations governing compressed gases.
IIIj.	Detailed regulations governing poisonous articles.
IIIk.	Detailed regulations governing combustible liquids.
Vb.	Reference specifications and publications.
Vd.	Switchboard installations.
Ve.	Motor controllers.
Vf.	Feeder size and overcurrent protection for transformers.
Vg.	Fuse ratings.
Vh.	Lighting fixture.
Vi.	Liquefied flammable gas.
Vj.	Explosion proof equipment installed on weather deck.
Vk.	General alarm systems.
VIIa.	Subdivision of certain non-mechanically propelled vessels.
VIIb.	Drydock examinations for public nautical schoolships.
VIIc.	Deep-sea sounding apparatus for vessels in Great Lakes service.
VIIf.	Life preservers, unicellular plastic foam, adult and child.
VIIg.	Attachment of self-igniting waterlights.
IXa.	Marina Del Rey, Calif., line of demarcation between Inland Waters and International Waters.

(Continued on page 110)

RECENT STUDIES OF BULK GRAIN IN SHIPS

Comdr. R. I. Price, USCG

GRAIN IS SURELY the most basic of commodities. It must have been a cargo very early in marine trade. (Grain vessels are mentioned in the commentaries of Julius Caesar.) Today grain shipments are at the heart of our aid programs as modern communication and transport make possible the timely transfer of the bounty of one continent and culture to offset the insufficiencies of another.

Grain can be shipped in bags, but it is far easier, faster and cheaper to load and unload it in bulk. Bulk or loose grain has long been recognized as a problem cargo aboard ship, requiring special precautions to prevent it from shifting. In recent years, several dramatic disasters or near disasters have befallen grain vessels at sea. Of these, the U.S. cargo vessel *"Smith Voyager"* (fig. 1.) and the British cargo ship *"Ambassador"* (fig. 2.) perhaps received most publicity. Others which have made headlines are the German ship *"Maria Elizabeth,"* and the Spanish *"Castillo Montjuich"* and *"Monte Palomares,"* as well as the U.S. vessel *"Elaine"*—all dry cargo vessels carrying grain in bulk. It is likely that there were others.

The Safety of Life at Sea Convention of 1948 took note of the hazard of grain as a bulk cargo and set down certain requirements for stowage to prevent shifting. These requirements specify essentially that holds be trimmed full and then that provision be made to compensate for assumed settling of the grain by a "feeder" having a volume which is a certain percentage of the hold volume. A feeder is usually accomplished in an ordinary dry cargo ship by constructing a temporary trunked structure extending from the hold through the tween deck to the hatch coaming above (although sometimes the hatch coaming becomes the feeder). In certain locations, longitudinal partitions must be installed to limit shifting. These feeders and partitions are commonly made of wood and are often disposed of at the end of the voyage, few vessels being continuously engaged in the carriage of grain.

How the column of grain in a "feeder" came to be agreed upon as the shipboard cure for possible shifting of grain in an ordinary cargo ship must now be a matter of speculation. It seems the logical result of observing that a small quantity of grain subjected to vibration will decrease in volume owing to the rearrangement of the particles. (As a practical matter, this must be less significant as the depth of the grain becomes greater because the pressure should prevent rearrangement and the mass becomes too great to be affected by the same frequency of vibration.) In dealing with the problem it was evidently realized that it was important to prevent a "slack" grain hold where a full hold was envisioned. The feeder was therefore intended to be sort of a depletion trunk. The impression that a "sinkage" or "settling" takes place follows from observing on occasion a lowering of the level of the grain in the feeder. From this, one would infer grain feeding into the hold to fill the empty space created as the grain "sinks". However, it must be appreciated that grain does *not* behave as a liquid. It does not flow around corners. If poured from a spout onto a surface, it will form a cone the sides of which lie at a so-called "angle of repose". When grain is initially trimmed flat, the surface must be inclined beyond the angle of repose before the grain will shift. In 1960 at the SOLAS Conference, certain changes were made to the 1948 convention grain rules to permit the omission of the centerline shifting boards in and under the feeders when a dry cargo vessel carrying grain will have, after a free surface allowance for the feeder grain, more than 12 inches (two-deck vessel) or 14 inches (more than two decks) of GM at all times throughout the voyage. In 1962, in the Inter-governmental Maritime Consultative Organization the United States questioned whether it was rational that stability should be independent of the vessel size and other characteristics of the hull such as fineness. The U.S. Coast Guard Grain Regulations presently exceed the SOLAS minima for GM, and relate the required value to the beam of the vessel.

To demonstrate the reasons for the difference, the U.S. representative to the IMCO Working Group on Intact Stability presented a dimensional analysis, based on the SOLAS Convention assumptions of the amount of settling in grain, to show the significance of vessel proportions. While the members of the IMCO Working Group generally agreed with procedure used in the analysis, some representatives pointed to instances of voyages in which no settling had been observed and expressed the belief that the settling assumed in the convention might be excessive.

From the ensuing discussions, it was evident that the basis of the settling allowance was not known, nor was it known to what extent the interference of the vessel's structure might cause residual void spaces in filling a hold with grain. Suppose feeding did not occur, wouldn't it be possible that settling was taking place in equal amount all over the hold? If so, the percent settling by volume could be far greater than assumed. It was agreed at IMCO that it was necessary to have more positive information on settling and voids to be able to determine the validity of the stability minima for grain ships.

An IMCO questionnaire was consequently developed by which the various maritime nations agreed that their grain-laden ships would observe and report the level of grain in the feeders at the start and at the completion of the voyage.

At the same time, the United States and Canada agreed to undertake an investigation of voids which might exist in ordinary cargo ships loaded with grain. Initial efforts in both countries to measure carefully the hold volume and weight of the grain stowed were inconclusive, but did serve to demonstrate the lack of consistency

Figure 1. *Smith Voyager*

tween the calculated and the actual ain stowage.

It became apparent that the only e way to determine the presence voids under the tween decks was direct measurement. By experi- nt conducted by the Coast Guard's erchant Marine Technical Division, was found that the grain surface ld be located accurately using an dinary carpenter's rule, inserted rough a small hole in the deck above e grain surface. The States Marine nes graciously offered their *"Blue ass State"* for a first full-scale test, d with the support of the U.S. LAS Subcommittee, the National rgo Bureau, the American Bureau Shipping, and the owners of three re grain vessels, a program was veloped. Small holes were drilled the tween decks of one hold in each the vessels. Measurements of the tance from the tween deck to the ain surface were taken by the ships' cers at the completion of loading, ice during the voyage, and again at e completion of the voyage. A typi- l pattern for the holes in the tween ck appears in figure 3.

Data were obtained for five voyages d the results clearly establish that:

(1) Clear of the feeders, voids do exist despite careful trimming. The average depth of void space is about 18 inches.

(2) The depth of void is independent of the hold proportions in the conventional dry cargo ship. (It would possibly be less in a ship with very large hatches and may also be influenced by the depth of structural members.)

(3) There is relatively little settling of the grain surface after filling and such settling as occurs generally takes place early in the voyage.

(4) There is relatively little filling of the voids from the feeders.

(5) Voids remain after loading regardless of whether trimming is by hand or machine.

From the IMCO questionnaire, information was obtained for the sailings of 300 ships carrying grain. The data were analyzed for the IMCO Working Group on Intact Stability by the U.S. representative who offered the following results:

(1) The factor which has the greatest influence on the change in level of the grain surface in the feeder is the weather encountered during the voyage. In nearly every case in which the grain surface fell 1.0 meter or more, there was a definite indication of a rough voyage.

(2) The length of voyage was seen to have little bearing on the change in ullage, except for the greater probability of encountering bad weather during a long voyage.

(3) The forward holds tend to have greater settling.

(4) There is no evident relationship between the observed grain settling and the geometry of the hold or the feeder.

(5) The kind of grain carried does not seem to have any clear-cut bearing on the settling.

(6) The port or country in which loading took place is not a factor.

(7) Settling is slightly greater on the average in dry cargo vessels than in bulk carriers or tankers.

(8) The absolute values of observed settling in feeders were between zero and 2.0 m. The average values were about the same measured in feeders and measured in holds when no feeder was fitted. However, the *volume percentage* of settling would, of course, be very large if the observed value were applied to the surface of the hold rather than to only

the surface of the feeder and the product related to the total volume of the hold.

Combining the results of these two studies, some important conclusions have been obtained regarding grain, altering some previous assumptions. As reported to the IMCO Maritime Safety Committee by the Subcommittee on Subdivision and Stability Problems:

"(a) In the case of ordinary cargo ships loaded with grain, substantial voids evidently remain under the surface of the weather deck and under the surfaces of the 'tween-decks despite trimming efforts; i.e., the wording of regulations 3 and 4 of chapter VI of the 1960 Safety Convention referring to the trimming of grain so as to fill all the spaces between the beams in the wings and ends describes a desirable condition but one that is not being achieved in practice.

(b) These voids evidently result primarily from the impracticability of initially filling the spaces concerned up to the deckhead and only secondarily from subsequent settling of the grain. The size of the voids being largely independent of the volume of grain in the hold, the Convention assumptions regarding settling as percentages do not properly relate to the actual physical conditions.

(c) The feeders do not feed grain into the voids unless the rolling of the vessel results in the angle of grain surface exceeding its angle of repose. Hence, the feeders normally provide very little feeding action and their value as such might be questioned. However, under extreme conditions of roll, particularly in association with an initial list, grain may flow from the feeders and into the voids on only one side of the ship."

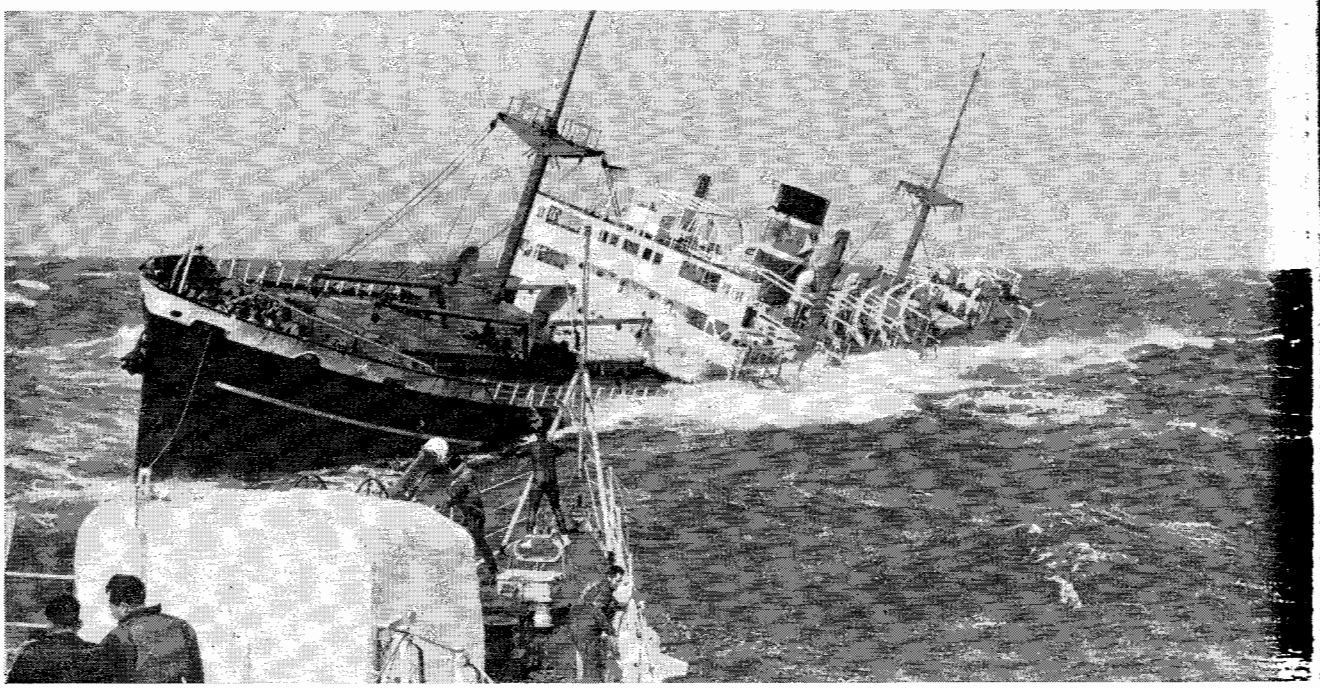

Figure 2. *Ambassador*

Using this newly derived information, a U.S. study developed by the Coast Guard's technical staff was submitted to IMCO on the heeling moments due to possible grain shift in a Victory ship. The vessel was assumed to be loaded with wheat at 47 cu. ft/ton with an 18-inch average void under the tween decks clear of the feeders. Assumed loading followed the approved loading plan and was in agreement with actual practice and with the provisions of chapter VI of SOLAS 1960. The angle of repose was taken at 30°. The vessel was assumed to list to various angles.

The results of the study are shown in figure 4.

Curve "A" is the righting arm curve for arrival GM corresponding to the assumed loading.

Curve "B" is the minimum righting arm curve to comply with a minimum GM of 14 inches, with correction for free surface in the feeders, as required by chapter VI, SOLAS, 1960.

Curve "C" is the curve of *heeling* arms due to grain shifting into the voids.

As curve "C" shows, there is relatively little heeling arm developed until the vessel lists to angles near 30°. Actually, this curve could be shown to begin at some lower angle, because the angle of repose of the most commonly shipped grains is below 30°. Additionally, there can be a virtual reduction in the angle of repose due to the dynamics of rolling, depending on the period of roll and the location and distance of the grain surface from the roll center.

If the vessel rolls far enough to one side shifting may occur, and curve "C" shows the amount of heeling arm (loss of righting arm) which may be incurred at an angle of heel within the range of possible shifting. If subsequent rolling to the same side attains greater angles, the heeling arm will increase along curve "C" as more

grain shifts. By about 45°, the maximum heeling arm is obtained because the voids on one side have filled owing to shift of feeder grain plus the shift of grain on the other side in toward the feeder.

Curve "D" indicates the maximum heeling arm due to complete filling of the voids. Its intersection with curve "A" and with curve "B" defines the angle of equilibrium attained under each of those conditions of initial stability. Equilibrium is at 9½° with curve "A" and at 12½° with curve "B."

The nature and effect of grain shift is influenced by whether the ship is stiff or tender. If a ship is stiff, the list to either side resulting from grain movement is limited not only by the stiffness per se but also by the fact that the shorter rolling period reduces the time available for a grain shift to develop. Thus, the increment of list due to any one shift probably tends to be small enough to have little effect on the symmetry of roll, with the result that some feeding to wings on both sides of the ship occurs. Under these conditions there may be little risk of a large uncontrollable list developing.

