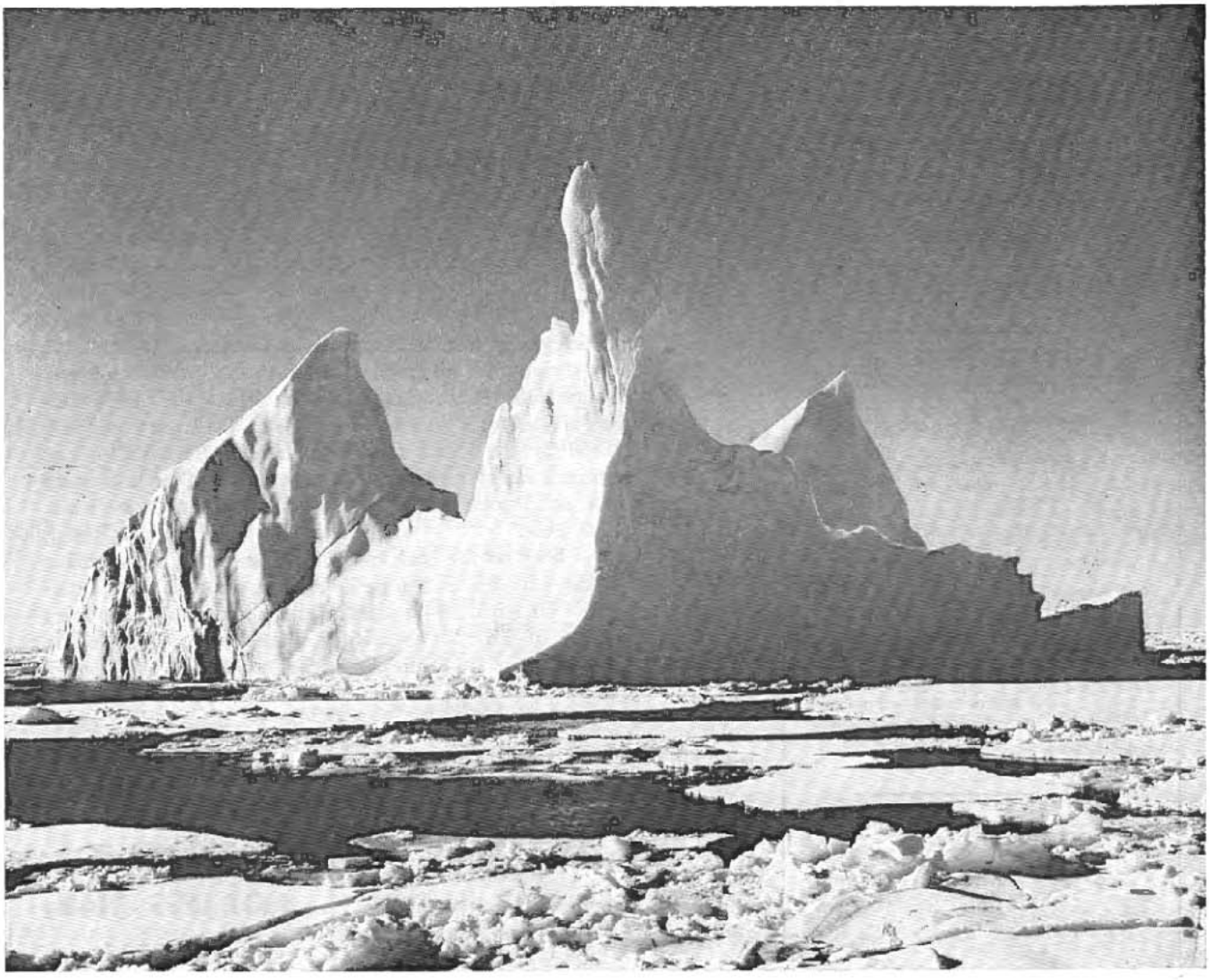
PROCEEDINGS
OF THE MARINE SAFETY COUNCIL



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PROCEEDINGS

OF THE MARINE SAFETY COUNCIL

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COVERS

Icebergs can assume fantastic shapes after they break off from the mother glacier and start the long, slow journey through Baffin Bay and Davis Strait to threaten the shipping lanes of the North Atlantic. The one on the front cover was sighted by the Coast Guard icebreaker *Eastwind* (since decommissioned) during a voyage that took her to a point in the solid polar ice slightly less than 442 miles from the North Pole.

The berg on the back cover is somewhat less impressive visually, but this is believed to be the one that sank the *Titanic* on April 14–15, 1912. The photo was taken from the deck of the cable ship *MacKay Bennett,* one of the first to reach the scene of the disaster.

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

maritime sidelights

PROJECT ICEWARN

Using information relayed via a satellite 23,000 miles out in space, commercial vessels are now able for the first time to safely ply the Great Lakes during the frozen winter season.

The satellite, operated by the National Oceanic and Atmospheric Administration (NOAA), is a vital link in an all-weather ice information system which brings detailed radar pictures of ice in Great Lakes shipping lanes, along with interpretative data and weather information, directly into the pilothouses of underway shipping and Coast Guard icebreakers. Armed with this information, often only a few hours old, vessel masters can now plan a course around heavy ice or through thinner ice.

The Great Lakes–St. Lawrence Seaway system traditionally has been closed to navigation because of ice from mid-December until early April. But during the 1974–75 winter, as a result of the Great Lakes Navigation Season Extension Demonstration Program, more than 15 million additional tons of commerce were shipped within the Lakes.

A major contribution to the program was "Project Icewarn," operating again this winter with 15 participating commercial vessels.

Project Icewarn utilizes a special "side-looking" airborne radar mounted on Coast Guard aircraft to determine the type, location, and aerial distribution of the ice cover in the Lakes. Flights are made over various predetermined problem ice areas three or four times a week, and the radar image is relayed to the Coast Guard Ice Center in Cleveland. There interpretative ice charts are prepared by Coast Guard, NOAA, and NASA experts and are broadcast along with weather data to facsimile recorders aboard Great Lakes vessels via the MARAD marine VHF–FM radio network.

Researchers from NASA and NOAA's Great Lakes Environmental Research Laboratory have determined that because of the geographic location and extent of the Great Lakes, the region is subjected to a variety of wind and weather patterns, and to rapid temperature changes.

In this climatic zone, the period of freezing temperature generally is not long enough to cause a lake-wide, solid stable ice sheet to form. Consequently, various stages of ice formation and decay often occur simultaneously at different locations within the lakes and can even occur at different locations in the same lake. Additionally, storms, winds, current and other factors produce rapid changes in the location and extent of the ice cover on the lakes, making rapid collection, analysis, and dissemination of information essential to the success of the program.

BOATING ACCIDENTS

Recreational boaters who ignore common boating safety principles are prime targets for accidents which often have tragic endings. Elements common in recent boating accident reports are outlined in the following short scenarios:

—Two men were duck hunting in a 10-foot jon boat when they spotted a flock of ducks and turned to fire at them. The sudden shifting of weight caused the boat to capsize. There were no life preservers on board. One man survived by holding onto the boat but the other drowned.

—The capacity plate on a 12-foot flat bottom boat read "Maximum hp.: 5; Maximum person capacity: 310 lbs; Maximum weight capacity: 390 lbs." The boat, powered by a 9½ hp. outboard, was underway with 4 persons on board (total weight 600 lbs.) The boat began to take on water over the bow, flooded, and capsized. Three people stayed with the boat while the fourth men started to swim for shore. The three who had stayed with the boat were rescued; the swimmer (blood alcohol content .21) drowned. He had never received any formal instructions in boating safety.

—Three men launched a 16-foot outboard motorboat. Upon pushing off from shore the owner unsuccessfully attempted to start the outboard engine while the two passengers looked for the boat's drain plug. The drain plug was never found. The boat drifted from shore, flooded, and capsized. One man swam to shore, one clung to the boat, and the third was trapped beneath the boat and drowned.

—Two men in a 12-foot aluminum outboard were fishing about 100 yards below a dam which was adequately marked with warning notices. When the boat's engine failed, the craft was drawn into the swift eddies below the dam and capsized by the rough water. Life preservers were available but they were not used and the boat was not equipped with an anchor or paddles. In this accident one man drowned.

The common elements in these stories? Boaters ignoring common boating safety principles, even to the point of not having or not using life preservers.

Of course, if the people involved had taken other precautions the accidents might not have happened at all, but if life preservers at least had been used, all might have lived to learn from their mistakes.

203-184—76——2

International Ice Patrol Service In The North Atlantic Ocean

As the 1976 iceberg season draws near, the 64th year in the annals of the International Ice Patrol, some conjecture exists concerning the severity of the upcoming season. The 1975 season proved to be a relatively light season with approximately 100 bergs drifting south of 48°N latitude. During the three previous years, a combined record number of 3,820 icebergs had drifted south of 48°N latitude into North Atlantic shipping routes. With 1972 the heaviest on record (1,587 icebergs) and 1974 the second heaviest with 1,386 bergs, the 1973 total of 847 seemed meager. Yet it was still well over three times the 1946–1973 average of 259 icebergs. Never before had there been three heavy iceberg years in a row. Does the 1975 low of 100 icebergs represent a swing of the pendulum, or a lull in the storm?

To help provide an estimate of the iceberg potential each year, northern surveys are conducted in January and February. Most Arctic icebergs originate from Greenland glaciers, where as many as 10,000 calve each year. West Greenland icebergs originate primarily in Melville Bay, but there are also significant contributions from glaciers to the north and south of this remote location. These icebergs drift in a counterclockwise rotation around Baffin Bay, where many gradually deteriorate due to summer melting and wave erosion. Some are frozen in the heavy winter ice along the coast of Baffin Island and are pushed southward with the sea ice in late winter along the coast of Labrador. East Greenland icebergs come from the glaciers of Scoresby Sound and southward to just below the Arctic Circle. Some of these East Greenland icebergs drife southward to Cape Farewell (Kap Farvel) where those that survive join the West Greenland Current and begin a northward journey. They either cross Davis Strait intermingling with the southward-moving West Greenland icebergs, or continue northward joining the iceberg pool in Baffin Bay.

The January preseason surveys cover the Labrador coast, Davis Strait and Baffin Island north to Cape Christian. The iceberg count represents a maximum potential to reach 48°N latitude under normal drift conditions in the spring and summer months. February surveys include the northeast coast of Newfoundland, a second coverage of the Labrador coast, Baffin Island only as far north as Cape Dyer and across Davis Strait. When comparing the iceberg concentrations of both months together with meteorological conditions, a realistic potential for a light, moderate, or heavy season can usually be forecast.

In early spring icebergs and sea ice reach the northwest coast of Newfoundland. Here environmental conditions effect these icebergs that are now one, two, three or more years old. These factors include air temperature, sea temperature, surface winds, and the Labrador and North Atlantic Currents. Most all environmental factors are interdependent upon each other. For instance, a predominant northwest wind brings colder air temperatures into the area, spreads and promotes growth of sea ice (which retards wave erosion of icebergs), builds up the strength of the Labrador Current and lessens the influence of the North Atlantic Current; thus, more icebergs drift south of 48°N than would otherwise. Bergs melt slower and are able to drift further south towards and perhaps beyond the Tail of the Banks. The Ice Patrol office monitors the air temperatures, sea surface temperatures, and surface winds (the latter by analyzing bi-monthly average pressure gradients). From the air temperatures, frost-degree or melting-degree days can be computed to indicate a lengthening or shortening of the sea ice and iceberg season. Sea temperatures affect the melting rates of icebergs, in that 7/8 of an iceberg's mass is below the sea surface.

The Labrador and North Atlantic Currents are monitored by regular time-series oceanographic surveys in April and June, conducted by the Coast Guard Cutter *Evergreen*. Research studies are also conducted on the June survey.

A computer is provided with surface winds and ocean currents in the vicinity of reported bergs. A predicted iceberg drift is automatically

vectored twice a day, thus providing the mariner an Ice Bulletin of the best estimate of the limits of all known ice and bergs at the time of broadcast.

In February or March of each year, depending upon iceberg conditions, the International Ice Patrol commences its annual service of guarding the southeastern, southern and southwestern limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland for the purpose of informing passing ships of the extent of this dangerous region. Reports of ice in this area will be collected from passing ships and from flights by Ice Patrol aircraft. Information on ice condition is provided by the Ice Patrol at 0000 GMT and 1200 GMT each day in an Ice Patrol Bulletin which is sent out by radio and landline circuits.

Reporting

All shipping is requested to assist in the operation of the International Ice Patrol by reporting all sightings of ice at once to COMINTICEPAT NEW YORK NY via the radio stations listed in the following section. When reporting ice please include the following information:

1. Position of ice.
2. Size and shape of icebergs.
3. Concentration of ice (for sea ice, in eighths).
4. Thickness of ice (for sea ice, in feet).

Table 2 may be used to describe icebergs reported to the Ice Patrol.

In addition to ice reports, sea surface temperature and weather reports are of importance to the Ice Patrol in predicting the drift and deterioration of ice and in planning aerial patrols. Shipping is urged to make sea surface temperature and weather reports to the Ice Patrol every 6 hours when within latitudes 40° to 50° N and longitudes 42° to 60° W. Ships with but one radio operator should prepare the reports every 6 hours as re-

Ice Patrol aircrew preparing for last year's annual wreath-laying ceremony at the site of the 1912 Titanic *sinking.*

quested and hold them for transmission when the radio operator is on watch. When reporting, please include the following:

1. Ship position.
2. Course.
3. Speed.
4. Visibility.
5. Air and sea surface temperature.
6. Wind direction and speed.

It is not necessary to make the above report if the ship is making routine weather reports to METEO WASHINGTON.

Ice sighting, weather, and sea surface temperature should be reported to COMINTICEPAT NEW YORK NY through Coast Guard Ocean Weather Station C7H, Coast Guard Communication Stations, and, if unable to work U.S. Coast Guard Stations, Canadian Coastal Radio St. Johns/VON on the frequencies indicated in Table 3. Merchant ships calling to transmit Ice Patrol traffic are requested to use the regularly assigned international call sign of the station being called; however, Coast Guard stations will be alert to answer NIK, or NIDK calls if used. Calling and traffic passing should be as shown in Table 3.

Gulf of St. Lawrence Information

Ice information services for the Gulf of St. Lawrence, as well as the approaches, from 58°00'W to 66°-30'W longitudes including the Strait of Belle Isle to west of Belle Isle itself, are provided by the Canadian Ministry of Transport during the approximate period December to late June. Ships may obtain ice information by contacting Ice Operations Officer, Dartmouth, Nova Scotia via Sydney Marine Radio/VCO or Halifax Marine Radio/VCS. Details of the service are available from Ice Operations Office, Marine Services Information Center, Ministry of Transport, P.O. Box 1013, Dartmouth, Nova Scotia. Telephone 902–426–5664 or 5665. Telex 019–22625.

Supplementary ice conditions and navigational warning for the Strait of Belle Isle, the coast of Newfoundland, and the Grand Banks may be obtained by contacting Canadian coastal radio stations St. Anthony/VCM, Comfort Cove/VOO, St. Lawrence/VCP, or Corner Brook/VOJ.

Warnings

Shipping is reminded that in spite of the best efforts of the Ice Patrol to prevent such occurrences, icebergs

Table 1.—Broadcasts of the Ice Patrol Bulletin

RADIO STATION	TIME OF BROADCAST (GMT)	FREQUENCIES (kHz)
CW Broadcasts		
Coast Guard Communications Station Boston/NIK	0018	5320, 8502.
	1218	8502, 12750.
Coastal Radio St. Johns/VON	0000 and 1330	478.
Maritime Command Radio Mill Cove/CFH	0130 and 1330	438 (off second Thursday each month from 1200–1600 GMT), 4255, 6430, 12990, 16926.5 and 22397.5.
Naval COMMSTA Londonderry (LCMP BCST)	0500 and 1700	5870, 8090, 12135, 16180, 20225, 25590 (Note: 20225 and 25590 activated only 1200–2400 (GMT).
Naval COMMSTA Iceland		
Naval COMMSTA Norfolk		
Radiofacsimile Broadcasts		
Coast Guard Communications Station Boston/NIK	1600	8502, 12750 (drum speed 120).
Fleet Weather Central Norfolk (NFAX)	0605 and 1805	3357 (0001–1200 GMT), 4975, 8080, 10865, 16410 (1200–2400 GMT), and 20015. (Limits of all known ice on nephanalysis.)
CANMARCOM/CFH	0000 and 1200	4271, 9890, 13510, 17560 (drum speed 120). (Primarily sea ice in Gulf of St. Lawrence and North. Limits of icebergs sometimes given.)
Radio Bracknell/GFE	1400	4782, 9203, 14436, or 18261 (drum speed 120) (N. Atlantic Ice Obs.)
Radio Hamburg-Quickborn/Pinneburg/DGC, DGN.	0905 (except Sundays and Holidays) and 2145.	3695.8 (0905–1014 GMT) and 13627.1 (2108–2157 GMT) (drum speed 120). (Ice Conditions in West Atlantic.)
Special Broadcasts		
Coastal Radio St. Johns/VON	As required when icebergs are sighted outside the limits of ice between regularly scheduled broadcasts.	Preceded by International Safety Signal (TTT) on 500 kHz.

have and will drift unnoticed into the usual shipping routes in the area of the Grand Banks. The positions of icebergs in the Ice Bulletin are updated for drift at 12 hour intervals. However, it is stressed that after about 5 days without resighting, the positions estimated by drifting are unreliable. Date of an iceberg sighting is indicated in the Ice Bulletin.