If a ship is tender it will generally roll less severely than the stiffer ship. As long as the rolling is symmetrical and not too severe very little grain movement may occur and it may therefore seem quite safe. However, under unfavorable conditions such as may occur with an initial list or an extended yaw heel occurring during quartering sea conditions, or when running with a strong wind and sea abeam, enough grain may shift to one side to substantially change the upright position about which the vessel rolls. This reduces the tendency for a corrective shift when the vessel rolls to the other side and increases the likelihood that further unfavorable shifts may occur on subsequent rolls. Thus, a dangerous list may quickly develop, as once a small list is acquired, the vessel tends to roll to the listed side to still higher angles generating greater heeling moment until the voids are filled.

At these higher angles, there is increased pressure on feeder sides and shifting boards. If any of these fail, the freed grain will spill to the low side producing further heeling moment leading to possible disabling of the machinery plant, and down flooding through the weather deck openings which will become awash or, if the vessel's righting arm curve does not provide sufficient positive arm to withstand the heeling arm due to the shift of grain, the vessel may capsize when a feeder or shifting board carries away. Curve "E" in figure 4 shows the effect of additional loss of righting arm due to failure of one feeder besides filling the voids. If the vessel in the study had only the minimum GM needed to satisfy the requirements of the 1960 Convention, it might then capsize.

Of course, a destructive train of events could also be set in motion by failure of an inadequately constructed feeder. The question of the strength of feeders and shifting boards is another indication that the behavior of grain was not well known in 1960. Recommendation 54 of the 1960 SOLAS Convention urged that some effort be made to evaluate the required strength of grain fittings. This task fell to the IMCO Working Group on Bulk Cargoes.

A major contribution to this effort was provided by the United Kingdom representative. Data obtained by the U.K. using a large model container with pressure pickups jibed very closely with that predicted by theoretical studies. One important finding was that the pressure on the sides of a feeder is a function not only of the head of grain but also of the width of the feeder.

From some simple experiments conducted independently by the Coast Guard to determine whether there was a scale effect to be considered, it appeared that the British data were valid and provided a substantial advance in knowledge about grain. However, at IMCO, some delegations, who reported having experienced no difficulties with their grain ships, noted that applying the British results would necessitate an increase in

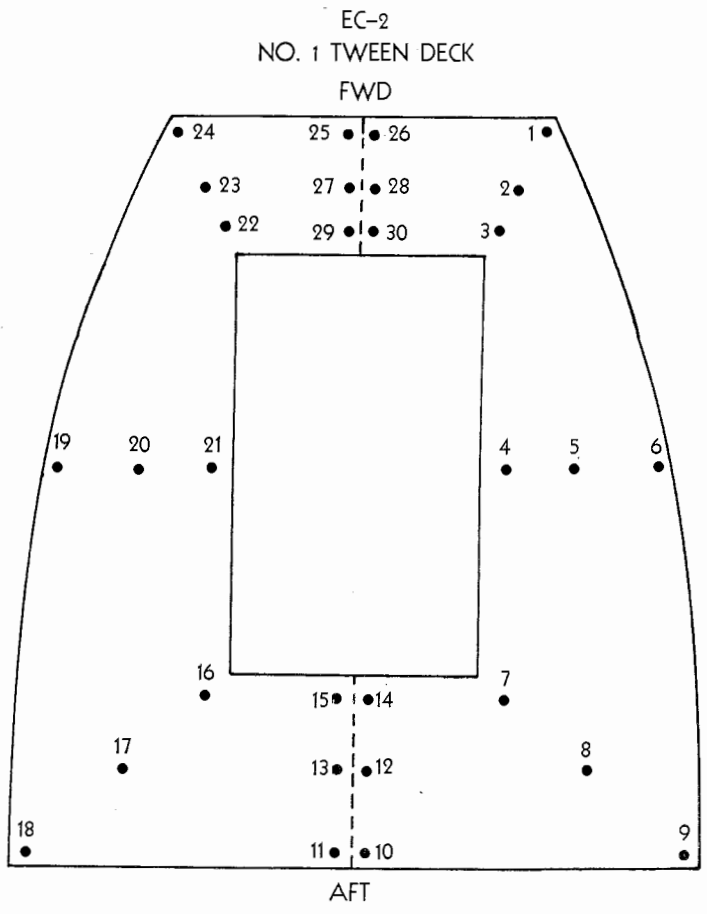

Figure 3. Pattern of measuring holes

the structural requirements for grain fittings, and questioned whether the test conditions were actually representative of those aboard ship.

As things now stand:

(a) The IMCO Subcommittee agreed that the SOLAS grain regulations on trimming represent a desirable condition not attained in practice. Consequently, substantial voids may be expected under flat surfaces clear of the hatchways. Also, it appears that the feeders do not perform as anticipated and, in fact, tend to aggravate the condition after a list is acquired by feeding grain to the low side.

load was increased on the longitudinal feeder bulkheads.

(e) The tween deck feeding holes now provided in "common-loaded" ships are considered ineffective for filling the voids.

(f) The IMCO Working Group on Intact Stability is evaluating a more rational approach to stability in grain ships than the present stability minima of 12 inches or 14 inches of GM.

(g) Further experimentation is in prospect regarding the strength of grain fittings. It is planned to fit strain gages on the feeder uprights of a grain-laden vessel, substituting

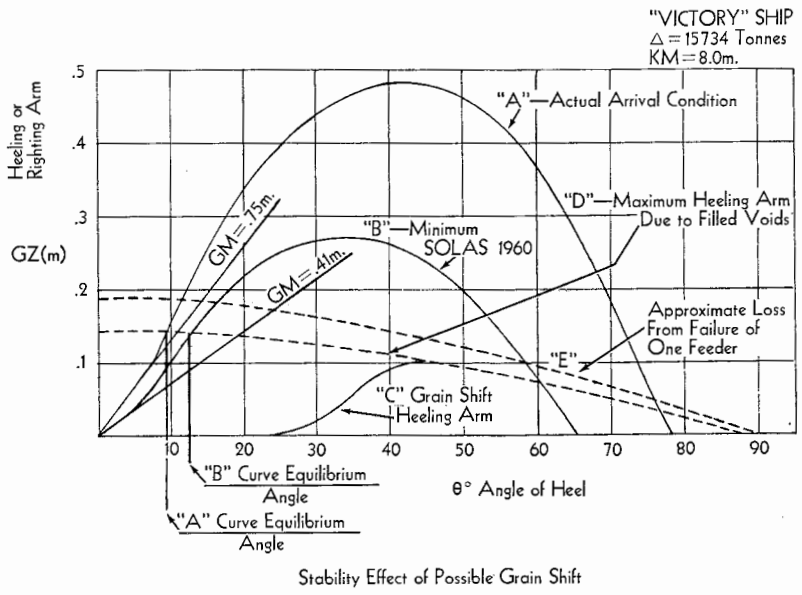

Figure 4. Righting arm loss due to grain shift

(b) It was recognized that the voids make it possible to develop substantial heeling moments and that the risk of failure of feeders and shifting boards is definitely increased by the listing which is a consequence of such moments.

(c) It therefore appeared that a return to the use of centerline partitions in feeders would reduce the possible heeling moment—not only by the decrease in free surface—but also in the transfer distance into voids in case of shifting.

(d) Additionally, it appears that since omitting the centerline shifting boards from the feeder in effect doubled the width of the feeder, the

aluminum members for the usual wooden members. The data would be timed to permit reference to the ship's log for the sea conditions and ship's behavior.

(h) Because the fittings are temporary, there is a great temptation to use inferior quality lumber. If the present construction is to be reliable, the lumber used in grain fittings must be quality material. The National Cargo Bureau is working with the Coast Guard on the idea of simple sketches to illustrate proper construction for the guidance of inspectors, surveyors, ship's officers, and carpenters.

(i) Most important, there is the realization that the premises of the SOLAS grain regulations are incorrect. Holds are not initially trimmed full, and the anticipated change in ullage is not a predictable percentage of the hold volume. Although as one IMCO delegate observed, the voids have always been there, at least the text of an international document should be altered to coincide with the facts as we now know them.

It is time for new approaches to the problem of grain shifting. Modern engineering must surely be able to come up with something better than the feeder. However, there are some practical considerations involved, foremost of which is the speed of loading which presently enhances the economics of bulk grain shipment. Any new practice should not lengthen the loading time. Some suggestions which may be capable of further development are:

(a) Install temporary surfaces sloping from or near the underside of hatches (the central portion) toward the wings. This would convert the hold to resemble the section of a specially suitable bulk carrier, and put the voids in a controlled place above the grain surface.

(b) Install a number of shallow vertical longitudinal shifting boards, which the trimmer can set up as he works in from the wings.

(c) Insert rubberized inflatable stowage bags in the wings under the tween decks and inflate them, or perhaps fill them with grain.

(d) Make a more permanent but removable arrangement of shifting boards which can be stowed clear when not in use. Aluminum corrugated bulkheads which are light and easily handled might be considered. Such arrangements are presently in use in some German grain ships.

(e) Make a great many more openings in the tween deck wings to aid in reducing the voids. This may require so many portable plates in the tween deck as to be impractical.

(f) Devise a portable air eductor for better trimming. Better investigate static charge and dust explosion possibility although this is the method generally used now in *un*loading. Or, to improve trimming the sides and ends install under the decks clear of the hatches horizontal rotatable rods having little scoops on radial arms. (This is a slight refinement of a facetious suggestion to put little animals in the voids to kick the grain around—a kind of animalometer?)

(g) The feeders do serve a function where the ship needs additional grain stowage volume in order to load to the loadline. Where such additional volume is required, a more de-

pendable way would be to make temporary bins on the tween deck using the transverse temporary restraining bulkheads. A transverse bulkhead would be under far less load than the longitudinal bulkheads of a feeder. The bins would be built as they are now so as to include a portion of the hatchway for filling.

Discovery of the behavior of grain should bring significant changes in the stowage practice. The feeder will

Comdr. Price is a 1945 U.S. Coast Guard Academy graduate. He has served in both deck and engineer billets afloat; his last such duty as Commanding Officer of the CGC Nemesis. *He is a 1953 naval engineer graduate of MIT, a former ship repair superintendent at the Coast Guard Yard, and former Chief of the Hull Branch, Merchant Marine Technical Division. Comdr. Price is presently Assistant Chief, Merchant Marine Technical Division. He is also the U.S. representative to the IMCO Working Group on Intact Stability.*

probably be with us for a while longer, until it has been possible to explore the feasibility of some of the new ideas. In the interim, the U.S. Coast Guard Grain Regulations have been altered to restore the centerline shifting boards in and under the feeders.

In these days of exotic new cargoes, it is astonishing that so old and elemental a marine cargo as grain can be so deadly. ⚓

nautical queries

DECK

Q. A vessel whose date is 6 June, while in East Longitude, crosses the International Dateline on an east bound course at 1400 Zone Time.

(a) What change does she make in her local date?

(b) What is the date and time at Greenwich when she crosses the line?

A. (a) The date is changed to 5 June.

(b) The date and time at Greenwich is 6 June, 0200.

Q. Why is a parallax correction unnecessary for the stars?

A. A star is at such a great distance from the earth that there is no measurable difference between its direction from an observer on the earth's surface and the center of the earth (Duttons, 10th edition).

Q. (a) Name the brightest star.

(b) Name the brightest planet.

A. (a) Sirius.

(b) Venus.

Q. The Nautical Almanac indicates that the sun's time of meridian passage for a given date is 1150. If your ship is keeping Zone Time and your longitude at local noon will be 95° West, what will be the Zone Time of Local Apparent Noon at the ship?

A. 1210

Q. A bale sling is:

(a) A manila rope short spliced at the ends to form a continuous piece.

(b) A length of chain with hooks at the ends.

(c) A length of wire rope with hooks spliced at the ends.

(d) Slings fitted with hooks or bars to lift a pallet.

(e) Hooks fitted with swivels for handling light drafts.

A. (a) A manila rope short spliced at the ends to form a continuous piece.

Q. Define the term "magnitude" as it is employed in nautical astronomy?

A. Magnitude refers to the relative brightness of a celestial body. The smaller (algebraically) the number indicating magnitude, the brighter the body. The expression "first magnitude" is often used somewhat loosely to refer to all bodies of magnitude 1.5 or brighter, including negative magnitudes.

Q. Referring to a chart, the term "bar" would indicate:

(a) A dock or shipyard.

(b) A sandbank near a beach.

(c) A bank or shoal obstructing the entrance to a river or making it difficult to enter.

(d) An island in an inlet which is covered at extreme high water.

(e) A junction between a tributary and a main waterway.

A. (c) A bank or shoal obstructing the entrance to a river or making it difficult to enter.

Q. What are the vertices of a great circle?

A. The vertices of a great circle are the points nearest the poles.

ENGINE

Q. How is circulation accelerated in the bent tube, express-type boiler?

A. The circulation is accelerated in bent tube boilers by the high rate of heat transfer, the large size of headers and connecting nipples, the steep angle of inclination of the generating tubes and the greatly increased number of return circulating tubes.

Q. What are the factors that tend to reduce the overall size and weight of modern marine boilers?

A. Minimum overall size and weight are obtained by:

(a) Accelerated water circulation.

(b) Increased velocity of gases of combustion, hence increased heat transfer per unit area of heating surface.

(c) Increase in furnace loads, i.e., rate of fuel consumption, per cubic foot of furnace volume.

Q. What determines the location of the superheater in a water-tube boiler, and how is it protected against excessive heat?

A. The exact location of the superheater depends upon the degree of superheat desired. The higher the degree of superheat for which it is designed, the closer to the furnace will be its location. The superheater is usually protected against excessive heat by screening rows of generating tubes placed between it and the furnace.

INDUSTRIES' RESPONSIBILITIES AND INTERESTS IN SAFETY LAWS

A. F. Dyer

The National Safety Council was treated to a look at safety legislation from a rather unique vantage point last fall—that of a petroleum industry representative. The Proceedings *is pleased to present his observations, feeling the carryover into the marine safety field is not insignificant. Opinions and views are Mr. Dyer's and do not necessarily represent those of the Coast Guard.*

NEITHER THE SUBJECT of safety nor legislative action is new in our society. Indeed, even the combination of the two, that is specific legislation directed at safety, is not new, but it is certainly receiving more attention, more consideration, and is the subject of much more discussion today than a relatively few years ago.

Yet, some of us in the petroleum and chemical industries may have not fully realized that every year there is an increasing number of legislative proposals which may affect our operations. The number of those operating under this delusion must have decreased significantly in the last couple of years or so, as a result of the spotlight that has been turned on industrial safety legislation, and regulations in general, by the Walsh-Healy Act. This activity became fairly commonly known throughout the petroleum, chemical, and related industries, especially in 1964 with the hearings that were held in Washington on proposed additional regulations under the Walsh-Healy Act. Although these hearings have been concluded, the proposition of sweeping safety regulations under the Walsh-Healy Act is not yet really settled and will need further attention. But perhaps more importantly, other bills having a potentially very significant impact on industrial safety in general have been introduced in the current session of Congress.

This spotlight on industrial safety legislation is not limited to the Federal level. There is also a continually increasing tempo of introduction of legislation in the various State legislatures and promulgation of new or more stringent regulations by administrative bodies in *attempts to improve industrial safety.*

With this ever-increasing activity, it is important that we gain a better understanding of safety legislation, and regulations in general, how they came to be, and what we can and should do about them.