In general, only icebergs south of about 48°N are included in the Ice Bulletin. In the event there are large numbers of icebergs south of 48°N, the Ice Bulletin will carry the positions of only those icebergs near the limits of ice and isolated icebergs or iceberg groups.

Carefully conducted tests by the Ice Patrol have proven that radar cannot provide positive assurance of iceberg detection. Since sea water is a better reflector of radar signals than ice, an iceberg or growler inside the area of sea return on the radar scope may not be detected. The *average* range of radar detection of a dangerous growler or very small iceberg, if detected at all, is only 4 miles. While radar remains a valuable aid for ice detection, its use cannot replace the traditional caution exercised in the vicinity of the Grand Banks while transiting south of the estimated limits of all known ice.

Note

Comments concerning operation of Ice Patrol, particularly concerning the effectiveness of the times and frequencies of radio transmissions, are of much interest to the Ice Patrol and are earnestly solicited. Ships are also requested to mail facsimile charts received at sea to Commander, International Ice Patrol, Building 110, Governors Island, New York, N.Y., 10004. Please indicate the frequency used and date, time, and position when the facsimile broadcast was received on the chart. ‡

Table 2.—Iceberg identification

SIZE	HEIGHT		LENGTH	
	Feet	Meters	Feet	Meters
Growler	Less than 4	Less than 1	Less than 20	Less than 6
Small Iceberg	4–50	1–15	20–200	6–60
Medium Iceberg	51–150	16–45	201–400	61–122
Large Iceberg	151–250	46–75	401–700	123–213
Very Large Iceberg	More than 250	More than 75	More than 700	More than 213

Shape	Description
Blocky	Steep sides with flat top. Very solid. Length-Height ratio less than 5:1.
Drydock	Eroded such that a large U-shaped slot is formed with twin columns. Slot extends into or near waterline.
Dome	Large round smooth top. Solid type iceberg.
Pinnacled	Large central spire(s) or pyramid(s) dominating shape.
Tilted-Blocky	Blocky iceberg which has tilted to present a triangular shape from the side.
Tabular	Flat topped iceberg with length-height ratio greater than 5:1.

Table 3.—Calling and transmission of traffic.

Purpose	Frequencies which should be used
Calling	500 kHz (If 500 kHz is being used for distress traffic then 512 kHz may be used as supplementary calling frequency). 2182 kHz (voice). Assigned HF (CW) calling frequencies.
Working Frequencies *Station*	
Ocean Weather Station C7H (occupied 1 August through 15 April only).	466 kHz (CW), 2670 kHz (Voice).
Coast Guard Communications Station Boston/NMF.	472, 8728, 12934.5, 22487.5 kHz (CW).
Coast Guard Communications Station Portsmouth/NMN.	466, 8465, 12718.5, 17002.4 kHz (CW) 2670 kHz (Voice).
Canadian Coastal Station St. Johns/VON.	478 kHz (CW).

The Marine Chemist and the Marine Inspector

By Lieutenant Commander Fred H. Halvorsen, USCG

This article is adapted from a paper presented at a session of the Marine Chemists' Association Seventeenth Annual Seminar held at Annapolis, Md., July 13–16, 1975.

There is no doubt that marine chemists perform an important and vital task to the maritime community in this country. They sell a product—safety. In this sense their organization and the Coast Guard are in the same business. The two organizations enjoy a unique and unusual relationship and it is this relationship I will discuss in this presentation.

Regulations

The importance which the U.S. Coast Guard places on the marine chemists' expertise, knowledge, and experience is best illustrated by the fact that their inspection services are required by *regulations* aboard a tank vessel prior to hot work (for instance, see 46 CFR 35.01). This regulation requires the services of a marine chemist certificated by the National Fire Protection Association or other designated person. The inspection itself is to be made in accordance with the provisions of NFPA Standard No. 306, "Control of Gas Hazards on Vessels to Be Repaired" (1972 Edition).

The Occupational Safety and Health Administration (OSHA) in the Department of Labor has mirrored this Coast Guard requirement in their ship repairing regulations. Prior to hot work, 29 CFR 1915.13 require a gas free certificate issued by a marine chemist.

Interviews with Coast Guard Officers

Recently, an attempt was made to discuss the work of marine chemists with as many Coast Guard marine inspection officers as possible. Because of their close proximity to the author, those officers who had been attached to marine inspection offices and were presently assigned to Headquarters provided the bulk of the information. Twenty marine inspection officers throughout the country were also contacted by telephone and asked to express their views. Approximately 40 Coast Guard officers were contacted and questioned.

Four basic questions were put to each person interviewed. These questions were chosen only to elicit a response and to prompt discussion. The four questions were:

(a) What do you think of marine chemists? Do they do a good job?

(b) Do you know what a marine chemist is supposed to do?

(c) Are there enough marine chemists?

(d) Have you had any good or bad experiences to relate regarding marine chemists?

The general responses follow:

What do you think about marine chemists? The response to this question was almost unanimous—Coast Guard marine inspectors are quite aware of the importance of marine chemists. They responded that marine chemists literally hold the life of the Coast Guard marine inspector in their hands. If the marine chemist does not do his job properly the marine inspector could find himself in difficulty—or worse.

In many cases the Coast Guard marine inspector is the first person to enter a tank or compartment aboard a vessel after the marine chemist has made his test. Good engineering practice dictates that tanks, voids, and cofferdams should not be entered alone. However, good engineering practice is sometimes modified by expediency—two inspectors may try to complete a vessel inspection by entering alternate spaces and periodically surfacing to check for one another. In another example, one marine inspector may stay on deck while the other enters the space to be inspected. In any case, rescue equipment is rarely close at hand and if anything untoward does happen, rescue would be difficult and possibly untimely. The marine inspector hopes that the marine chemist has done his job well.

How well does the marine chemist do his job? Coasts Guard officers are generally in agreement that the vast majority of marine chemists perform their required tasks in a professional and competent fashion. Some inspectors expressed across-the-board acceptance of any certificate issued by a marine chemist. Other slightly less enthusiastic inspectors said they would accept without question certificates issued by some marine chemists. Some inspectors stated that as in every other profession, there are good, fair, and poor marine chemists.

What is a marine chemist supposed to do? Most inspectors thought they had a pretty good idea how a marine chemist inspects and certifies a tank. Upon pressing them for a specific explanation however, few could respond entirely correctly.

Marine inspectors do understand that if the certificate says "Safe for Men" they can enter the space. Some admitted to not carefully reading the certificate. Others said they scrupulously review the certificate.

Many inspectors thought that a marine chemist always checks for oxygen and were not aware that the chemist can use his judgement in determining that sufficient oxygen is present. (It is understood that a recent revision to NFPA Standard 306 will make a test for oxygen mandatory as well as the test for toxic vapors. In many cases flammable vapors, oxygen, and toxic vapors must be checked.)

Many inspectors have never seen a marine chemist inspect a tank, void, or compartment and are familiar only with the gas free certificate. On the other hand, some inspectors have witnessed inspections and extensively discussed procedures with the marine chemist. Some marine chemists have excellent working relationships with Coast Guard marine inspectors and routinely will discuss conditions aboard different ships and barges in the yard or dock.

All marine inspectors seemed to be aware that marine chemists should physically enter the spaces they certify as "Safe for Men–Safe for Fire." The inspector assumes that the chemist has carefully inspected the tank and has travelled to all corners and crevices during the inspection. When a tank is certified safe for fire, the marine inspector does not expect to find combustible liquid in the tank bottom or behind web frames.

Are there enough marine chemists? As you are probably well aware some port areas have sufficient marine chemists and others do not, and the response to this question took that form. The answer depended on the specific port area.

In some instances marine inspectors offered examples where barge repairs were held up for a few days until the services of a marine chemist bechemical carrier SS *Edgar M.* came available. In most instances however, only a few hours' hold-up was mentioned. One office felt that it was beneficial to have only one marine chemist who worked in the area. This permitted them to become acquainted with him and benefit from the relationship. They knew his work would be good and were on sufficiently good terms that the chemist could be readily consulted.

In some situations our regulations permit the Officer in Charge, Marine Inspection, to select a person who is not a certified marine chemist to make the inspection prior to hot work on a vessel [for example, see 46 CFR 35.01(c)(1)], if the services of a certified marine chemist are not reasonably available. This selection of an alternate is for a specific vessel and is only made on recommendations of the vessel owner or contractor. Selection of an alternate to the marine chemist is normally not done. However, the OCMI's who brought up the subject said they felt some of the "competent persons", as defined by OSHA regulations, to be fully capable of making a professional and accurate inspection. They further stated they would have no compunction in making the selection of an alternate to the marine chemist if the services of a marine chemist were not "reasonably" available.

"Have you had any good or bad experiences to relate regarding marine chemists?" As stated previously, the majority of Coast Guard marine inspectors have a high regard for the marine chemists' profession, and in general are highly complimentary of their work.

One good example of the work done by a marine chemist was offered by the marine inspection office in Philadelphia.

On 31 January 1975, the U.S. flag *Queeny* rammed the moored crude carrier SS *Corinthos*. The subsequent explosion presented the *Queeny* with an unexpected passenger—a 110-ton piece of the side and deck of *Corinthos*. The problem was how to remove this uninvited and unwanted supercargo with safety and dispatch since the *Queeny* was fully loaded with both toxic and/or flammable materials. Coast Guard inspectors were present throughout the entire removal operation. They highly complemented the work of Mr. Irwin Carlitz, a marine chemist in Philadelphia. Mr. Carlitz helped to plan the removal and was present for consultation and advice throughout the entire operation. The safe and rapid removal of the plate was due in a large part to the professional manner in which Mr. Carlitz performed his job.

There is no doubt that the nature of their profession dictates that marine chemists must perform their tasks under sometimes trying circumstances—in inclement weather, late at night, or under physical duress. They may he called at any time and are expected by their clients and the Coast Guard to promptly discharge their requests.

The esteem with which insurance companies view their work was quite evident in the *Queeny/Corinthos* incident. The insurance company required that hull inerting, draining, and blanketing of tanks had to be approved by Mr. Carlitz before work could proceed.

The Coast Guard expects marine chemists to follow their own rules as established in NFPA Standard No. 306. If they do not dispatch their duties as outlined therein, complaints may arise from their local Coast Guard Marine Inspection Office.

For instance, on one occasion, an OCMI called our office and said he had a question concerning a marine

chemist. Apparently, the local marine chemist had been sending his non-certified assistant to inspect and certify vessels as gas free. This does not conform with our regulations. We turned the matter over to the Marine Chemists' Association for rectification. The matter was promptly cleared up.

One marine inspector cited the first investigation that he was called upon to perform involving a death aboard a vessel. The casualty was a marine chemist. Obviously, they are placing their own lives on the line in performing their job.

One warrant officer said that he had inspected a barge which had been certified gas free by a marine chemist. Welding operations were started just as he was leaving. A few seconds after he left the barge, an explosion occurred in the tank which had been certified gas free. Based upon prior experience with the marine chemist, the warrant officer said that he had complete faith that the proper inspection had been performed on the barge. He said that it appeared a gas pocket was present which went undetected during the marine chemist's inspection.

One inspector commented that in one port, if one marine chemist refuses to certify a tank, then different marine chemists may be called until one does certify the space gas free. This is not a good practice and does little to enhance the reputation of marine chemists.

Additional Comments

The questions which were posed to the marine inspectors elicited other comments.

Many marine inspectors noted they had never seen a marine chemist—only the certificate. Some of these officers voiced a little apprehension and said that in the back of their minds they really wondered if an inspection of the tank or space had been made. On the other hand some inspectors said they had tremendous working relationships with a particular marine chemist. This particular marine chemist would go out of his way to brief and inform the marine inspectors about conditions aboard various vessels.

One area of confusion has to do with the length of time that a gas free certificate remains in force. It is generally understood that the gas free certificate must be issued within 24 hours prior to hot work and remains in force "until conditions change." For instance one marine inspector gave the example of transferring cargo through piping passing in or near a gas free tank. Does this negate the gas free certificate? It has also been suggested that certificates also have a maximum length of time which they remain in force.

Many marine inspectors emphasized the importance of the marine chemist adding amplifying information to the gas free certificate. They enthusiastically endorse this practice and would like to see more such information on the certificate.

There is some evidence that shipyard workers are not aware of the need for a gas free certificate prior to hot work. It was suggested that the marine chemist spend a few minutes and explain why he is making this inspection and describe the particular vapors that may be present. This information could be given to anyone in the area when the inspection is made. This approach may have positive benefits in the future.

Some questions were raised about policing the work of marine chemists. The marine chemists have their own internal ethics organization and an example was given of an infraction turned over to them for action. Some marine inspectors suggested the Coast Guard issue cards to marine chemists based upon certification by the NFPA. This card could be withdrawn only upon recommendation by the NFPA. Without this card, the marine chemist would not be qualified to certify a vessel gas free prior to hot work.

One Headquarters marine inspector involved in casualty review feels that the role of marine chemists should be greatly expanded to include tests for toxic vapors in *chronic* concentrations as well as acute concentrations. He is heartened by the proposed revision to the standard for the "Control of Gas Hazards on Vessels", NFPA 306–1975, which *requires* a test for toxic vapor prior to certifying a tank safe for men. He has a number of reservations, however. His experience is that the cargo which was carried aboard a particular vessel is not always known, and if not known then the proper detection tube may not be chosen.

If any one point was made through my discussions with other Coast Guard officers it is that they are becoming more and more aware of gas hazards. These gas hazards are not specifically those associated with inspections prior to hot work but also include entry into voids, cofferdams, and double bottoms. Flammable vapors, lack of oxygen, and the presence of acutely toxic materials are the major worries, but some persons are voicing concern over chronically toxic concentrations. We look to the marine chemists to provide the expertise to promote an increased level of awareness in all facets of the industry. ⚓

Heritage

The White Star liner *Titanic* left Southampton, England, on the tenth of April, 1912, enroute to New York on what was hoped would be a precedent setting voyage. Expectations were high for a record Atlantic crossing by a vessel hailed as the safest ship afloat. When one spoke of the *Titanic* the word unsinkable was often used. She was indeed an impressive ship, built in Belfast with a length of 852 feet, a beam of 92 feet, and grossing 46,328 tons. She boasted a speed of over 21 knots and the protection of a steel hull and watertight compartments.

On April 14, 1912, the *Titanic* was approximately 400 miles southeast of Cape Race, Newfoundland. The liner *Carpathia* radioed there are "icebergs in your immediate vicinity," but the captain of the *Titanic,* relying on his lookouts and the outstanding maneuverability of the ship, did not reduce speed. The seas were calm and the skys were clear with unlimited visibility that evening, unusual circumstances at that time of year for the normally foggy Grand Banks.

Then the report came from the lookout of a berg dead ahead. The engines were ordered full astern and the helm was put over but the great ship was unable to avoid collision. The submerged ledge of the low, dark berg cut through the *Titanic* like a knife.