I shall not attempt to present an analysis of recent or current legislation (good or bad). This would be prohibitively time consuming and not necessarily of value in the long run. Rather, I hope to give you a basis for making your own analysis and suggestions for acting upon it.

To do this, let's first look at the broad background of industrial safety activity, specifically as related to the petroleum and chemical field; some of the "whys" of safety legislation and regulatory activity. Then we'll explore some of the pitfalls of legislative activity (as well as how they can be avoided); and, finally, a summary of these related factors, including our individual and collective responsibilities and activities in this area.

Before recounting some of the background of industry safety programs, let us recognize that while the petroleum and chemical industries have grown up rather completely separate. there is today, in many operations. little difference in the *real problems involved* although there are some who feel that there is a vast difference from one standpoint or the other. In fact. in many cases the safety programs and developments in the petroleum and chemical industries are not significantly different from industrial safety programs in general.

The first significant, or perhaps organized, effort toward the development and implementation of recognized safety standards and procedures began after the turn of this century. The initial areas covered by safety standards involved such general categories as tank design and construction requirements; provisions for relief of excessive internal pressure in tanks, boilers, pressure vessels, and piping; design and construction of transportation equipment; requirements for the design and construction of proper electrical power facilities, etc. Quite properly, these standards were based, to a very large extent, on what industry had learned would work properly and what would not work properly rather than upon theoretical concepts.

The organizations participating in and leading the development of uniform standards of safety in this field include, in addition to the National Safety Council, those known today as the National Fire Protection Association, the American Petroleum Institute, the Manufacturing Chemists' Association, the National LP-Gas Association, the Compressed Gas Association, the Association of American Railroads, the American Society of Mechanical Engineers, the American Standards Association, to mention a few. Obviously, the names of some of these have changed slightly over the years, but this list is intended only to indicate the breadth of interest and activity and the *recognition of need for a concerted effort to achieve the goal of an improved level of safety.*

The results of these efforts are to be found in published and recognized standards of the groups just mentioned. It is important to emphasize at this point that few, if in fact any, of these safety standards which have stood the test of time have done so without extensive and almost continual revision. Those of you who are familiar with the ASME Code, the NFPA Standards, ASA Standards, etc. know that it has been found necessary to revise them frequently to keep the requirements up to date with changing technology, equipment, and safe "practice" concepts. In fact, one of the biggest problems in this area is the difficulty of accomplishing changes rapidly enough to keep "abreast of the times." We will relate this factor to legislation and regulations later.

Accompanying the standards development activity of the industry technical groups has been the effort to disseminate information, that is, to educate those involved and interested. John Ruskin once stated, "Education does not mean teaching people what they do not know only. It means teaching them to behave as they do not behave. It is painful, continual, and difficult work to be done by kindness, by watching, by warning, by precept, and by praise, but above all by example." But safety education programs, as such, which come out of the work of these groups is only a part of the essential dissemination of information. The need for continuing safety education is still dramatized too frequently such as in cases of using gasoline instead of high flash-point solvent for cleaning parts and equipment.

One of the most important areas of activity, not only of industry groups, but of companies and individuals as well, has been to promote and disseminate accurate information concerning products, safe procedures, and practices, etc., at every available opportunity. Again, with constant changes in technology, equipment, and recognized safe practices, this cannot be a "one-shot" effort; of necessity, it is a continuing, day after day occupation. Even without changes in technology it is a difficult job—because familiarity breeds contempt. The employees become so used to dealing with potentially dangerous materials, equipment, or operations that they decide "it can't happen to me," but then it does. Couple this with new techniques and methods as well as new products and the need for constant training and dissemination of accurate information becomes obvious.

There are, unfortunately, many ways in which misstatements and misinformation concerning products, practices, and equipment are released and accepted as fact. Thus, a very important part of the industry safety educational effort has been, and must continue to be, to see that accurate information is made available through ALL channels of communication, both within and without the industry. We'll discuss the importance of this effort as related to safety legislation and regulatory activity in more detail later.

It would be most gratifying if we could at some time expect to be able to say that all of the millions of dollars and manhours that have been expended in this voluntary safety effort had resulted or would result in the Utopian situation of achieving a level of *complete* safety. I am confident that this will never happen—but this is not cause for undue alarm. We can not properly call this a "failure"—it is simply a part of our industrialized, high-speed society. This does not mean, however, that we can relax our efforts; rather, the ever-increasing pace and scope of developments means that these efforts must be continually intensified.

Some safety laws and subsequent regulations are inevitable.

There are those who would respond with the timeworn cliche that "there ought to be a law" which would *require* complete safety and eliminate all industrial accidents. The simple fact is that we have "people" involved here and people never have allowed, and never will allow, themselves to be *completely* controlled by laws or rules. There are many examples to indicate this is true. Our highway traffic safety record is perhaps a most classic example of this.

Many, many times we can lead people to a higher level of safety than they can be forced to achieve by some law or regulation. But this is not an ironclad rule. It must be made clear that, in a good number of areas, industry has concluded that some degree of legislation or regulation is desirable to achieve a higher level of safety throughout the affected industry. There are numerous examples of this on the lawbooks at the Federal level and more extensively at the State and local level. Included are such areas as the transportation of "dangerous" commodities; the storage, handling, and use of liquefied petroleum gas, flammable liquids, and specific laws and regulations dealing with boilers and unfired pressure vessels in several States, as well as our vast complexity of traffic laws, which to one degree or another affect, in many cases, the petroleum and chemical industries.

Such efforts have caused some people to conclude that the passage of safety legislation and the adoption of regulations will automatically result in an increased level of safety. This does not necessarily follow. For instance, in the case of the LP-gas industry, there are very, very few geographical areas which do not have safety rules and regulations governing installations, etc. Yet, it has been impossible to find evidence that those States or localities which have detailed safety laws and/or regulations, have a measurably higher level of safety than do those areas which have absolutely no safety regulations! Obviously, this lack of difference can, in large measure at least, be attributed to voluntary industry compliance with the nationally recognized NFPA standards.

In spite of this, we should not conclude that safety legislation and regulation are inherently bad. As a matter of fact, we could state that some safety laws and subsequent regulations are inevitable. Yes, even desirable.

This brings us to the point of looking at some of the "whys" of safety laws and regulations.

First, we have legislation which is sponsored to eliminate the problem of achieving industrywide *voluntary* compliance with the applicable standards. Here, the ever constant concern of responsible industry groups for a high level of safety causes them to sincerely conclude that they should urge the adoption of legislation to give voluntarily developed safety standards the uniform force and effect of law. The goal is to minimize the possibility of accidents caused by those who have less strong convictions with regard to the importance of safety, thereby downgrading the safety image of the entire industry. This sometimes serves the companion purpose of guarding against the possibility of passage of ill-advised legislation which would not improve safety, but might, in fact, detract from it.

Secondly, safety legislation is quite often sponsored by individuals outside the industry who are safety minded and have a very sincere, although sometimes misguided, feeling of responsibility to work for legislation in this field.

Third, we find in many cases the public reaction to an accident or unfortunate situation results in a "clamor" for legislation and regulation to solve a real or imagined problem.

Finally, we too often find that someone or some group promotes safety legislation as a political stepping-stone for their own advantage.

We must recognize then that some safety legislation and regulation is good, some is bad. Now, how in the world can we tell the difference? What yardstick can be used to measure proposals, sentiment, etc., and determine whether the legislation is sound?

First, whether the legislation is sponsored by industry or fostered by individual or public reaction, we must simply, but *most* objectively, answer the question: Is there a real need for it? Industry, whether petroleum, chemical, or otherwise, should *never* foster legislation or regulations unless (1) there is a real safety problem, and (2) the problem can only be best solved or mitigated by law and regulation *rather* than by voluntary action and education. These are obviously difficult questions to answer, particularly in our day and time, when all too many people, both within and without industry, see or imagine that they see some problem and immediately conclude that the best way of solving it is to take it to Congress, the State legislature, or municipal councils or administrative bodies.

This is the area in which our industry associations, at the local State, as well as National levels can be beneficial and effective forums in evaluating the problem and developing the best procedure to follow to solve it. They serve as our best sounding board to get broad objective study of the problem and possible solutions.

One of the most dangerous and deceiving pitfalls of "safety legislation" is the attempt on the part of some to promote economic legislation under the guise of safety. Such legislation might establish minimum requirements for inventories, restrict operating areas, or otherwise establish detailed requirements. Such legislation, when *thoroughly* evaluated, may prove to have absolutely nothing to do with safety, for either the personnel working in the industry or the public at large, but might well grant preferential treatment to some member or segment of industry. This has been demonstrated too often by attempts to improve safety by limiting the quantity of flammable liquids that can be stored or transported in a city. Ironically, the result is a decrease rather than an increase in safety because the quantity limitations result in more frequent trips to fulfill the consuming public's requirements, hence—a greater traffic exposure.

What yardstick can be used to measure proposals and sentiment and determine whether the legislation is sound?

Next, we come to the area of legislation and regulation promoted by sincere, but sometimes uninformed or misinformed, public officials or by public clamor as a result of panic-type reaction to an incident. Here, the same question must be asked and answered. That is, (1) is there a real problem, and (2) will legislation or regulation result in the best solution to the problem, or will the proposed cure be worse than the illness? This is the sort of legislation that might be promoted when a small child drowns in a swimming pool with the resultant clamor for an ordinance or law abolishing all swimming pools to prevent further drownings. Obviously, this is about as likely to succeed as attempting to prevent drunken driving by complete prohibition of the sale of alcoholic beverages. It will not cure the problem at all, and it is the type legislation or regulation which is completely unenforceable and, hence, impractical. Panic legislation can be avoided only by calm and knowledgeable consideration of either the real or imagined problem. Here then, is where the furnishing of accurate information to the public and existing regulatory officials really becomes absolutely essential.

The attempt at safety legislation and regulation for political gain is more difficult to cope with because the proponents or promoters of it are not really interested in the true facts of the situation, but are interested only in construction of a political organization or dynasty to further their own situation. In such cases, the more the real issues are clouded, the better it serves their purpose, and hence it becomes much more difficult to cope with this type of situation. But this does not minimize the importance of disseminating factual information, rather it makes it doubly important.

So much for whether there should or should not be legislation. Let's assume for the moment that in any given particular situation the previously outlined "yardsticks" have been applied to the situation and or proposal and it is deemed one in which sound safety legislation should be enacted. What particular features or concepts should be embodied? First, as a general rule there are few, if any, cases in which it is desirable to make safety legislation lengthy and detailed. Rather, the better approach for the legislation is to state concisely, but accurately, the problem which is to be solved, what administrative authority is to handle it, provide for adoption of administrative regulations, and establish limiting criteria within which the administrative authority will be expected to function.

There are other features which, of course, must be fitted into such a law, but the significant point is that *detailed requirements should not be written into law.* These should be handled by the adoption of available nationally recognized standards applicable to the subject or, where necessary, adoption of reasonable administrative regulations to fit the need. The reason for this should be obvious. Administrative rules can be revised within reasonable periods of time as is necessary, whereas revision of laws can be cumbersome and time consuming. Rules and regulations can be automatically kept up to date through the development of revised national standards such as those of NFPA, ASME, etc., as the need arises, without going through the full legislative process.

By the same token, legislation should not be so "loosely" written to make extensive revisions to administrative regulations subject only to the whim of the administrator involved. Most State governments have "administrative procedures acts," or requirements which detail the procedures which are to be followed for handling revisions of administrative regulations. This usually includes notice of intent to revise regulations, notice of public hearings, requirements for procedures at public hearings, etc.

In many cases, it is wise to incorporate in the so-called enabling legislation, in addition to provisions giving the administrator the authority to adopt regulations, a requirement that an advisory committee composed of people knowledgeable in the industry be appointed to advise and counsel with the administrator. This latter feature is consistent with the proven concept that those who are most directly involved with the industry have the greatest working knowledge and interest and, hence, can be the best source of help and guidance to the administrative authority.

Such an advisory group provides a mechanism for avoiding the situation of the authority administering requirements without knowledge and information about the industry and products involved. A situation which, to paraphrase Judge Learned Hand, would result in the administrative personnel wandering aimlessly in the valley of easy assumptions.

How can all this be accomplished? Few, if any of us, are *directly* involved in governmental bodies and too many of us shudder at the prospect of becoming involved. Herein lies one of the greatest problems. Our city, county, State, and Federal legislative representatives cannot be expected to be expert in all fields. In fact, we should be grateful if they are expert in any. We are so busy with our routine administrative and operating responsibilities that we would like to take the easy course and leave the solution of the problem to "Joe." But "Joe" is in the same situation and is inclined to do nothing about it. If the situation is left at this point, nothing will happen and our industry faces the possibility that someone will pass some legislation that will either put you out of business or seriously hamper your operations without increasing safety. This is not imaginary; it has been demonstrated in the past to be true. As a matter of fact, there is a very good possibility that such legislation will detract from safety.

So, what to do? We come back to the importance of organized effort, whether it be a local group, a State, or a National organization. Industry associations, technical groups, etc. (remember the sounding board for objective evaluation of problems and possible solutions?) are the ideal means of voicing this organized effort. These associations can, and should, function as a mechanism for transmitting the resultant message to the legislative body and the appropriate members of the legislature. Some people disparagingly refer to this as lobbying activities. It should not be referred to in this manner since often times it is the best and most effective mechanism available for making truly sound information known. But, we still cannot simply hand the problem to "Joe" (our association representative in this case) and expect him to do all the work. Particularly at the municipal, county, and State level it is essential that we, as individuals, function also. This is even true at the national level—our organization representative is one voice and should speak the consensus of the industry group. But whatever level of government is involved, it is essential that individuals in the industry living

Bills having a potentially very significant impact on industrial safety in general have been introduced in the current session of Congress.

within that geographical area speak to their appropriate public officials to confirm to the governing bodies that their organization representatives are really voicing their viewpoints. This means that we must know our legislative representatives and be able to communicate with them, but, *first*, of course, we must know our subject and our problem as well.

Now, where does this leave us? The petroleum and chemical industries can not rightfully categorically condemn all safety legislation. Obviously, you are interested and concerned about safety or you would not even be at this meeting.

A. F. Dyer is a graduate of Kansas State University. He has been employed in the engineering department of Phillips Petroleum Co. for the past 15 years, currently as a technical representative.

He actively represents Phillips Petroleum in many industry trade association and regulatory matters in such groups as the American Petroleum Institute, National LP-Gas Association, and Agricultural Ammonia Institute as well as the Manufacturing Chemists' Association.

In addition, he has participated in the development and revision of numerous State regulations covering liquefied petroleum gas, flammable liquids, and anhydrous ammonia.