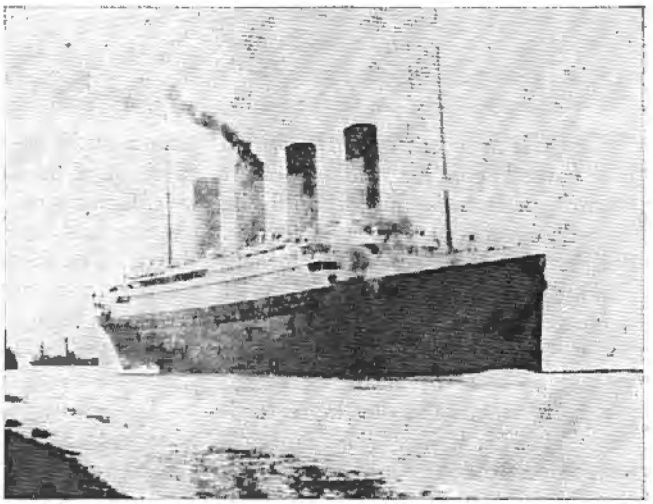
With many of her watertight compartments ruptured the *Titanic* began to flood. The senior radio officer, John Phillips, began sending CQD and the newly instituted SOS distress signals over the wireless. The *Carpathia,* 58 miles away, immediately changed course to come to the aid of the stricken liner.

There were 17 lifeboats on board the *Titanic* but these were woefully inadequate to accomodate the 2,223 passengers and crew of the vessel. As many women and children as possible were put in lifeboats, while the remainder waited on deck for the arrival of help. After 60 minutes the *Titanic* was down by the bow and experiencing internal explosions. At approximately 0300, April 15, less than four hours after the collision, the great ship sank.

The loss of life was catastrophic; 832 passengers and 685 crew members perished before the *Carpathia* could arrive on scene. Included in the casualties were all members of the ship's band which gallantly played while the ship sank. Among the passengers who perished were John Jacob Astor IV, Benjamin Guggenheim, and Isidor Straus whose wife refused to leave the sinking vessel without him.

The public was appalled by this tragedy. The U.S. Navy Department sent the scout cruisers *Birmingham* and *Chester* to patrol the area and warn shipping of icebergs presenting a hazard to navigation. This patrol continued until the end of the ice season on the Grand Banks.

The following year, 1913, the Treasury Department deployed the cutters *Seneca,* commanded by Captain Charles E. Johnson, and *Miami,* commanded by Captain Aaron L. Gamble, to resume the patrols along with the British trawler *Scotia.*



On January 20, 1914, in London, the International Conference on the Safety of Life at Sea drew up a treaty among the countries of Belgium, Canada, Denmark, France, Germany, Great Britain, Italy, Netherlands, Norway, Sweden, and the United States calling for a combined ice patrol, ice observation, and derelict destruction force. The United States was placed in charge of the patrol with the expenses to be shared by all member countries on a percentage basis proportional to tonnage of shipping. In 1929, Japan, Spain, and the USSR joined the other members in ratifying the treaty.

So out of the worst marine disaster in history came the International Ice Patrol, a dedicated group who annually patrol a 40,000 square mile area of ocean, tracking icebergs for the protection of all using the North Atlantic shipping lanes.

Each year on the fourteenth of April the Ice Patrol carries out another duty, that of dropping a ceremonial wreath at Latitude 41° 46′ N, Longitude 50° 14′ W, the spot where the *Titantic* went down that fateful night, in rememberance of all who lost their lives in the tragedy. Since the inception of the Ice Patrol no ship has been lost due to collision with an iceberg in the area covered by the Patrol. With improvements in radar and electronic navigation it is hope that there will never be another marine disaster of the proportions of the *Titanic.* ⚓

Is That Tank Safe?

By Lieutenant (jg) Tom Perry, USCG

Last fall an event occurred which has caused concern among Coast Guard personnel and should be shared with the maritime community. A Coast Guard Marine Inspector was making a routine examination of cargo tanks onboard a chemical slop barge. The examination proceeded routinely until the inspector began feeling nauseous and developed difficulty with his vision. The symptoms developed gradually and the inspector didn't realize that he was losing his vision until he bumped into several ladders and bulkheads. He reported that these symptoms remained with him for about a week after his examination of the tanks. This writer considers the inspector extremely lucky to be alive and to have no permanent physical impairments as a result of his experience.

Inquiry into this incident disclosed that several shipyard workers had developed similar symptoms, both on this and other occasions. It could not be determined if they had entered the cargo tanks or merely been exposed to the vapors in the vicinity of the tank barge. On numerous occasions, including the day of the incident, the main deck of the tank barge had been littered with dead birds. The barge had been gas freed under the supervision of a marine chemist before the inspector made his examination. The gas freeing operation took a week before a certificate was issued. The composition of the slops made gas freeing a difficult process. In the past gas freeing had been a problem with this barge. The inspector examining the barge in the past had found the odors so strong and so penetrating that he was forced to dispose of his coveralls after the examinations.

The marine chemist's certificate designated cargo tanks port and starboard numbers 1, 2, 3, 4, and 5, "Safe for Man, Safe for Fire, *Maintain Forced Ventilation*". Void compartments starboard numbers 1, 2, 3, and 4 were designated "Safe for Man, Safe for Fire". Void compartments port numbers 1, 2, and 3 were designated "Safe for Man, Safe for Fire". Port number 4 was designated "Not Safe for Man, Not Safe for Fire, Contamination in the Tank."

The inspector examined the marine chemist's certificate and pointed out to the marine chemist that the tank barge had only four tanks instead of five tanks as noted on the certificate. He asked that the certificate be corrected, and returned the certificate to the marine chemist. The marine inspector, after returning the certificate, proceeded to examine the void compartments and tanks.

The inspector could not recall how the barge was docked. He may have entered the contaminated compartment first depending upon the relative position of the barge to the dock. The inspector recalls examining the certificate carefully, but does not recall noting that any of the spaces had been designated, "Not Safe for Man". The marine inspector was lucky; you may recall reading in the November 1975 PROCEEDINGS of a less fortunate Coast Guard Inspector who lost his life in an oxygen difficient tank. There is no good reason for such incidents.

Responsibility of the Marine Chemist

The marine chemist has an awesome responsibility. He must ensure that the tank he certifies, "Safe for Man" is indeed safe. He must test the atmosphere for toxic vapors. It is not enough to simply make a "sniff" test and okay a tank. Such testing is not sufficient! The marine chemist is required to determine the composition of previous cargoes and make instrument tests accordingly. The table of threshold limit values (TLV's), published by the American Conference of Governmental Industrial Hygienists (ACGIH), is the criterion by which the chemist judges a tank safe from toxic vapors. The hazardous effect of a mixture of chemical vapors should be considered additive rather than regarding each chemical individually. Thus, the TLV of a mixture of chemical vapors may be exceeded even though the TLV for each of the chemical constituents is not. Formulas are available to the marine chemist to determine if the TLV for a mixture is being exceeded.

The marine chemist must also test the atmosphere of the tank with an oxygen indicating instrument for sufficient oxygen content. At least 18% oxygen by volume is required before men are permitted to enter such tanks or spaces.

Since most chemicals shipped in bulk have combustible properties, the marine chemist usually tests for combustible vapors. The certificate, which

the chemist prepares on location, must be posted in a conspicuous location onboard the vessel where it can easily be examined by anyone who might enter the tanks or void compartments. Generally the certificate will state qualifications and special instructions which should be carefully followed.

Responsibility of the Marine Inspector

The marine inspector, and anybody else intending to enter tanks or void compartments, also has responsibilities. First, it makes good sense to scrutinize the marine chemist's certificate. It should be examined carefully and qualifications, instructions, and the date should all be carefully noted. If a discrepancy is found on the certificate, an entry into the tank or space should not be made. The marine chemist should be contacted and asked to reissue a new certificate. A person may feel better about relying on a certificate if he can determine the manner and care with which a tank or space has been tested.

The prudent marine inspector exercises caution and watches for telltale signs that might indicate an unsafe tank. Dead birds on deck and sick workers are good indicators that things are not as they should be.

Odors from a tank are not to be ignored! Odors could well be an indication that the tank is *not* safe for entry. Beware, though—a lack of odors does not guarantee a safe atmosphere. Some chemicals are not easily detected by smell. A person should not rate a tank safe just because an odor cannot be detected. Unusual circumstances should trigger mental alarms and caution should be exercised before and during tank entry. While in any tank or confined space, caution is the word to live by. A person who becomes drowsy or in any way feels affected by the tank's atmosphere should *immediately get out* and report his symptoms to his superiors and the marine chemist.

The Coast Guard marine inspector is protected by certain regulations. Section 19 of the Occupational Safety and Health Act of 1970 requires all federal agencies to comply with standards or equivalent regulations promulgated under the Act.

About the Author

LTJG Tom Perry is a Coast Guard Reserve Officer assigned to the Cargo and Hazardous Materials Division, Office of Merchant Marine Safety. He works in the area of occupational safety and health, and has attended several Occupational Safety and Health Courses at the OSHA Training Institute in Rosemont, Illinois, as well as other courses dealing with gas detection instrumentation, industrial hygiene measurements, and fire and explosion hazards. Perry attended Xavier University and graduated with a Bachelor of Science degree in chemistry in 1972.

The President has twice directed, by executive order, compliance with Section 19 of the Act by federal agencies. The Coast Guard has responded to the order (most recently, Executive Order 11807) by adopting OSHA standards by reference in the Coast Guard Safety Manual. The applicable OSHA regulations are those found in Part 1915.11 of Title 29 of the Code of Federal Regulations, "Explosive and Other Dangerous Atmospheres, Precautions Before Entering."

Before entering a tank, marine inspectors must physically examine the marine chemist's certificate and search the area with his senses for the tell-tale signs of potentially unsafe conditions. It is the individual judgment of the marine inspector which is the final factor in determining whether or not he will enter the space. If he decides for any reason not to enter the space, then his decision is final and nobody may require him to enter.

46 CFR 35.01–1 requires that certain tests be made in accordance with the provisions of "Standards for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by the National Fire Protection Association. These regulations do not specifically address tank entries.

The Coast Guard is presently preparing tank entry regulations which will cover the regulatory void in the area of safe tank entry. The Commandant (G–MVI) should be consulted further regarding any questions about tank entry policy or other safety procedures.

A survey was conducted in 1974 by the Commandant (G–DET) to determine the availability of protective clothing and breathing apparata, and their capability for protecting man from dangerous environments caused by discharges of hazardous chemicals. The information from this survey has been published and is available from the National Technical Information Service, Springfield, Virginia 22161. The title of the publication is "Survey of Personnel Protective Clothing and Respiratory Apparata For Use by Coast Guard Personnel in Response to Discharges of Hazardous Chemicals." The catalog number is AD–A010110.

The Coast Guard has prepared an illustrated brochure describing safe

(*Continued on page 77.*)

Danger Below

The following is reprinted, by permission, from the Winter 1975 issue of fathom, *published by the U.S. Naval Safety Center.*

Several fatalities and near-fatalities in tanks and void spaces in recent months indicate a need for ships to review gas-free engineering programs and to reemphasize safety awareness to those involved in entering and working in these spaces.

A Navy ship was undergoing inactivation at a shipyard in preparation for eventual decommissioning a few weeks later. Among other things, the inactivation required the installation of blank flanges on the ballasting system sea valves. An inspection of all voids aboard the ship had been conducted by the Inactive Ship Facility some time earlier and had determined the blank flanges were required in 24 voids.

A tank team was organized to perform this work, consisting of three firemen and one petty officer second class. The petty officer and at least one fireman had been briefed and knew the proper precautions to be taken when entering closed spaces.

The tank team started their work early the next morning and soon completed the installation of one blank flange without incident. They then moved to a supply storeroom and entered a second void. A seaman standing a security watch in the compartment questioned their intention and was told their reason for being there.

They proceeded to install the second blank flange in short order and replaced the manhole cover to the void. Removing the manhole cover of an adjacent void, they realized that it was the wrong one. While two of the firemen replaced this cover, the petty officer in charge and one fireman went to the shipfitter shop for nuts and studs needed to complete their work.

The petty officer in charge remained in the shop to perform some other duties while the fireman returned to the storeroom. In the meantime, the two firemen in the storeroom had completed their first task and had removed the manhole cover to a wiring trunk which led to another manhole cover to the desired void.

After the fireman returned from the shipfitter shop, one of the men entered the void to install a blank flange. He did not attach a tending line, as it was to be used to lower the blank flange into the void. Not long after the man entered the void, he felt faint and subsequently passed out.

A fireman outside the space saw the man was unconscious and after calling for a light, entered the void to assist him. When the third fireman and the seaman on watch returned with the light, they found both men unconscious. The third fireman told the seaman to get a doctor as he climbed into the void to help his companions. Once inside, he was also overcome.

Within a few minutes, the seaman located a corpsman who, along with another man, proceeded to the scene of the mishap. While enroute, the three men were stopped by an officer who asked where they were going. They replied (not really knowing the true circumstances) that a man had fallen into a void. They continued, and upon reaching the storeroom, the corpsman, seeing that the void was dark, instructed the two men to get more lighting and some stretchers. The corpsman then entered the void and became unconscious.

The inquiring officer also headed for the void after obtaining a flashlight but stopped at the quarterdeck phone to summon medical assistance. He was unable to raise anyone on a nearby ship—so, without informing OOD of the problem, he continued to the storeroom.

As he entered the wiring trunk above the void, there was no sign of life below in the darkness. Through the open manhole, however, he noticed three bodies in the void. He also detected a strange odor in the air and advised the men with him that gas was present and that oxygen breathing apparatus would be required in order to enter the void. He then reported the facts to the OOD.

Upon hearing of the situation, the OOD passed the word by telephone and by intercom for the fire party to muster and provide OBA's. He summoned medical and ambulance assistance from the shipyard dispensary. Efforts to reach the nearby ship by telephone were again unsuccessful, but after being informed of the incident via messenger, the ship's senior medical officer and an HM2 were sent. The shipyard dispensary responded immediately with three civilian doctors and three ambulances.

Rescue efforts by the ship's fire party and other personnel were quickly set into motion. Personnel entering the void used OBA's during the initial 20 minutes of rescue operations. Subsequently, a Red Devil blower was placed in operation and, in addition, pure oxygen was pumped into the void.

When the rescuers entered the void, they quickly located two of the victims lying on pipes near the top of the space. These men were evacuated

and resuscitation soon began to revive them.

Another was found near the bottom of the void. He was removed to the wiring trunk where efforts to revive him (heart massage, mouth-to-mouth resuscitation, and oxygen respirator) were immediately employed by a shipyard doctor and a corpsman. These attempts proved unsuccessful and the man was moved to the storeroom as resuscitation was continued. A medical officer administered external cardiac massage and an intracardia injection without success. The man was beyond reviving.

By the time the last man was found near the bottom of the void, he had been partially revived by the air/oxygen which was pumped into the space and was able to climb out with some assistance. The three surviving men were sent to the shipyard dispensary for examination and treatment and were found fit for duty. They returned to the ship the next day, noticeably shaken by the experience but a great deal wiser.

It was later determined that none of the voids the men had entered that day had been tested for explosive or toxic gases. Neither these tests nor the test for oxygen deficiency had been performed even though the members of the tank team were aware that such tests were required prior to entering a void. This accident could have been and should have been prevented.

A ship's tank or void space may be free of oil, cargo residue, or anything else, and still may be unsafe to enter. If, for instance, the inside of a void were painted (but otherwise empty) and sealed for a long time the atmosphere might possibly be oxygen-deficient, poisonous, or explosive, and could prove fatal to anyone entering without taking proper precautions. Also, casualties can and have occurred in tanks which are, at times, filled with water for ballast or serve other purposes (i.e., double bottom and peak tanks).

Free air normally contains about 21 percent oxygen by volume, but men can work with decreased efficiency when the oxygen level is as low as 16 percent. At this point, however, little work can be accomplished.

When the oxygen content decreases to between 8 and 11 percent, the average man will lose consciousness, and death may ensue from oxygen starvation. If the oxygen concentration decreases to 6 percent, death can result in 6 to 8 minutes.

Moist steel surfaces consume oxygen by rusting (oxidation), and in some cases, rusting has been known to reduce the level of oxygen in a closed space to less than 4 percent. One of the biggest dangers presented by an oxygen-deficient atmosphere is that there is nothing in the appearance or odor of the air to warn of the deficiency. A man may enter a tank and lose consciousness almost immediately, without warning of any kind. And worse, attempts at rescue often result in additional casualties since gas masks, respirators, wet towels, and other means commonly used to protect the wearer against gaseous atmospheres are of no value in such a situation. The only breathing apparatus useful under such conditions are air line masks and OBA's.