The first and most effective step is to intelligently and continuously pursue improving the level of safety through improvement of recognized industry standards in our fields (through the appropriate voluntary group). Equally as important, and just as necessary from our individual viewpoint, we must diligently pursue the *application* of safety standards and safe practices in our day-to-day operations. Better standards accomplish nothing unless applied. If they are not used, it is like a farmer who, when his county farm agent urged him to attend a "Better Farming Methods" meeting, replied, "Why should I, I am not farming but half as well now as I know how to."

Development and *application* of better standards accomplishes several things. This minimizes the possibility of an accident occurring and thereby minimizes the possibility of a justifiable need arising for legislation. For, you see, if the safety record is as high as reasonably possible, then no one can "make a case" for legislation or regulations which could be unnecessarily burdensome to you and your industry.

Now to summarize the efforts that each of us shoud make which can be of benefit to all of us, as well as to the general public:

First, we should all actively participate in the organization which follows safety problems in our respective industries, both locally and nationally. This gives us a good sounding board and a strong voice to use as it becomes necessary.

Second, each of us should maintain liaison contact with our governmental officials so that we can speak to them, and they will listen, when the need arises.

Third, throughout all these endeavors, which really involve a selling and educational job, we should make certain that only factual information is disseminated. When we see misconceptions and misinformation being released, we must pursue the matter *immediately* to correct the impression so that an untrue picture does not develop.

Finally, always remember that industry should not foster or condone safety legislation unless (1) there is a real problem, and (2) the problem cannot be solved or mitigated by voluntary action; leaving legislation or regulation as the only answer. *Never* regard legislation complacently, simply because it appears industry "can live with it." Safety legislation generally costs both industry and the public money. It must be money well spent, in terms of improved safety, otherwise the legislation is not sound. ⚓

SS YARMOUTH CASTLE

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

24 February 1966

Commandant's Action
on

The Marine Board of Investigation convened to investigate the fire on board the Panamanian SS *Yarmouth Castle* on 13 November 1965 and subsequent sinking and loss of life.

1. The record of the Marine Board of Investigation convened pursuant to the request of the Government of the Republic of Panama has been reviewed and the record including the findings of fact, conclusions, and recommendations is approved.

ACTION CONCERNING THE RECOMMENDATIONS

RECOMMENDATION 1 concerning the forwarding of a copy of the record of investigation to the Government of the Republic of Panama will be accomplished.

RECOMMENDATION 2 concerning a study looking to legislation to require all U.S. flag passenger vessels built prior to 27 May 1936 to be built of incombustible material is undergoing interdepartmental study and review.

RECOMMENDATIONS 3 and 5 concern implementation of efforts to upgrade and amend the International Convention for Safety of Life at Sea, 1960, with respect to passenger vessels that contain large amounts of combustible material in their construction. Action has been instituted and arrangements have been made for these recommendations to be presented to the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization at a special meeting in May 1966.

RECOMMENDATION 4 concerning action looking toward execution of bilateral agreements with foreign governments whose vessels transport passengers from United States' ports will be held in abeyance pending completion of the special meeting of the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization. The specific suggestions mentioned in RECOMMENDATION 4 will be brought to the attention of the Maritime Safety Committee of the Intergovernmental Maritime Consultative Organization at the special meeting in May 1966.

RECOMMENDATION 6 concerning implementation of recognition of the exemplary rescue action of the SS *Bahama Star* and the MV *Finnpulp* will be given active consideration.

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

FINDINGS OF FACT

1. The Commandant, pursuant to the request of the Government of the Republic of Panama, convened this board on 19 November 1965 for the purpose of inquiring into all the facts and circumstances surrounding the fire and sinking of the Panamanian flag SS *Yarmouth Castle,* with loss of life, while underway in the Atlantic Ocean, on 13 November 1965.

2. At or about 0045 [e.s.t.], 13 November 1965, the Panamanian SS *Yarmouth Castle,* O.N. 4319–53, was en route Miami, Fla., to Nassau, Bahamas. A fire was discovered in the forward staircase area, which rapidly spread and enveloped the amidship passenger section and the bridge area. The vessel subsequently capsized and sank at 0603 the same morning in the Northwest Providence Channel, Atlantic Ocean in approximate position 25°55′ N., 78°06′ W., about 13 miles from Great Stirrup Cay. As a result 85 passengers and 2 crew are missing and 3 passengers are known dead.

3. (List of deceased deleted, Ed.)

4. The weather at the time of the casualty was good, the sea smooth, the sky clear, visibility excellent, and there was a light southeasterly breeze, Beaufort Scale 2 [4–7 m.p.h.]. The barometer at 2400 was 30.06 and the air temperature was 80° F.

5. The SS *Yarmouth Castle* was 379 feet overall, 5,002 gross tons, 2,474 net tons, molded depth to main deck 29 feet 6 inches, with steam turbine propulsion [2] of 7,500 h.p. Home port was Panama, Republic of Panama. Owner was Chadade Steamship Co., Inc., Pier 3, Miami, Fla., and the operator was Yarmouth Cruise Lines, Inc., Pier 3, Miami, Fla. Master at the time of the casualty was Byron Voutsinas, licensed by the Republic of Panama.

6. The SS *Yarmouth Castle* [ex-SS *Evangeline*] was a passenger vessel of riveted steel construction, built at Philadelphia, Pa., in 1927. She had eight (8) watertight transverse bulkheads extending to the main deck, stepped where required to suit accommodations and freight spaces. The vessel had a lower deck [E], a deck [D], a main deck [C], a promenade deck [B], a boat deck [A] and a sun deck. [The original plans refer to these decks as lower [E], main [D], upper [C], promenade [B] and boat deck [A].] The lower, D, and main decks were fully steel plated. The main deck at the after end, the promenade deck outside of the house, and the boat deck outside the house had caulked wood decks over steel. The promenade deck and the boat deck inside the house were wood decks. The decks forming the top of the house on the boat deck, the bridge, top of wheel and chart house, and top of the wireless house were wood decks covered with canvas. The sides of the superstructure on the promenade and boat decks were steel. All interior passenger staterooms, passageways, and stairways above the main deck were of wood construction. The boiler and engineroom casings and all public and private toilet space bulkheads and decks were of steel construction. Two uninsulated transverse steel fire zone bulkheads were fitted within the passenger area; one aft of the forward passenger stairway and one forward of the after main stairway. Sliding plate steel fire doors were fitted in way of these bulkheads at each deck level in the passageways.

The ship was originally fitted with mechanical ventilation for ventilating the living quarters, messrooms, store-

rooms, etc., on the D deck and on the main deck the inboard passenger staterooms, various offices and service spaces, dining room, etc. A separate mechanical exhaust system was provided for the main galley and main pantry. Various light and air shafts were provided for natural ventilation for public toilets and washrooms, and inside staterooms on the superstructure decks.

A separate mechanical exhaust system was provided from all public and private toilet rooms. Vent ducts from these various toilet rooms connected into the fore-and-aft ducts in the overhead of the port and starboard passageways on the main deck, promenade deck, and boat deck. These port and starboard ducts connected into vertical risers in the boilerroom casing and terminated at the exhaust fans aft of the stack on the top of the house. Manual fire dampers were fitted in this system at the location of the fire zone bulkheads.

Subsequent to 1954, at various stages, the dining room, public rooms, and all staterooms were air-conditioned. The dining room, and the staterooms amidships and forward were air-conditioned by a chilled water system piped to the various spaces. Individual air blowers were provided in each space. Staterooms at the after end of the ship were air-conditioned by a separate freon system circulating cold air through air ducts. When the air-conditioning was installed on the vessel, the original mechanical ventilation supply system to these spaces was blanked off and air shafts for staterooms in the superstructure were blanked off.

7. The vessel operated first in coastwise service and in international coastwise service under the U.S. flag and was delivered to the Government for war service in 1942. The vessel, as the SS *Evangeline,* was converted from wartime to peacetime service in 1946–47 by the War Shipping Administration. At that time the U.S. Coast Guard considered the conversion a "material alteration" of the vessel and pursuant to the provisions of 46 U.S.C. 369 the War Shipping Administration was advised that the vessel would have to meet all the requirements relative to fire retardant construction. In addition, detailed plans and arrangement of the vessel were required to be submitted to the Coast Guard for approval prior to conversion. After further analysis by the War Shipping Administration it was found that compliance would bring about an estimated increase in weight of joiner work of 100 tons and cause a total loss in deadweight capacity of approximately 450 tons due to additional ballast necessary for stability. The War Shipping Administration advised that this increase in weight would be serious not only from an economic point of view but also because of draft limitations in her trade route. In view of these considerations, the Coast Guard, pursuant to the provisions of 46 U.S.C. 369d, considered the requirements could not be reasonably and practicably complied with and modified the requirements to permit the repair and restoration of the existing type of construction subject to the following requirements: [1] the main stairwells to be trunked in with incombustible material behind the paneling; [2] the installation of hinged metal fire doors enclosing the stairways; and [3] staterooms, passageways, stairways, and public spaces to be covered with a seven (7) zone automatic sprinkler system. This was accomplished; however, original wood construction throughout the vessel was retained, and the sprinkler system was not required to serve in the toilet spaces.

8. In 1947, after reconversion, she returned to service under the U.S. flag. The vessel was laid up from 1948 through 1953, except for 2½ months of service in 1950, and was sold in April 1954 to a wholly owned Liberian subsidiary of the Eastern Steamship Co. and placed under Liberian flag and registry. The request, for sale and transfer, to the Maritime Administration cited as reason "can operate under Liberian flag more economically." The vessel operated under Liberian flag and registry through several owners until 1958 when she was transferred to the McCormick Shipping Corp., a Panamanian corporation, with concurrent transfer of flag and registry from Liberia to Panama. In 1962 the vessel was sold to the Evangline Steamship Co., S.A., a Panamanian corporation and in 1964 the vessel was sold to the Chadade Steamship Co., Inc., a Panamanian alien controlled corporation. The Panamanian flag and registry were retained, but the name was changed from *Evangeline* to *Yarmouth Castle.*

9. The vessel had a dry-pipe automatic sprinkler system which was installed to cover by seven zones all staterooms, passageways, stairways, and public spaces. Air pressure was maintained in the pipelines, counterbalancing water pressure in a pressure tank containing 260 gallons of fresh water. Opening of a sprinkler head would release air pressure in the system and water in the pressure tank would flow in the system. As the pressure dropped, a 300 g.p.m. sprinkler pump started automatically. At the same time an alarm bell would actuate on the bridge and in the engineroom. On the bridge an indicator light would show the zone in operation. A cross-over connection was provided to the fire pump.

The vessel had manual fire alarm stations strategically located throughout. Actuation of one of these stations would ring an alarm bell on the bridge and in the engineroom, and an indicator would light on the bridge showing the fire zone affected.

The vessel's fire main system was provided with a fire pump with a capacity of approximately 400 g.p.m. and with forty-six (46) fire hydrants located through the vessel. Additional pumps, including the bilge-and-ballast pump with a capacity of about 250 g.p.m., could be connected to the fire main system. A connection was fitted to the fire room line with a valve on the promenade deck for use in filling the swimming pool. Fifty-foot hoses were provided for the fire hydrants.

The general alarm system provided for 29 alarm bells strategically located throughout the vessel in areas available to passengers and crew. All alarm bells were separately fused from the main circuit. The alarm control was located on the after bulkhead of the bridge. No separate emergency signal alarm system for alerting the emergency squad was provided on the vessel. The vessel was provided with a public address system with the main control station on the bridge.

The vessel carried 13 lifeboats including one (1) radio-equipped motor lifeboat for a total capacity of 598 persons. Boats were fitted under mechanical davits with wire falls and lowering winches. Three of the boats were nested. Also provided were eight (8) approved-type buoyant apparatus capable of serving 160 persons.

10. The vessel was classed as a passenger vessel by the American Bureau of Shipping. She had a Passenger Ship Safety Certificate issued by the American Bureau of Shipping as agent for the Republic of Panama, under the pro-

The watchman in making his rounds did not cover the port passageway, main deck, in which room 610 was located.

visions of the International Convention for the Safety of Life at Sea, 1960 [hereinafter referred to as SOLAS 1960], and a Certificate of Examination for Foreign Passenger Vessels issued by the U.S. Coast Guard. The Passenger Ship Safety Certificate certified the vessel for carriage of 426 passengers and 172 in the crew.

11. In June 1965 the American Bureau of Shipping inspected the vessel at Miami, Fla., for compliance with the provisions of the International Convention for the Safety of Life at Sea, 1960, and on 23 June 1965 issued a 1960 SOLAS Passenger Vessel Safety Certificate to the vessel for a period of 3 months under the authority of the Government of Panama. The Republic of Panama had not at this time deposited its acceptance of the International Convention for the Safety of Life at Sea, 1960, with the Inter-Governmental Maritime Consultative Organization; therefore the 1948 Convention was in effect; however, that Government had directed the American Bureau of Shipping to have Panamanian flag vessels comply with the requirements of the International Convention for the Safety of Life at Sea, 1960, as were applicable to an existing vessel. The 1960 Convention, as did the 1929 and 1948 Conventions, exempted existing vessels from the construction and arrangements standards applicable to new vessels except as decided by the administration concerned. The additional standards applicable in this instance applied basically to equipment. Three inflatable life rafts required by the SOLAS 1960 regulations were not available and were noted as deficiencies. This inspection by the American Bureau of Shipping included a complete evaluation of the interior structure of the hull, testing of watertight doors and side closures, testing of pumping arrangements, testing of fire detection and extinguishing systems, examination of lifesaving appliances and equipment, testing of portable radio apparatus, radio-telegraphy installation, and various other appurtenances and equipment as applicable to an existing vessel. The vessel was in the Tampa Ship Repair & Drydock Corp. yard from the middle of September to October 15, 1965, at which time the Passenger Vessel Safety Certificate was extended by the American Bureau of Shipping for 3 additional months [15 January 1966]. While the vessel was in the shipyard, the American Bureau of Shipping made a complete 3d Special Periodical Survey of hull and machinery, and an Annual Load Line survey.

12. The U.S. Coast Guard examines annually, with reexaminations quarterly, foreign passenger vessels carrying passengers from ports of the United States to check the vessels' documents, firefighting equipment, lifesaving equipment, and to verify that the vessels are in compliance with their SOLAS Convention Safety Certificates and issues as evidence of these examinations Certificates of Examination of a Foreign Passenger Vessel. Reexaminations are made quarterly to verify continued compliance with the vessels' Safety Certificates.

The U.S. Coast Guard Marine Inspection Office, Miami, Fla., had cognizance of the *Yarmouth Castle* and conducted most of the annual examinations and the quarterly reexaminations. During the 12 months prior to the casualty five examinations were conducted, one of which was conducted by the U.S. Coast Guard Marine Inspection Office, Tampa, Fla., where the vessel was undergoing drydock examination. These tests and examinations included fire and boat drills, fire screen doors, fire hydrants and hoses, watchmen key stations, watertight doors, sprinkler pump, automatic alarms, emergency generator, and such other equipment as the Coast Guard inspector deemed necessary to establish the condition of the vessel's lifesaving and firefighting equipment. The Coast Guard Marine Inspection Office, Tampa, Fla., completed an examination of the vessel on 15 October 1965 for issuance of a certificate for the period of her SOLAS Safety Certificate. Three deficiencies were noted and when the vessel returned to Miami, Fla., the Coast Guard Marine Inspection Office, Miami, Fla., witnessed the correction of these deficiencies on 25 October 1965 by conducting a fire and boat drill, testing the sprinkler system in zones 6 and 7, and testing the operation of watertight doors and the emergency generator.

13. The Board was unable to obtain a copy of the *Yarmouth Castle's* Fire and Emergency Station Bill but obtained a copy of the station bill from her sister ship, the SS *Yarmouth*. Testimony was received that the bills on both vessels were identical. The vessel's Fire and Emergency Station Bill listed the duties of the officers and crew at emergency stations. In addition each member of the crew was given a station bill duty card printed in English and Spanish upon reporting aboard. The annual and quarterly drills conducted by the Coast Guard during the year preceding the casualty noted no discrepancies in knowledge of duties by members of the crew. Testimony received by the board indicated weekly drills were held in Nassau, Bahamas.

14. The officers and crew were nationals of Austria, Bahamas, Canada, Columbia, Cuba, the Dominican Republic, Greece, Haiti, Honduras, Jamaica, Spain, and the United States.

15. The *Yarmouth Castle* departed at approximately 1700, 12 November 1965 on her biweekly trip from Miami, Fla., to Nassau, Bahamas. The sailing and subsequent passage was uneventful until about 0030, 13 November 1965. At the time the SS *Yarmouth Castle* was steady on course 101° T., speed 14 knots, steaming in Northwest Providence Channel, Atlantic Ocean between Great Isaac Light and Great Stirrup Cay. On board were 376 passengers and 176 crew. West and behind the SS *Yarmouth Castle,* on course 101°, speed 14 knots, was the Panamanian SS *Bahama Star* at a distance of about 12 miles. Ahead and east of the SS *Yarmouth Castle,* on course 100° T., speed 13 knots, was the Finnish MV *Finnpulp* at a distance of about 8 miles. The Master of the *Yarmouth Castle* had retired to his cabin. The bridge watch on the *Yarmouth Castle* consisted of the Second Mate, Jose L. Rams de Leon, licensed by the Government of Cuba, the helmsman, and two watchmen. This distribution of personnel resulted from the fact that the watchman who had started his security patrol at 0030 hours had completed his rounds at 0050 and returned to the bridge to relieve the helm. The watchman in making his rounds did not follow the numerical sequence of the watch clock stations designed to cover all accessible passenger and crew areas of the vessel, and did not cover the port passageway, main deck, in which room 610 was located.

16. Although not known on the bridge, first indications of fire were noted by officers and crew of the vessel after midnight and before 0100. During that time a member of the engineroom crew advised the Chief Engineer by

word of mouth that there was smoke coming into the engine spaces through the natural draft ventilation system. Immediately the Chief Engineer started a search in the pantry-galley-bakeshop area with negative findings and without report to the bridge. He proceeded to the main entrance lobby [Purser's square on the main deck] where he met the night cleaner, Whyley, who reported that he had found smoke in the men's toilet on the promenade deck. The night cleaner and the Chief Engineer ran up to the promenade deck and forward via the port passageway to the men's toilet opposite stateroom 702. The Chief Engineer opened the door, looked inside, closed the door, and proceeded forward. The night cleaner proceeded aft to awaken the crew in the crew's quarters aft. When he passed through the main entrance lobby on the main deck he told the gift shop operator, Charlie Agero, about the fire and its location. Mr. Agero testified that the time was 0045. At this time Mr. Agero proceeded to the men's toilet on the promenade deck. Meanwhile the radio operator who left the radioroom at 0048 had smelled smoke at his station on the sun deck and started looking for the fire. A passenger, Mr. Lloyd Lamn from cabin 634 on the main deck, the Master, the Chief Mate, the First Assistant Engineer, the Cruise Director, the Switchboard Operator, and other crewmen and passengers also were looking for the fire and all of the above ultimately arrived on the promenade deck and main deck at the forward staircase. There was considerable confusion in this vicinity with these people arriving and leaving at different times; however, fire and smoke were found or observed by these individuals in room 610 on the main deck and in the men's toilet directly above on the promenade deck. Several fire extinguishers were used to no avail and an attempt was made to activate the zone fire alarm boxes in the vicinity. A fire hose was run out and the First Assistant Engineer was sent by the Chief Engineer to notify the engineroom to start the fire pump. By this time the fire appeared to be extremely hot and well advanced in room 610 and when the door to this room was [sic] opened, pushed in or fell in, the fire, heat, and smoke broke out into the passageway. Fire and smoke quickly advanced into the forward staircase and aft in the passageway out of control. The Master, leaving the Chief Engineer in charge, returned to the bridge. The Chief Engineer, after fighting the fire for a brief period, gave the hose to an unidentified crewman and went to the engineroom to close off the mechanical ventilating system and to see that all machinery was operating and then proceeded about the decks closing scuppers. The Chief Mate did not tarry at the scene of the fire but went forward on the outside of the house on the promenade deck and with other crewmembers began assisting passengers out of their stateroom windows and breaking out fire hoses to fight the spreading fire. The radio operator made his way back to the bridge. All others went aft, pounding on stateroom doors to awaken passengers and crew and ultimately to the promenade and boat decks to the area of the after lifeboats. The crew was not alerted to the fire emergency by the general alarm system and the fire emergency organization of off-watch personnel did not come into play during the resulting debacle.

17. *Action on the bridge.* It was testified to by the mate on watch that the first indication of fire came to the bridge at about 0110 when the Engineer of the watch, Haralampos Sotiriou, a Greek national, licensed by the Government of Panama, reported smoke coming through the engineroom natural draft ventilation system. Immediately the watch officer dispatched one (1) watchman to the sun deck and one (1) watchman to the promenade deck to locate the fire and report. He then reported by word of mouth through the voice tube to the master, who ordered, "Sound the alarm, I am coming up." There was testimony by the Master and several officers of the vessel that the general alarm was sounded and heard, but this was not corroborated by any passengers interviewed. Within a short time the Master arrived on the bridge; directed the Mate to stay in charge and departed to locate the fire. The Master returned to the bridge in about five (5) minutes, at which time there was smoke and flame in the chartroom aft of the bridge. He ordered, "Stop the engines" [0120], "close the watertight doors in the engineroom" [0121], and "turn to port." No attempt was made to use the public address system. At about this time the radio officer reported for orders and was directed by the Master to transmit a distress message. Immediately thereafter he reported inability to comply because of flames and smoke at the radio room, and was directed to transmit a distress message by flashing light. Communications were not established by the radio officer with either the SS *Bahama Star* or the MV *Finnpulp*. During this time bridge personnel were forced by smoke and flame to the open forward deck of the wheelhouse. The Master ordered the abandon-ship signal sounded at approximately 0125. The Second Mate broke the wheelhouse window and sounded the whistle by the electrical control but was unable to enter the bridge to sound the general alarm. The complete abandon-ship signal of seven shorts and one long was not obtained. Within a few minutes the Master, the Second and Third officers, and the watchman abandoned the forward deck of the bridge and all, with the exception of the Master, proceeded to assist in the evacuation of passengers. The Master proceeded to motor lifeboat No. 3 which contained the emergency radio. He, with the assistance of the Second Electrician, Emmanuel Sakaleros, a Greek national, was unable to clear the boat because of fire and smoke. At this time the Second Electrician and four (4) passengers, Mr. and Mrs. James T. Heigel, from stateroom W–1, and Mr. and Mrs. Carl M. Apuzzo, from stateroom 835, released a buoyant apparatus and jumped from the sun [top] deck into the water. Mrs. Heigel testified that her watch stopped at 0130. The Master proceeded to lifeboat No. 1, which contained several passengers and after considerable difficulty, due to the proximity of the fire, the boat was lowered to the water by the Master and Chief Boatswain, Ines Gozan-Pinder, who had come to the boat deck from the forecastle. The boatswain descended in the boat and the Master descended on the lifelines. At this time the Staff Captain, Panagiotis Menegatos, licensed by the Government of Greece, appeared and came down to the boat on the lifelines. The time by best estimate was 0145.

18. *Action in the engineroom.* The Third Assistant Engineer with two oilers and two firemen was on the midwatch [0000 to 0400] in the engine and boilerrooms. Shortly after the completion of blowing of boiler tubes, about 0100, the smell of smoke was noted carrying into the

Various crewmembers left the vessel by the side pilot doors.

boilerrooms from the topside ventilators. A fireman was sent up to find out what was wrong and an oiler was dispatched to notify the Chief Engineer and other engineroom officers. The bridge was notified by telephone about 0110. At approximately 0115 the First Assistant Engineer came down and the fire pump was started. About 0117 the sprinkler alarm located in the No. 2 fireroom sounded and the sprinkler pump started. The Chief Engineer came to the engineroom and shut down all power ventilation blowers. About 0120 the engineroom received orders to stop the engines. At this time the firemen cut out three burners on each boiler leaving only one burner operating on each boiler. Boiler No. 1 was not in service. Soon after the engines were stopped, the three watertight doors in the fire and enginerooms were closed from the bridge; however, the alarm on the engineroom watertight door rang continuously. The fire pump, sprinkler pump, and the generators were operating.

About 0145 the steam pressure was dropping, so the Third Assistant went up from the engineroom and down into the fireroom and added a second burner to the four boilers in the No. 2 fireroom. Everything continued to operate satisfactorily in the engineroom and around 0300 the Third Assistant was advised by word of mouth to add the bilge pump to the fire pump. He and the oiler stayed in the engineroom until about 0400 when they left and departed the vessel by the midship pilot side port on the D deck. All of the above pumps operated continuously and were in operation when the engineroom was abandoned.

19. *Action forward on the vessel.* The Chief Mate, on leaving the scene of the fire, went aft on the main deck and proceeded up the port crew amidship stairway to the outside on the promenade deck. On going forward toward the bridge he was unable to go into the lobby of the forward stairway due to the heat and smoke in the area. He then continued forward on the promenade deck and began breaking the passenger stateroom windows to assist passengers to get out on deck from their rooms since smoke and heat had filled the passageways at that time. Meanwhile the deck crew in the forecastle had been aroused by a night watchman and had come on deck in that area. Some of them assisted the Chief Mate in getting passengers out of their rooms and in breaking out firehoses forward to fight the fire that was advancing. No water could be obtained at the fire station on the forecastle head. The firehose on the port side at the forward end of the promenade superstructure was damaged and was abandoned. The fire station on the starboard side of the promenade superstructure was activated by the Chief Mate and he left a crewmember there directing the hose into the lobby stairway area on the starboard side. Good pressure was obtained on this station. The Chief Mate went aft on the starboard side and had a crewmember use a firehose at a location amidships to throw water into the interior of the vessel. He continued on to the after part of the vessel. In the meantime many passengers, several severely burned and cut, had congregated on the boat deck forward. At this time it was impossible to go aft on the boat deck as the fire had broken through the sun deck across the vessel. The crewmembers forward, including the Second Mate, Third Mate, and radio operator assisted the passengers down to the promenade deck in the bow area. Ladders and ropes were lowered over the side of the ship.

About 0150 the No. 1 lifeboat in which the Master, Staff Captain, Boatswain, several crewmembers, and several passengers were embarked went off the vessel about 50 yards and began sending up flares. The passengers and crew in the bow area hailed the boat to pick them up. The Master testified that he had been unable to send out an S O S signal and wanted to go to a ship that was approaching from some distance away on the starboard bow to advise them to send an S O S and of the need for lifeboats for rescue purposes. Seeing that the boat was not going to come back to the bow to pick up passengers, several passengers and crew went over the side and swam to the boat. The boat then rowed to meet the approaching vessel, MV *Finnpulp,* and arrived alongside between 0215 and 0225, about ⅓ mile from the *Yarmouth Castle.*

Back on the bow of the *Yarmouth Castle* the remaining crew and passengers waited to be rescued. Three crewmembers had gone below through the forward hold to the D deck where they opened the forward port cargo side port and went overboard in a small paint boat that was stowed in the hold. Later when the lifeboats from the two rescue vessels arrived, the passengers and crew forward were picked up and taken to these vessels. When evacuation of the vessel was completed by approximately 0400 the port cargo door forward on D deck, at frame 37, and the side pilot ports, port and starboard, at frame 103 on the same deck were open.

20. *Action aft on the vessel.* The first indication of fire came to the ballroom-bar area aft on the boat deck at 0105 when Miss Erna Groeger, a passenger from stateroom 832 on the same deck, burst in screaming "fire." Shortly thereafter a badly burned passenger came into the bar. There was no smoke in this area at the time and the lights were on. Meanwhile other passengers who had escaped from the amidship section and the passengers in the after staterooms were proceeding to the stern of the vessel. The members of the crew in the after crew's quarters came up and mingled with the passengers in this area. Some of these assisted the passengers in finding lifejackets, others broke out firehoses and directed water on the fire forward of the after staircase and others assisted in preparing the after lifeboats for lowering. Although shown on the plans there were no single boats Nos. 11 and 12, these boats being nested and identified as 9A and 10A, respectively. The time and order of launching of the boats aft cannot be definitely established except that lifeboat No. 7, heavily loaded, appeared to be the first boat in the water. Difficulty was experienced in launching lifeboats 10 and 10A due to the brake seizing on the drum. Other than this delay, which was corrected, boats 7, 9, 9A, 10, and 10A were lowered. All passengers and crew who were not accommodated on the boats left the vessel via lines, ladders, and by jumping into the water and were taken on board awaiting lifeboats from the rescue vessels. Some passengers in the staterooms on the main deck escaped the vessel by climbing through the portholes. Various crewmembers left the vessel by the side pilot doors. During the above evacuation the swimming pool aft on the open deck was observed filling with water. The Master testified that he returned to the vessel and assisted in the evacuation of passengers from the stern. This was corroborated by the Chief Engineer.