Supervisors must ensure that all personnel entering empty spaces are adequately instructed and that applicable safety precautions are precisely followed. Each man must alter his habit patterns in order to register a mental warning when confronted with the task of entering a void space.

Think about the consequences of your actions before you initiate them. The routine of ignoring the hazard potential in an empty space has to be broken in order to curb the rising number of casualties resulting from "rushing in where angels fear to tread." ⚓

Is That Tank Safe?

(*Continued from page 75.*)

tank and confined space entries. This brochure will be distributed this spring to the Marine Safety Offices for their use and for distribution to the public upon request at no charge.

The Coast Guard is also preparing a video tape presentation illustrating the safe procedures to be followed for entering tanks and other enclosed spaces. When this video tape is completed it will be available for showing upon request from the Commandant (G–MHM), U.S. Coast Guard, 400 7th Street, S.W., Washington, D.C. 20590.

Here briefly are the five general guidelines to be followed before entering any cargo tank or enclosed space.

1. Carefully examine the marine chemist's certificate. Note the date and any qualifications.
2. Make a point of determining the care and manner in which the tank has been tested. Knowing the marine chemist personally is a good policy.
3. Do not ignore tell-tale signs of a potentially unsafe tank.
4. Get out of the tank immediately if you become drowsy or in any other way feel affected by the tank's atmosphere.
5. Your decision to enter a tank or not is the final word. Nobody will argue with you if you decide not to enter the tank for any reason at all. Your life rests on your final decision.

Cargo tanks and other enclosed spaces are dangerous. Entry into such spaces should always be made with the greatest of care. After all, with so much on the line, it makes good sense to play it safe and make sure that the cargo tank or void space is indeed, "Safe for Man." ⚓

COAST GUARD RULEMAKING

(Status as of 1 March 1976)

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
BOATING SAFETY							
Lifesaving devices on white water canoes & kayaks (CGD 74–159) comment period extended 6–12–75	2– 4–75	.....	7–15–75	X	.....	.....	.....
Safe loading and safe powering standards (CGD 73–250)	3– 6–75	.....	4–21–75	....	.....	9–23–75	3–23–76
Inboard safe loading standard (CGD 74–83)	3– 6–75	.....	4–21–75	....	.....	8–13–75 Corrected 11–5–75	2– 9–76
Boats and associated equipment (CGD 75–110)	9–19–75	.....	11– 5–75	X	.....	.....	.....
BRIDGE REGULATIONS							
Chicago River, IL (CGD 74–137)	6– 3–74	.....	7–16–74	X	.....	2–23–76	2–29–76
Matanzas River, FL (CGD 75–024)	1–29–75	.....	3– 4–75	X	.....	.....	.....
Fox River, WI (CGD 75–035)	2– 6–75	.....	3– 7–75	X	.....	.....	.....
Mystic River, MA (CGD 75–053)	3–27–75	.....	4–29–75	X	.....	.....	.....
West Palm Beach Canal, FL (CGD 75–070)	3–27–75	.....	4–29–75	X	.....	.....	.....
Illinois River, IL (CGD 75–060)	4– 1–75	.....	5– 6–75	X	.....	.....	.....
Duwamish Waterway, WA (CGD 75–097)	5–13–75	.....	6–30–75	X	.....	.....	.....
Gulf Intracoastal Waterway, LA (CGD 75–131)	6–18–75	.....	7–22–75	....	.....	1–16–76	2–20–76
Tombigbee River, AL (CGD 75–153)	8– 5–75	.....	9– 5–75	....	.....	2–23–76	3–29–76
Clearwater Pass, FL (CGD 74–299)	8–12–75	.....	9–12–75	X	.....	.....	.....
Harlem R., East R., & Gowanus Canal, NY (CGD 75–181); effective date amended 1–27–76	10– 1–75	.....	10–31–75	....	.....	1–16–76	2–20–76
AIWW Hallendale, FL (CGD 74–257)	10–15–75	.....	11–14–75	....	.....	1– 5–76	2– 2–76
Indian River, FL (CGD 75–180)	10–30–75	.....	12– 2–75	....	.....	2–12–76	3–15–76
Chehalis River, WA (CGD 75–179)	11– 4–75	.....	12– 9–75	....	.....	2–23–76	3–29–76
Bayou Grosse Tete, LA (CGD 75–215)	11–21–75	.....	12–31–75	....	.....	2–23–76	3–29–76
Old Fort Bayou, MS (CGD 75–214)	11–21–75	.....	12–31–75	....	.....	2–23–76	3–29–76
Norwalk River, CT (CGD 75–216)	11–21–75	.....	12–31–75	X	.....	.....	.....
St. Lucie River, FL (CGD 72–168)	11–21–75	.....	12–31–75	X	.....	.....	.....
Tacoma Harbor, WA (CGD 75–195)	11–21–75	.....	12–31–75	X	.....	.....	.....
Lake Champlain, VT (CGD 75–222)	12– 8–75	.....	1– 9–76	X	.....	.....	.....
Dutch Kills, NY (CGD 75–231)	12–22–75	.....	2– 5–76	X	.....	.....	.....
Shrewsbury, NJ (CGD 75–241)	2– 2–76	.....	2–20–76	X	.....	.....	.....
Missouri R. IA (CGD 75–244)	2–26–76	.....	3–12–76	....	.....	.....	.....
Mitchell River, MA (CGD 76–014)	2–19–76	.....	4– 5–76	....	.....	.....	.....
MARINE ENVIRONMENT AND SYSTEMS (GENERAL)							
Pipelines, lights to be displayed (CGD 73–216)	9–19–74 Corrected 10–18–74	10–21–74	11– 4–74	X	.....	.....	.....
Oil and hazardous substance liability (CGD 73–185)	12– 4–74	.....	1–16–75	X	.....	.....	.....

Coast Guard Rulemaking—Continued

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
Demarcation line, Guayanilla Bay, PR (CGD 73–287)	6–18–75	.....	8– 4–75	....	.....	2– 5–76	3– 8–76
Demarcation line, San Carlos Bay, FL (CGD 75–235)	1– 2–76	.....	2–18–76	X	.....	.....	.....
Visual identification of tank barges (CGD 75–039)	2– 5–76 Corrected 2–23–76	.....	3–16–76	....	.....	.....	.....
MERCHANT MARINE SAFETY (GENERAL)							
Bulk Dangerous Cargoes, Inspection of Barges (CGD 73–271)	3–11–74	4–15–74	4–30–74	X	.....	.....	.....
First Aid Certificates (CGD 73–272)	4– 2–74 Supp. Notice 12– 1–75	.....	6–15–74 1–16–76	 X	....	....	....
Carriage of Solid Hazardous Materials in Bulk (CGD 74–13)	5–15–74	7–16–74	8–31–74	X	.....	.....	.....
Load line regulations rail height adjustment (CGD 74–164)	10– 4–74	.....	11–15–74	....	.....	1– 8–76	2– 9–76
Construction and equipment of tank vessels (CGD 74–127); advance notice 9–5–74	4–21–75	5–21–75	6– 5–75	....	.....	1–26–76 Corrected 2– 2–76	2–26–76
Licensing and certificating; apprentice mate endorsement (CGD 74–226); Comment period extended 3–7–75	1–23–75	.....	4– 9–75	X	.....	.....	.....
Metal borings, shavings, turnings, and cuttings (CGD 75–133)	8– 1–75	.....	9–15–75	X	.....	.....	.....
Marine occupational safety and health standards (CGD 75–101); Advance notice; comment deadline extended 12–11–75	8–11–75	.....	1–15–76	X	.....	.....	.....
Tank vessels; air compressors, cargo handling room bilges (CGD 75–017)	8–13–75	.....	9–29–75	X	.....	.....	.....
Civil penalty procedures (CGD 75–123)	9–11–75	.....	10–27–75	....	2–19–76	.....	.....
Vessel inspection regulations (CGD 75–074)	9–16–75	.....	10–31–75	X	.....	.....	.....
Fire hydrants and hose (CGD 74–60)	9–23–75	.....	11–10–75	X	.....	.....	.....
Electrical cable splicing (CGD 74–305)	10– 8–75	.....	11–24–75	X	.....	.....	.....
Great Lakes pilotage rates (CGD 75–175)	10–31–75	.....	12– 1–75	X	.....	.....	.....
Fire and boat drills on passenger vessels (CGD 75–009)	12–17–75	.....	1–26–76	X	.....	.....	.....
Structural fire protection (CGD 75–032)	12–22–75	.....	2– 5–76	X	.....	.....	.....