21. *Action by rescue vessels.* The MV *Finnpulp*, proceeding on a course 100° T., observed by radar, that the range to a following vessel about 7.8 miles aft on the port quarter was opening. A bright glow in that direction was noted and the Master was called at 0130. Looking through his binoculars he saw what he believed to be a ship on fire. About 0132 the vessel was turned and headed back to the *Yarmouth Castle*. The radio officer attempted to call VPN [Radio Nassau] three times on 500 kc/s between 0140 and 0145 but was unable to establish contact. At 0154 he called Coast Guard Radio, Miami, and reported a vessel on fire. No distress signal was transmitted. The vessel's speed was increased from about 13 knots to about 16 or 17 knots and the course changed to 280° T. At about 0215 the *Finnpulp* came within ⅓ mile of the *Yarmouth Castle*, made a starboard turn, and stopped. The *Yarmouth Castle* was broadside to the *Finnpulp* and at this time towering flames were seen on the *Yarmouth Castle* forward of the stack and engulfing the bridge area. The *Finnpulp's* port lifeboat had been cleared and was lowered into the water. The starboard gangway was lowered and a lifeboat from the *Yarmouth Castle* containing the *Yarmouth Castle's* master came alongside. The Master of the *Finnpulp* was told by someone in the lifeboat that the *Yarmouth Castle* had about 600 persons on board and lifeboats were needed to rescue these people. The passengers and some of the crew in the lifeboat came aboard the *Finnpulp* and the rest of the crew in the lifeboat headed back to the *Yarmouth Castle*. The *Finnpulp's* starboard boat was then lowered and both boats proceeded to rescue passengers from the *Yarmouth Castle*. Two other lifeboats from the *Yarmouth Castle* were in the vicinity and the people from these boats later came on board the *Finnpulp*. The two Finnish lifeboats proceeded to take passengers and crew from the *Yarmouth Castle* and finally the vessel took on board 51 passengers and 41 crew. Two of the *Yarmouth Castle* lifeboats were later hoisted on board the *Finnpulp*. The *Finnpulp* remained in the vicinity until the *Yarmouth Castle* sank at 0603 and then proceeded to Nassau, Bahamas, where the survivors were placed ashore. One badly burned survivor was removed from the MV *Finnpulp* by Coast Guard helicopter.

SS Bahama Star. The SS *Bahama Star* was proceeding in the Northwest Providence Channel at a speed of 14 knots on course 101° T. At about 0205 hours the mate on watch on the *Bahama Star* advised the Master that he could see Great Stirrup Light. In keeping with his routine, the Master looked out of the porthole, observed the light, and at the same time observed an orange glow on the horizon on the port bow. The Master came to the bridge, observed a vessel on fire and ordered the helmsman, "Come left and steer for that ship." The *Bahama Star* arrived alongside the starboard side of the *Yarmouth Castle* at about 0225. Enroute a blinker light from the *Yarmouth Castle* was observed; however, no actual message was read or understood. Two or three lifeboats were at this time passed and hailed. These boats were from the *Yarmouth Castle*. The *Yarmouth Castle* was afire from her stack forward, including her bridge and radio shack, through all decks to the main deck. The forecastle head was not burning nor was there fire aft. Fourteen boats were placed in the water from the *Bahama Star*. These lifeboats proceeded to take passengers and crew from the *Yarmouth Castle*, completing rescue efforts at approximately 0415 hours. The *Bahama Star* remained in the vicinity until the *Yarmouth Castle* sank at 0603 and upon release by the Coast Guard proceeded to Nassau, Bahamas, where survivors were placed ashore. The *Bahama Star* took on board 240 passengers and 133 crew. Twelve passengers, badly burned, were evacuated to Nassau from the SS *Bahama Star* by Coast Guard helicopter.

22. At 0154 the MV *Finnpulp* advised Coast Guard Radio, Miami, of a vessel on fire. This information was relayed from the Coast Guard Rescue Coordination Center to the Coast Guard Air Station, Miami, Fla., by telephone at 0204. The first aircraft was airborne at 0236 and was followed by three others at 0300, 0302, and 0332, respectively. The first helicopter was airborne at 0322 hours, followed by another at 0412, and a third at 0657. Illumination of the scene was commenced at 0343. At 0513 the first of the 12 injured passengers transported to Nassau was hoisted from the SS *Bahama Star*. Search of the area was conducted throughout the day with the last helicopter departing the area at 1651 and the last aircraft departing at 1745.

23. There was no noticeable list to the vessel during the night prior to the casualty. After the fire broke out, the vessel heading was altered to place the prevailing wind on the starboard side and the vessel was stopped. As time elapsed a gradual list developed to the port side and the vessel was down by the head. By about 0300 the list appeared to be approximately 4 to 5 degrees. When the vessel was completely abandoned about 0400 the list was estimated to have increased to about 7 or 8 degrees and the sea was observed entering the forward open cargo side port on the port side. The list continued to increase to port until the vessel quickly rolled over, bottom up, and sank a 0603.

24. The radio room, the motorboat fitted with radiotelegraph installation, and the lifeboat portable radio apparatus stowed in the chartroom were all located within the same relative area of the vessel. Accordingly, when the fire broke out in this area, these three independent means of transmitting radio messages for assistance were, within a very short time of each other, unavailable for use.

25. The sprinkler system alarm sounded on the bridge and in the engineroom during the fire. The Chief Engineer testified that when he was on D deck he observed the sprinkler system gages and noted that the sprinkler system in zone 2 on the boat deck and zone 3 on the promenade deck was operating.

26. Room 610 was located on the main deck [referred as upper C deck on original construction plans] on the inboard side of the port passageway and immediately forward of the boilerroom uptake. The steel galley vent trunk on the forward side separates the room from the forward passenger stairwell. On the starboard side of the room was a ladies' toilet. The boilerroom was below and above was a men's toilet on the promenade deck and over that was another toilet on the boat deck. At the forward and after ends of this room were natural ventilation ducts which extend vertically from this room to the top of the superstructure. These ducts also served the two toilet rooms above and opened directly into those rooms. Additionally, a mechanical exhaust duct, previously described, served these rooms. Room 610 had been built as a toilet room and was of steel construction, and when the sprinkler

The magnitude of loss of life stemmed from failure of early use of the general alarm.

system was installed in 1947 no sprinkler head served this room. At some later date the room had been converted to a ship's hostess stateroom, but no sprinkler head was installed. In October 1965 the room was dismantled and insulation, paneling, and equipment removed. Testimony by Roderick Smith, the Second Steward, and several other crewmembers indicated that on the night of the fire nothing was in the room with the possible exception of a vacuum cleaner and a mop. Testimony by the hostess, Ruth Wright, and Charles Agero, the gift shop operator, indicated that they entered the unlocked room the evening of the fire to look at some mattresses that were stored inside. Their testimony indicated that in the room were about five mattresses, a couple of damaged chairs, pieces of scrap paneling, a vacuum cleaner, and other miscellaneous items. A jury rigged electric cable stretched across the room from which hung a large naked light bulb and socket with bare wire connections and it was indicated that the light was on when they entered and left. Further testimony indicated that arrangements had been made with the stewards to secure one of these mattresses from this room to be put on Mr. Agero's bunk that night. Mr. Agero stated that later that night when he visited his stateroom his bunk had been fitted with a mattress.

27. The greatest loss of life was determined to have occurred on the boat deck. Fifty-two of the passengers and crew missing and presumed dead were assigned staterooms on this deck; 22 were assigned staterooms on the promenade deck; and 13 were assigned staterooms on the main deck. Two of the passengers known dead were assigned staterooms on the boat deck and the third was assigned a stateroom on the main deck.

28. Testimony of several witnesses who occupied outside staterooms on the night of the fire indicated that they could not open the windows and shutters in their staterooms.

CONCLUSIONS

1. That the fire originated in room 610, on the main deck, originally a toilet space, containing a number of combustible items including mattresses, discarded bulkhead paneling, and broken chairs. The fire smoldered and increased in intensity for an unknown period of time.

2. That the source of ignition of the fire could not be determined, but could be attributed to anyone or a combination of the following:

a. Malfunction of the lighting circuit in room 610 which had been jury rigged.

b. Sparks entering room 610 through the natural ventilation ducts during blowing of boiler tubes.

c. Unintentional or careless acts of persons entering room 610 during the evening of 12 November 1965, such as failure to extinguish a cigarette; placing of mattresses so that they came in contact with the jury-rigged lighting circuit, etc.

3. That the proximate cause of the debacle was failure of early detection of the fire in a ship with combustible materials in her structure. When the fire escaped room 610, the wooden interior and inflammable paint together with the chimney effect of the forward stairway permitted a rapid, uncontrolled spread of fire and smoke to the overhead of the boat deck and forward passageways. Contributing to the rapid spread was the mechanical exhaust system connecting room 610 with the toilet spaces on the port side of the main deck.

4. That contributing to the failure of early detection was the inadequate control of the security patrol in not knowing that he was not following the prescribed route and thereby increasing the possibility of a fire going undetected. A further contributing factor was the absence of a sprinkler head in a room containing combustible materials.

5. That the magnitude of loss of life stemmed from failure of early use of the general alarm or the public address system and failure of windows and shutters on outside staterooms to be maintained in a condition so they could be easily opened.

6. That the general alarm did not ring during the casualty.

7. That an attempt to sound the general alarm was not made before the Master returned from the scene of the fire to the bridge. Failure of the alarm on any subsequent attempt is ascribed to the fact that the general alarm was a one-circuit system and fire damage to any portion would place the complete circuit out of operation.

8. That the lack of pressure at fire hydrants forward on the vessel is ascribed to the fact that more valves were opened throughout the ship than the fire pumps could service. Contributing to this deficiency was the open valve from the fire main to the swimming pool.

9. That the installed sprinkler system was in operation, but was ineffective in reducing a fire of this magnitude.

10. That the sprinkler system is of value only in early detection and extinguishment of small fires in their early stages within the area of sprinkler heads. It is of little value in hidden spaces such as overhead ceiling spaces, behind paneling, etc., or where an advanced fire has developed before the sprinkler system comes into action.

11. That with the possible exception of the sliding fire screen door in the port passageway aft of room 610 there is no evidence that any fire doors in the vessel were closed.

12. That the Master and ship's officers who were searching for the fire and ultimately arrived at the scene failed to take firm and positive action to organize the crew to isolate and combat the fire or to awaken and evacuate passengers in the area.

13. That the decision of the Master to leave his ship to allegedly go to the rescue vessel to assure the sending of the distress signal demonstrates negligence, abandonment of command responsibility, and an overall failure to approach and cope with the difficulties attending the accomplishment of a task of this order of magnitude.

14. That the emergency squad was unable to obtain gear from the emergency squad locker outside the radio room on the sun deck due to the delayed alert and the rapid spread of fire in the area.

15. That the organization of the vessel for fighting a fire as evidenced by the station bill was adequate; however, the organization was not implemented upon first discovery of the fire or subsequently thereto and prior to its getting out of control. When the fire was out of control those members of the crew remaining on board and performing as individuals performed adequately.

16. That the organization of the vessel for abandon ship, as evidenced by the station bill, was adequate and in view of the extent of the fire at the time the abandon-ship signal was given, all accessible boats were utilized and there was no loss of life as a result of abandon-ship procedures.

17. That a progressive list developed to port as a result of the accumulation of water on the several decks from the sprinkler system, open fire hydrants, and probably sanitary lines damaged during progression of the fire. As this list progressed the open side ports became awash and, as the testimony indicated that no watertight doors other than three doors in the boiler and machinery spaces were closed, the sea flooded the vessel amplifying the list and the vessel rolled over and sank.

18. That the inspection performed by the American Bureau of Shipping for the Passenger Vessel Safety Certificate was proper and adequate. The vessel was equipped in accordance with the SOLAS, 1960, requirements with the single exception of inflatable liferafts, and the Board received no evidence of significant failure or deficiency.

19. That the inspection performed by the Coast Guard for the Examination of Foreign Passenger Vessel Certificate was proper and adequate to verify that the vessel was in compliance with her Passenger Vessel Safety Certificate and that her lifesaving and firefighting equipment was satisfactory.

20. That the rescue effort of the SS *Bahama Star* and the MV *Finnpulp* was performed in an exemplary manner and in keeping with the highest traditions of the sea.

21. That over half of the persons who are missing and presumed dead were assigned staterooms on the boat deck and their loss is attributed to the rapid rise of smoke, heat, and fire in the forward staircase reaching the closed overhead of the staircase on the boat deck and rapidly spreading horizontally preventing passengers exiting through the passageways.

22. That the Board had difficulty, and was unable to correlate fully the observed and estimated times of reported events into a chronological sequence.

RECOMMENDATIONS

1. That a copy of this record of investigation be forwarded to the Government of the Republic of Panama for information, study and such action as deemed appropriate looking to preventing a reoccurrence of such a casualty and for improving the safety of life at sea.

2. That, although the record indicates there are no U.S.-flag passenger vessels operating on the high seas with combustible material in their structure, it is recommended that the Commandant, U.S. Coast Guard, institute a study looking to Federal legislation to require that any other American-flag passenger vessels fitted with passenger berthing spaces and built prior to 27 May 1936, be made to conform to the requirements for use of incombustible material in their structure as applicable to passenger vessels built subsequent to that date.

3. That the Commandant, through the U.S. representatives to the Inter-Governmental Maritime Consultative Organization [IMCO], seek to amend the International Convention for Safety of Life at Sea, 1960, to require all signatory governments to upgrade passenger vessels which contain large amounts of combustible material in their construction to obtain an acceptable fire safety standard.

4. That in the interim period the Commandant give consideration to the following suggestions for improving safety of existing passenger vessels of type construction and service similar to the SS *Yarmouth Castle,* and that these be the basis of discussion looking to bilateral agreements with foreign governments whose flag vessels transport passengers from U.S. ports:

a. During the nighttime, watchmen should make complete rounds of all accessible areas of the vessel every 20 minutes.

b. An independent alarm system from the bridge should be provided serving the emergency squad berthing spaces for the purpose of alerting them at the first sign of an emergency.

c. All fire screen doors, except normally closed doors, should be capable of release from a control station on the bridge and also at the doors themselves. The doors should be capable of automatically closing upon failure of the control system.

d. Steel fire-screen bulkheads should be provided with incombustible insulation to provide adequate fire barriers.

e. All exposed paneling in passageway bulkheads that provide escape routes from passenger and crew staterooms should be of incombustible material.

f. All stairwells should be trunked in with incombustible paneling and fitted with fire-screen doors to enclose the area.

g. All ventilation ducts that pass through fire zone bulkheads should be provided with automatic fused fire dampers.

h. The sprinkler system should cover all interior combustible spaces accessible to passengers and crew including spaces where combustible material might be stowed.

i. A loudspeaker communication system should be provided to all passenger and crew areas.

j. All emergency means of escape available, such as stateroom windows and portholes, should be kept in good operable condition.

k. Vital communications systems such as general alarm circuits, loudspeaker system, etc., should be installed clear of high fire hazard areas and/or insulated against early damage.

l. Pressure should be maintained on the fire main system at all times.

m. On all overnight voyages on vessels equipped with berthing areas a fire and boat drill, including muster of passengers, should be held at starting or shortly thereafter.

n. Consideration be given to the adequacy of communication among officers, crew, and passengers concerning matters pertaining to safety of life at sea.

5. That the Commandant, through the U.S. representatives to IMCO, seek to revise the construction standards of new passenger vessels prescribed in the 1960 SOLAS to require the maximum use of incombustible material, as opposed to reliance on sprinklers and detecting systems in conjunction with partially combustible construction.

6. That the Commandant give consideration to implementing letters of commendation to those vessels and personnel who performed in the rescue operation in the highest tradition of the sea. This will be the subject of separate correspondence from the Board. ⚓

AMENDMENTS TO REGULATIONS

The *Proceedings* does not normally reprint Federal Register material in toto because of space limitations. Rather, as a public service, mention is made on this page of those Federal Register items published during the month that have a direct effect on merchant marine safety. Then, should one wish to read the regulation in its official presentation, he must purchase the applicable Federal Register from the Superintendent of Documents. Always give the date of the Federal Register when ordering. This date can be found in the *Proceedings* coverage of the items. See instructions in publications panel inside back cover.

TITLE 33 CHANGES

INLAND WATERS BOUNDARY LINES

Official names of certain navigational aids, boundary lines, and locations of aids have been recently changed in the following areas: New York Harbor, Delaware Bay and tributaries, Charleston Harbor, Savannah Harbor, St. Simons Sound, St. Andrew Sound and Cumberland Sound on the Atlantic Coast; Tampa Bay and tributaries, Mobile Bay, Ala., to Mississippi Passes, La., Mississippi Passes, La., to Sabine Pass, Tex., Brazos River, Tex., to the Rio Grande, Tex., on the gulf coast; Grays Harbor, Columbia River Entrance, Bodega and Tomales Bays, Monterey Harbor, Estero-Morro Bay, San Pedro Bay, Santa Barbara Harbor, Redondo Harbor, and Newport Bay on the Pacific coast. These changes are to be found in the Federal Register of 15 March 1966.

SEVENTH DISTRICT UNIT BOUNDARIES CHANGED

Captain of the Port areas within the 7th Coast Guard District have been revised in the Federal Register of March 22, 1966. Included are the Captain of the Port areas of Charleston, Jacksonville, Key West, Miami, Port Canaveral, San Juan, Savannah, and Tampa.

In related action in the same Federal Register was the publishing of the change of factory inspections at Sebring, Ohio, from the Pittsburgh Marine Inspection Office to the Cleveland office.

TITLE 46 CHANGES

LIFE PRESERVER MARKING CHANGES

The marking requirements on kapok, fibrous glass, and unicellular plastic foam life preservers manufactured under specifications found in 46 CFR 160.002, 160.005, and 160.055 have been amended to reflect the information that these life preservers may be used on motorboats. Sections 160.002–6, 160.005–6, and 160.055–8 are affected by this amendment in the Federal Register of March 25, 1966.

STIFFER U.S. BULK CARGO RULES PUBLISHED

In the last several years a number of casualties have occurred involving vessels transporting loose grain in bulk quantities as cargo. In at least two of the known casualties, feeder bulkhead failures have occurred. The subject of ships carrying grain cargoes in bulk is a matter for intensive study by all interested parties. The fact that ships carrying bulk grain cargoes continue to be involved in serious casualties under the various conditions which may be encountered at sea is indicative that the problem of grain shifting has not been satisfactorily resolved, even though actions have been taken to improve safe stowage, including requiring stronger feeder construction and the use of quality lumber. In accordance with the recommendations of the National Cargo Bureau, Inc., which are based upon studies of grain stowage and upon consideration of recent casualties to vessels loading grain in U.S. ports, sections 144.20–10, 144.20–20(a), and 144.20–34(a) in 46 CFR Part 144 have been amended to eliminate the provisions which have permitted the omission of shifting boards in and below feeders so that, in the future, centerline divisions in and below the feeders will be required on U.S. flag vessels. However, under the provisions of Regulations 4 (a) and (b) of Chapter VI of the 1960 SOLAS Convention, vessels of foreign flag will be permitted to load grain without providing shifting boards or other suitable longitudinal divisions in and below the feeders when so allowed by the administration of the country to which the vessel belongs.

The U.S. action, as set forth in the Federal Register of March 10, 1966, is being also transmitted to other governments, via IMCO, with a recommendation that similar action be taken with respect to their own ships. At the same time, it is understood that the National Cargo Bureau will advise the owners and/or agents of foreign vessels of the desirability of installing shifting boards in and below feeders on their vessels loading grain in U.S. ports.

LICENSES IN TEMPORARY GRADES APPROVED TO ALLEVIATE SHORTAGES

The adequate manning of vessels has become a serious problem with the sudden increase in the number of active vessels needed to carry cargoes from U.S. ports. This condition has been reported to various agencies of the U.S. responsible for movement of cargoes connected with maritime activities. The Coast Guard has found that personnel to man vessels being reactivated are not always available and concurs in the findings of other Agencies concerning the unavailability of personnel. The Coast Guard has the administrative responsibility for establishing requirements and procedures for the licensing of persons who are deemed sufficiently qualified to serve as licensed officers on merchant vessels.

The regulations in 46 CFR Part 10 set forth qualifications for men to serve as officers of merchant vessels under normal conditions and procedures for applicants to obtain various grades of licenses. Under emergency conditions or other special circumstances when licensed officers are not available in sufficient numbers to man all the vessels required to meet the needs of commerce, it is reasonable to provide for the licensing of officers for such emergency purposes. This is necessary in order that vessels be manned by officers who are considered sufficiently qualified under such emergency conditions who might not otherwise be considered as fully qualified.

The Under Secretary of the Navy in a letter dated January 20, 1966, requested the Coast Guard to take appropriate action to alleviate the problem concerning a shortage of available Third Assistant Engineers and proposed that favorable consideration be given to reducing the sea service requirements in 46 CFR Part 10 for applicants to qualify as Third Assistant Engineers. The problems in availability in various ports of persons holding Third Assistant Engineer licenses, as well as those holding Third Mate licenses and the potential shortages of other licensed personnel, were investigated. The Coast Guard has found that definite shortages or potential shortages in the availability of licensed officers below the grades of Master and Chief Engineer exist. Therefore, it is found necessary in the public interest that additional regulations designated as 46 CFR Part 11, as set forth in this document, regarding licenses in temporary grades or

special endorsements on licenses to permit temporary service in higher grades are needed in order to make available persons found to be qualified to serve as officers of vessels under present conditions.

In the public interest, the entirely new Part 11 to 46 CFR is carried below:

Subpart 11.01—General

§ 11.01–1 Application.

(a) The regulations in this part apply to all applicants for licenses to serve as "Temporary Third Mate" or "Temporary Third Assistant Engineer," and for special endorsements on regular licenses as Second and Third Mates and Second and Third Assistant Engineers which will permit the holders to serve temporarily in the grade next higher than that endorsed on the regular licenses.

(b) The applicable regulations in Part 10 of this subchapter shall apply in all cases except to the extent that certain requirements in §§ 10.05–1 to 10.10–29, inclusive, are modified to permit issuance of licenses as "Temporary Third Mate" or "Temporary Third Assistant Engineer," and for endorsement of certain licenses authorizing the holders to serve temporarily in the grade next higher than the grade in which the license is issued other than as Master or Chief Engineer.

§ 11.01–3 Purpose.

(a) The regulations in this part set forth the special, reduced requirements of sea service by which applicants may be considered qualified for licenses as "Temporary Third Mate" or "Temporary Third Assistant Engineer." Compliance with these requirements will permit the issuance of licenses in temporary grades to those applicants who have established to the satisfaction of the Officer in Charge, Marine Inspection, that they possess the other qualifications necessary and are entitled to be issued such licenses.

(b) The regulations in this part set forth the special conditions under which the Officers in Charge, Marine Inspection, may endorse regular licenses as Second and Third Mates or Second and Third Assistant Engineers to permit qualified holders to serve temporarily in the grade next higher than that endorsed on the regular licenses.

§ 11.01–5 Duration of regulations.

(a) The regulations in this part shall be in effect for such a period of time as may be considered necessary to provide licensed officers in emergency situations upon the request of an authorized official of the U.S. Government. The amendments, revisions, additions or cancellations of these regulations shall become effective ninety (90) days after the date of publication in the Federal Register unless the Commandant shall fix a different time.

§ 11.01–10 Duration of licenses in temporary grades or special endorsements issued pursuant to this part.

(a) The licenses in temporary grades issued under the provisions of this part shall be valid for a period of five (5) years from the date of issuance unless sooner canceled or suspended by proper authority as published in the Federal Register. Licenses in temporary grades shall not be renewed.

(b) The special endorsements placed on regular licenses to permit service in the grade next higher shall be valid for the period of the regular license. The special endorsement may be continued upon the first renewal of the regular license subsequent to obtaining the special endorsement unless sooner canceled or suspended by proper authority as published in the Federal Register. Except as provided in this paragraph, special endorsements shall not be renewed.

Subpart 11.05—Definitions

§ 11.05–1 General.

(a) Certain terms or words used in this part shall be used in accordance with the definitions in this subpart unless otherwise stated. When terms or words are defined in other regulations in this chapter, such definitions shall apply to the terms or words in this part except when such term or word is defined otherwise in this subpart.

§ 11.05–5 Endorsement for temporary service.

(a) The endorsement for temporary service means the special endorsement placed on a regular license authorizing the holder to serve in a temporary capacity on vessels in the grade next higher than the grade of the regular license, but subject to any other limitations placed on the regular license.

§ 11.05–10 Regular license.

(a) The term "regular license" means the license issued to an applicant who qualifies therefor under the provisions of Part 10 in this subchapter, and authorizes the holder to serve in the grade or grades stated therein and subject to any limitations placed on the license.

§ 11.05–15 License in temporary grade.

(a) The term "license in temporary grade" means the license issued to an applicant who qualifies for "Temporary Third Mate" or "Temporary Third Assistant Engineer" under the provisions of this part.

Subpart 11.10—Licenses in Temporary Grades

§ 11.10–1 Temporary Third Mate.

(a) The applicable procedures and requirements in Part 10 of this subchapter shall be followed and the applicant for a license as "Temporary Third Mate" will be considered eligible upon presentation of evidence of 24 months' service on deck in a watchstanding capacity and endorsement as "Able Seaman" on his merchant mariner's document.

(b) After application to the Officer in Charge, Marine Inspection, any person who is found qualified under the requirements set forth in this part shall be issued a license endorsed as "Temporary Third Mate."

(c) Such license endorsed as "Temporary Third Mate" authorizes the holder to serve in the capacity of "Third Mate" subject to any limitations appended with the same force and effect of a regular license issued without the term "temporary."

§ 11.10–5 Regular license as Third Mate.

(a) The holder of a license as "Temporary Third Mate," upon completion of such additional service as to meet the 36 months' service required for a regular license as "Third Mate" in Part 10 of this subchapter, is considered eligible for a regular license as Third Mate without examination. Such holder may submit a regular application with evidence of additional service to the Officer in Charge, Marine Inspection, who shall issue a regular license as Third Mate.

§ 11.10–50 Temporary Third Assistant Engineer.

(a) The applicable procedures and requirements in Part 10 of this subchapter shall be followed and the applicant for a license as "Temporary Third Assistant Engineer" shall be considered eligible upon presentation of evidence of 18 months' service in the capacity of Fireman, Oiler, Watertender, Junior Engineer, Deck Engine Mechanic, or Engine Man. Applicants presenting evidence of service as Electrician or Refrigeration Engineer will be given consideration when specifically recommended for a license by the Chief Engineer of a vessel on which such service has been performed and by the Superintending Engineer of a company on whose vessel the applicant has served in such capacity.

(b) After application to the Officer in Charge, Marine Inspection, any person who is found qualified under the requirements set forth in this part shall be issued a license endorsed as "Temporary Third Assistant Engineer."

(c) Such license endorsed as "Temporary Third Assistant Engineer" authorizes the holder to serve in the capacity of "Third Assistant Engineer" subject to any limitations appended with the same force and effect of a regular license issued without the term "temporary."

§ 11.10–55 Regular license as Third Assistant Engineer.

(a) The holder of a license as "Temporary Third Assistant Engineer," upon completion of such additional service as to meet the 36 months' service required for a regular license as "Third Assistant Engineer" in Part 10 of this subchapter, is considered eligible for a regular license as Third Assistant Engineer without examination. Such holder may submit a regular application with evidence of additional service to the Officer in Charge, Marine Inspection, who shall issue a regular license as Third Assistant Engineer.

Subpart 11.15—Endorsements on Licenses To Permit Temporary Services

§ 11.15–1 Special provisions.

(a) Upon application and after finding that an applicant meets the special conditions in this subpart, the Officer in Charge, Marine Inspection, may place on a regular license of Second and Third Mates and Second and Third Assistant Engineers an endorsement which will permit the holder to serve in a temporary capacity in the next higher grade, subject to any other limitations on such license.

(b) The holder of a regular license as Second or Third Mate or Second or Third Assistant Engineer who has served at sea under the authority of and in the capacity of such a regular license for a period of at least 6 months is eligible to apply for an endorsement authorizing him to serve temporarily in the grade next higher than the capacity stated on the regular license, but subject to any other limitations placed on such license, without examination.

(c) The holder of a regular license with an endorsement permitting service in the next higher grade, upon completion of such additional service as to meet the 12 months' service for the next higher grade as required by Part 10 of this subchapter, may apply for a regular license in that grade subject to examination. When such holder presents his application and shows to the satisfaction of the Officer in Charge, Marine Inspection, that he possesses all the applicable qualifications for such higher grade regular license specified in Part 10, the Officer in Charge, Marine Inspection, shall issue such regular license. No regular license shall be issued until the applicant has met all the service and examination requirements specified in Part 10 for such regular license.

§ 11.15–5 Authority of endorsement on license for temporary service.

(a) The endorsement on a regular license for temporary service authorizes the holder to serve in the capacity stated thereon subject to any limitations appended with the same force and effect of a regular license issued without the term "temporary." These amendments are to be found in the Federal Register of March 17, 1966.

APPROVED EQUIPMENT

COMMANDANT ISSUES EQUIPMENT APPROVALS; TERMINATES OTHERS

By Commandant's action of March 16, 1966, Coast Guard approval was granted to certain items of lifesaving, firefighting, and other equipment and materials. Included were life preservers, buoyant cushions, buoyant vests, desalter kits, pressure vacuum relief valves, safety relief valves, CO_2 fire extinguishing systems and flame arresters.

By Commandant's action of March 1, 1966, Coast Guard approval was granted to certain life preservers, buoyant apparatus, lifeboats, buoyant vests, buoyant cushions, work vests, sound-powered telephone systems, power boiler safety valves, relief valves, and flame arresters. At the same time approvals were terminated on certain davits, buoyant vests, buoyant cushions, and flame arresters.

Those interested in these approvals and terminations should consult the Federal Registers of March 15, and 24, 1966, for detailed itemization and identification.

LIFEBOAT EQUIPMENT

NEW EQUIPMENT LISTED

In the Federal Register of 8 September 1965 (30 F.R. 11414–11495) it was noted that certain items of new lifeboat equipment primarily necessitated by the 1960 SOLAS Convention may not be available and a reasonable time would be given to bring the vessel into compliance (30 F.R. 11415). Except for the 15-minute floating orange smoke distress signal which is undergoing development and tests but not yet commercially available in the United States, the other additional items of lifeboat equipment, the lifeboat protecting covers, the fishing kits, and the desalter kits, are now available from the manufacturers listed below. Therefore, the lifeboat protecting covers, fishing kits, and desalter kits shall be provided. Although there are approximately 150 lifeboat covers in use without approval numbers, all such covers manufactured by Gentex Corp. are acceptable. However, all approved protecting lifeboat covers manufactured after 10 January 1966, will bear approval numbers.