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

Nautical Queries

The following items are examples of questions to be included in the new Chief Engineer and Master multiple choice examinations which are expected to be in use by September 1976.

Deck

1. The daily path of a celestial body that is parallel to the celestial equator is the
   A. altitude circle.
   B. vertical circle.
   C. diurnal circle.
   D. hour circle.

2. A Master would be well advised to file a marine note of protest if
   A. portions of his vessel's cargo were illegally impounded in a foreign port.
   B. longshore labor went on strike in the port causing undue vessel delay.
   C. cargo was received at ship side which was damaged in land transit.
   D. the vessel encountered heavy weather which might have caused bottom damage.

3. Galvanizing would be suitable for protecting wire rope which is used for
   A. topping lifts.
   B. cargo runners.
   C. stays.
   D. any of the above.

4. Which of the following conditions could cause a gyro-compass to develop an easterly error?
   A. Azimuth motor too tight.
   B. Adjusting screw too far out.
   C. Locking latch is up.
   D. Voltage becomes too high.

5. A vessel may acquire a list if the center of gravity is
I. off the centerline.
II. too high in the vessel.
   A. I only
   B. II only
   C. Both I and II
   D. Neither I nor II

Engineers

1. Obstructed suction passages in the case or pintle of a radial piston hydraulic pump will cause the
   A. fluid volume pumped to de-decrease.
   B. pump back pressure to decrease.
   C. fluid discharge pressure to decrease.
   D. pump to be excessively noisy.

2. Low discharge pressure from a metering or proportioning pump may be caused by
   A. rapid wear on the cross-head.
   B. rapid wear on the plunger packing.
   C. damage to the pressure compensator valve.
   D. damage to the stroke adjustment arm.

3. The major source of chemical contaminants in hydraulic fluid is
   A. antioxidant additives.
   B. abrasive waste.
   C. oxidation by-products.
   D. gum resins.

4. Compensated flow control valves are used in a hydraulic system to
   A. assure constant fluid temperature.
   B. compensate for system losses.
   C. maintain proper fluid viscosity.
   D. allow for system pressure changes.

5. Low pressure distilling plants used aboard ships will not effectively remove.
   A. dissolved chemical salts from the raw sea water.
   B. soluble minerals from the raw sea water supplied.
   C. suspended vegetable matter from the raw sea water.
   D. volatile liquids with a boiling point lower than sea water.

Answers

Deck
1. C 2. D 3. C 4. D 5. C
Engineers
1. A 2. B 3. C 4. D 5. D

MERCHANT MARINE SAFETY PUBLICATIONS

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

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

CG No.	TITLE OF PUBLICATION
101	Specimen Examinations for Merchant Marine Deck Officers (Chief Mate and Master) (1–1–74).
101–1	Specimen Examinations for Merchant Marine Deck Officers (2d and 3d mate) (10–1–73).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (4–1–72). F.R. 7–21–72, 12–1–72, 11–14–74, 6–18–75.
115	Marine Engineering Regulations (6–1–73). F.R. 6–29–73, 3–8–74, 5–30–74, 6–25–74, 8–26–74, 6–30–75.
123	Rules and Regulations for Tank Vessels (1–1–73). F.R. 8–24–73, 10–3–73, 10–24–73, 2–28–74, 3–18–74, 5–30–74, 6–25–74, 1–15–75, 2–10–75, 4–16–75, 4–22–75, 5–20–75, 6–11–75, 8–20–75, 9–2–75, 10–14–75, 12–17–75, 1–21–76, 1–26–76, 2–2–76.
169	Rules of the Road—International—Inland (8–1–72). F.R. 9–12–72, 3–29–74, 6–3–74, 11–27–74, 4–28–75, 10–22–75, 2–5–76.
172	Rules of the Road—Great Lakes (7–1–72). F.R. 10–6–72, 11–4–72, 1–16–73, 1–29–73, 5–8–73, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75, 10–22–75, 2–5–76.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids.
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–73).
176	Load Line Regulations (2–1–71). F.R. 10–1–71, 5–10–73, 7–10–74, 10–14–75, 12–8–75, 1–8–76.
182	Specimen Examinations for Merchant Marine Engineer Licenses (Chief Engineer and First Assistant.) (1–1–74).
182–1	Specimen Examinations for Merchant Marine Engineer Licenses (2d and 3d Assistant) (4–1–75).
184	Rules of the Road—Western Rivers (8–1–72). F.R. 9–12–72, 12–28–72, 3–8–74, 3–29–74, 6–3–74, 11–27–74, 4–16–75, 4–28–75, 10–22–75, 2–5–76.
190	Equipment List (8–1–72). F.R. 8–9–72, 8–11–72, 8–31–72, 9–14–72, 10–19–72, 11–8–72, 12–5–72, 1–15–73, 2–6–73, 2–26–73, 3–27–73, 4–3–73, 4–12–73, 4–26–73, 6–1–73, 8–1–73, 9–18–73, 10–5–73, 11–26–73, 1–17–74, 2–28–74, 3–25–74, 4–17–74, 7–2–74, 7–17–74, 9–5–74, 10–22–74, 11–27–74, 12–3–74, 12–30–74, 1–15–75, 1–21–75, 2–13–75, 2–19–75, 3–18–75, 3–19–75, 4–9–75, 4–16–75, 5–1–75, 5–7–75, 6–2–75, 6–25–75, 7–22–75, 7–24–75, 8–1–75, 8–20–75, 9–23–75, 10–8–75, 11–21–75, 12–11–75, 12–15–75, 2–5–76, 2–23–76.
191	Rules and Regulations for Licensing and Certification of Merchant Marine Personnel (6–1–72). F.R. 12–21–72, 3–2–73, 3–5–73, 5–8–73, 5–11–73, 5–24–73, 8–24–73, 10–24–73, 5–22–74, 9–26–74, 3–27–75, 6–2–75, 7–24–75, 8–13–75, 12–11–75.
*200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68, 4–30–70, 10–20–70, 7–18–72, 4–24–73, 11–26–73, 12–17–73, 9–17–74, 3–27–75, 7–28–75, 8–20–75, 12–11–75.
*227	Laws Governing Marine Inspection (3–1–65).
239	Security of Vessels and Waterfront Facilities (5–1–74). F.R. 5–15–74, 5–24–74, 8–15–74, 9–5–74, 9–9–74, 12–3–74, 1–6–75, 1–29–75, 4–22–75, 7–2–75, 7–7–75, 7–24–75, 10–1–75, 10–8–75.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (4–1–73). F.R. 12–22–72, 6–28–73, 6–29–73, 8–1–73, 10–24–73, 12–5–73, 3–18–74, 5–30–74, 6–24–74, 1–15–75, 2–10–75, 8–20–75, 12–17–75.
258	Rules and Regulations for Uninspected Vessels (5–1–70). F.R. 1–8–73, 3–2–73, 3–28–73, 1–25–74, 3–7–74.
*259	Electrical Engineering Regulations (6–1–71). F.R. 3–8–72, 3–9–72, 8–16–72, 8–24–73, 11–29–73, 4–22–75.
*266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69, 8–20–75.
268	Rules and Regulations for Manning of Vessels (12–1–73).
293	Miscellaneous Electrical Equipment List (7–2–73.)
*320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (7–1–72). F.R. 7–8–72.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (9–1–73). F.R. 1–25–74, 3–18–74, 9–20–74, 2–10–75, 12–17–75.
329	Fire Fighting Manual for Tank Vessels (1–1–74).
439	Bridge-to-Bridge Radiotelephone Communications (12–1–72). F.R. 12–28–72, 3–8–74, 5–5–75.
467	Specimen Examinations for Uninspected Towing Vessel Operators (10–1–74).

CHANGES PUBLISHED DURING FEBRUARY 1976

CG–123, Federal Register of February 2.
CG–169, 172, & 184, Federal Register of February 5.
CG–190, Federal Registers of February 5 & 23.

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