The following approvals have been granted:

DESALTER KIT

Approval No. 160.058/1/0.	Ionac Chemical Co., Birmingham, N.J., 08011.
Approval No. 160.058/2/0.	Van Brode Milling Co., Inc., Clinton, Mass., 01510.

FISHING KIT

Approval No. 160.061/2/0.	Monroe Industries Inc., Post Office Box 894, New Haven, Conn., 06504.
Approval No. 160.061/3/0.	Van Brode Milling Co., Inc., Clinton, Mass., 01510.

Protecting cover for lifeboats. Existing protecting covers for lifeboats made by the Gentex Corp., Carbondale, Pa., which were constructed in accordance with MMT Guide for Protecting Cover for Lifeboat (5946/160.035), are acceptable.

Approval No. 160.065/1/0.	Gentex Corp., Carbondale, Pa., 18407.

The available additional equipment necessary to meet the applicable rules and regulations is required in all lifeboats on ocean and coastwise vessels. All passenger vessels shall have this equipment on board at the time of the first inspection for certification after 26 May 1966. All tank, cargo, and miscellaneous vessels shall have this equipment on board at the time of the first inspection for certification or midperiod inspection, whichever occurs first, after 26 May 1966. If the owner, agent, or master of a vessel can show to the satisfaction of the Officer in Charge, Marine Inspection, that compliance with such equipment regulations is unreasonable or such equipment cannot be obtained, then the Officer in Charge, Marine Inspection, may issue a deficiency notice on Form CG–835 specifying a date by which the equipment shall be on board, which in no event shall exceed 6 months from date Form CG–835 is issued.

The cooperation of owners, masters, and agents of ocean and coastwise vessels is requested and they are urged to obtain the additional new equipment required for lifeboats at the earliest possible date. The ordering

of such equipment prior to dates for the scheduled inspections of their vessels is essential since the Officer in Charge, Marine Inspection, must have reasonable grounds, other than failure to order the equipment, before he may exercise the latitude provided. From the Federal Register of March 4, 1966.

CIRCULARS

NVIC 0–66 LISTS ALL CIRCULARS IN FORCE

The annual listing of navigation and vessel inspection circulars in force has been made in NVIC 0–66, available at the local marine inspection office.

STRUCTURAL STEEL CONTINUITY RULES

Navigation and Vessel Inspection Circular No. 1–66 has been published to point out the need for special consideration whenever it is proposed to use steels other than ordinary ship steel or specially approved steels in hull construction. The circular also points out the need for recognizing that fittings, etc., attached by welding to any part of the ship's structure generally tend to share the stress borne by that part of the structure. Cases have recently come to attention where steels not complying with section 39 of the American Bureau of Shipping Rules and not entirely suitable have been used or are proposed for use.

In order to be suitable for use in ships' hulls, steel needs to be suited to ship fabrication procedures, to have sufficient strength, and to have sufficient ductility and notch toughness for the ambient temperatures which may occur. To be adequate it should sufficiently meet each of these conditions, i.e., an excess ability in any one respect does not satisfactorily compensate for a deficiency in any other. Considering these requirements, it is necessary to recognize that even items which are intended to serve no structural function and which are totally disregarded in the making of strength calculations, need to be regarded as structural if they are connected by welding to the more highly stressed elements of a ship's structure. This is because the continuity provided by the welding generally results in such members being subjected, at least in part, to the same stresses as the member to which they are attached. Thus, half rounds fitted around hatch coamings bear the same stress as the adjoining coaming material, etc. Evidently with the thought that short members are not subjected to full stress, items such as car or crane rails have sometimes been fitted in short lengths with gaps between each section. While the stress in the portion of such members farthest removed from the plating to which they are attached may be less than that in the plating, the stress along the line of attachment is the same as that in the plating. In addition, the stress concentration and conditions of restraint existing at each end of each section provide a potential fracture source at each such point.

Referring particularly to the application of car or crane rails on vessel and barge decks, direct welded connection of such members to decks may not be satisfactory. This is because the higher carbon content of rail steel and other properties which may be at variance from those specified for ship steel may appreciably reduce the notch toughness. While there may be some instances of apparently satisfactory performance of such installations, it is believed that these may be simply fortuitous, and may reflect the fact that the properties of some of these steels can vary over a pretty wide range and therefore may sometimes be appreciably better than the prevailing average.

The circular specifies that the full approval of the American Bureau of Shipping (or other classification society recognized by the Coast Guard) and of the Commandant (MMT) shall be obtained whenever steels other than those complying with the requirements of section 39 of the American Bureau of Shipping Rules are proposed for use either directly in the hull structure or in subsidiary items attached by welding to the higher stressed portions of the main hull structure such as the deck, upper side shell, bilge or bottom. For such an application to be considered, full details shall be furnished as to the physical properties (including notch ductility and fatigue and corrosion data, when pertinent) and chemical properties of the steel in question together with pertinent related structural details. Copies of NVIC 1–66 may be obtained at the local marine inspection office or by writing Commandant (CHS) U.S. Coast Guard, Washington, D.C., 20226.

NVIC 2–66

Navigation and Vessel Inspection Circular 2–66 has been published giving broader explanation to Coast Guard policy regarding lifeboat equipment which appears in Federal Register coverage on page 108.

COLD WEATHER USE OF UNICELLULAR PLASTIC FOAM LIFE PRESERVERS

Coast Guard Merchant Marine inspectors observed that vinyl dip coated plastic foam life preservers with approval numbers between 160.055/1 and 160.055/49 stowed on open decks became much less flexible in cold weather. This loss in flexibility could prevent a person from stretching the head opening wide enough to don these life preservers. All vessels on routes where the air temperature will be below 28° F. that have on board unicellular plastic foam life preservers are advised to check them for donning at these low temperatures. Those life preservers that cannot be donned at low temperatures should be stowed inside or transferred to vessels on routes with warmer air temperatures. The production of these life preservers has been stopped. Those life preservers now produced with approval numbers 160.055/50 and over may be donned in cold weather without difficulty.

STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from March 1, to March 31, 1966, 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

Verax Chemical Co., 3753 Brookly Ave. Northeast, Seattle, Wash., 98105, Certificate No. 643, dated March 21, 1966, SPRA-BRYTE HEAVY DUTY CLEANER.

DuBois Chemicals, Broadway at 7th, Cincinnati, Ohio:

Certificate No. 644, dated March 21, 1966, A–612.

Certificate No. 645, dated March 21, 1966, DuBOIS F.O.T.

Associated Chemists, Inc., 4401 S.E. Johnson Creek Blvd., Portland, Oreg., 97206:

Certificate No. 646, dated March 21, 1966, SUPER SPRAY No. 480.

Certificate No. 647, dated March 21, 1966, ROYAL SPRAY CLEANER.

Certificate No. 648, dated March 21, 1966, CROWN SPRAY CLEANER.

Nalco Chemical Co., 6216 W. 66th Pl., Chicago, Ill., 60638, Certificate No. 363, dated March 10, 1966, NALCO 155.

CANCELED

(Failed To Renew in Accordance With 46 CFR 147.03–9)

Chemical Compounding Corp., 262 Huron St., Brooklyn, N.Y.:
Certificate No. 231, dated June 8, 1961, QUIST No. 1412—SUPER (INSECTICIDE);
Certificate No. 408, dated Dec. 1, 1959, QUIST No. 1400—5 SPECIAL;
Certificate No. 422, dated Feb. 11, 1960, QUIST No. 1400.

Nuvite Chemical Compounds Corp., 213 Freeman St., Brooklyn, N.Y., Certificate No. 116, dated July 8, 1953, NUVITE MARINE CLEANER.

Samuel Halaby Inc., 482 Clinton Ave., South Rochester, N.Y., Certificate No. 113, dated March 17, 1942, KIL-MOE.

Pennsalt Chemicals Corp., 2700 South Eastern Ave., Los Angeles, Calif., 90022:
Certificate No. 460, dated April 9, 1964, PENNSALT 3024 DIESEL FUEL ADDITIVE.
Certificate No. 579, dated October 25, 1963, PENNSALT 3003 HEAVY DUTY CLEANER.

DuBois Chemicals, Inc., Broadway at 7th, Cincinnati, Ohio:
Certificate No. 506, dated Feb. 1, 1962, WAX-AWAY.
Certificate No. 507, dated Feb. 1, 1962, B 1006.
Certificate No. 509, dated Feb. 1, 1962, AERO CARB.

Franklin Research Co., 5134 Lancaster Ave., Philadelphia, Pa., Certificate No. 318, dated Aug. 22, 1950, FRANKLIN'S SLO-SURFACE WAX.

Mine Safety Appliance Co., 201 North Braddock Ave., Pittsburgh, Pa., Certificate No. 180, dated March 12, 1945, VELOCITY POWER RIVET REMOVER.

West Chemical Products, Inc., 42–16 West St., Long Island City, N.Y., Certificate No. 518, dated April 4, 1962, WESTICIDE.

AFFIDAVITS

The following affidavits were accepted during the period from February 15, 1966, to March 15, 1966:

Texas Flange & Manfacturing Co., Inc., P.O. Box 40127, Houston, Tex., 77040, FLANGES.

Crane, Chapman Division, 203 Hampshire St., Indian Orchard, Mass., 01501, VALVES AND CASTINGS.[1]

[1] Name changed from Chapman Valve Manufacturing Co., to Crane, Chapman Division.

Public Hearing

(Continued from page 87)

Item No.	*Subject*
IXe.	Distinctive blue lights authorized for use by law enforcement vessels.
Xa.	Permissive electric bonding of tank barges.
Xb.	Liquefied flammable gas, definition.
XIa.	Official transcripts of sea service showing military service by license applicants.

The Merchant Marine Council accepted certain changes in the following proposals and recommended their approval as revised:

Item No.	*Subject*
II.	Small passenger-carrying vessels.
IIIc.	Shipper's requirements re: Packing, marking, labelling, and shipping papers.
IIId.	Vessel's requirements re: Acceptance, handling, stowage, etc.
IIIe.	Railroad vehicles, highway vehicles, vans, or portable containers loaded with explosives or other dangerous articles and transported on board ocean vessels.
Va.	Intrinsically safe instruments and equipment.
Vc.	Wiring methods and materials for hazardous locations.
VIa.	Painters provided for lifefloats on manned platforms.
VIId.	Life preserver for bow lookout.
VIIe.	Life preservers, general, for merchant vessels.
VIIIa.	Engineroom manning for uninspected vessels of 200 gross tons and over with fully automated pilothouse control.
IXb.	Posting Pilot Rules on Great Lakes vessels.
IXc.	Lights for moored barges.
IXd.	Navigation lights and shapes, whistles, foghorns, and fog sound devices.

The following proposals are under further study:

Item No.	*Subject*
Ia.	Uniform State Waterway marker system; private aids to navigation.
IIIa.	Shipments in international trade and subject to the 1960 International Convention for Safety of Life at Sea, Chapter VII.
IIIf.	Detailed regulations governing flammable liquids.
IIIg.	Detailed regulations governing flammable solids and oxidizing materials.
IIIm.	Detailed regulations governing hazardous articles.
IIIn.	Detailed regulations governing the transportation of military explosives and hazardous munitions on board vessels.
IIIo.	Vessels specially suitable as vehicle carriers for transporting automobiles or other self-propelled vehicles offered for transportation with fuel in tanks.
IVa.	Propylene oxide.
IVb.	Phosphoric acid.
VIIh.	Releases, hydraulic and manual, for inflatable liferafts.
Xc.	Liquefied flammable gas, general revision.
XIb.	Deck licenses as master and pilot and as mate and pilot of freight and towing vessels of not more than 1,000 gross tons.
XII.	User charges for services.

MERCHANT MARINE SAFETY PUBLICATIONS

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

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402. Subscription rate is $1.50 per month or $15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1966 are now available from the Superintendent of Documents, price $2.50.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (8–1–62).
115	Marine Engineering Regulations and Material Specifications (9–1–64). F.R. 2–13–65, 8–18–65, 9–8–65.
123	Rules and Regulations for Tank Vessels (4–1–64). F.R. 5–16–64, 6–5–64, 3–9–65, 9–8–65.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (9–1–65). F.R. 12–8–65, 12–22–65, 2–5–66, 3–15–66.
172	Rules of the Road—Great Lakes (6–1–62). F.R. 8–31–62, 5–11–63, 5–23–63, 5–29–63, 10–2–63, 10–15–63, 4–30–64, 11–5–64, 5–8–65, 7–3–65, 12–22–65.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–65).
176	Load Line Regulations (7–1–63). F.R. 4–14–64, 10–27–64, 9–8–65.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (6–1–62). F.R. 1–18–63, 5–23–63, 5–29–63, 9–25–63, 10–2–63, 10–15–63, 11–5–64, 5–8–65, 7–3–65, 12–8–65, 12–22–65, 2–5–66, 3–15–66.
190	Equipment lists (8–3–64). F.R. 10–21–64, 10–27–64, 3–2–65, 3–26–65, 4–24–65, 5–26–65, 7–10–65, 8–4–65, 10–22–65, 10–27–65, 1–27–66, 2–2–66, 2–5–66, 2–10–66, 3–15–66, 3–24–66.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (2–1–65). F.R. 2–13–65, 8–21–65, 3–17–66.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (10–1–63). F.R. 11–5–64, 5–18–65.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (3–1–65).
239	Security of Vessels and Waterfront Facilities (7–1–64). F.R. 6–3–65, 7–10–65, 10–9–65, 10–13–65, 3–22–66.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (4–1–64). F.R. 6–5–64, 8–21–65, 9–8–65.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (9–1–64). F.R. 2–13–65, 3–9–65, 8–21–65, 9–8–65.
258	Rules and Regulations for Uninspected Vessels (1–2–64). F.R. 6–5–64, 6–6–64, 9–1–64, 5–12–65, 8–18–65, 9–8–65.
259	Electrical Engineering Regulations (7–1–64). F.R. 2–13–65, 9–8–65.
266	Rules and Regulations for Bulk Grain Cargoes (7–1–64). F.R. 3–10–66.
268	Rules and Regulations for Manning of Vessels (2–1–63). F.R. 2–13–65, 8–21–65.
269	Rules and Regulations for Nautical Schools (5–1–63). F.R. 10–2–63, 6–5–64, 8-21–65, 9–8-65.
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, 9–8–65.
293	Miscellaneous Electrical Equipment List (6–1–64).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (10–1–59). F.R. 10–25–60, 11–3–61, 4–10–62, 4–24–63, 10–27–64.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (1–3–66).
329	Fire Fighting Manual for Tank Vessels (4–1–58).

CHANGES PUBLISHED DURING MARCH 1966

The following have been modified by Federal Registers:
CG–266, Federal Register, March 10, 1966.
CG–169, CG–184, and CG–190, Federal Register, March 15, 1966.
CG–191, Federal Register, March 17, 1966.
CG–239, Federal Register, March 22, 1966.
CG–190, Federal Register, March 24, 1966.

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