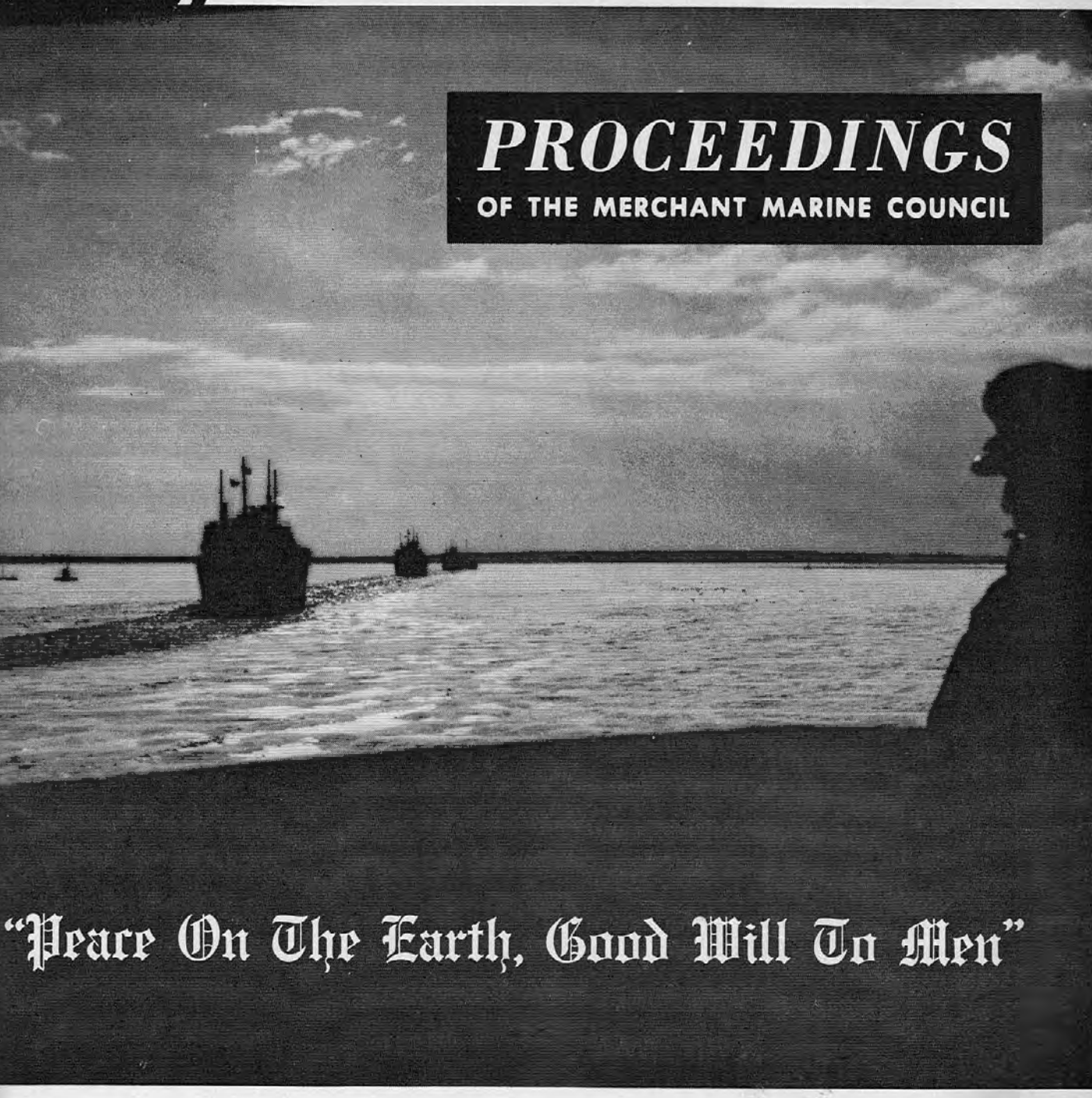
COAST GUARD



PROCEEDINGS

OF THE MERCHANT MARINE COUNCIL

"Peace On The Earth, Good Will To Men"

Vol. 27, No. 12 CG–129 December 1970

Ground Detection Devices . . .

Season's Greetings

As this year's voyage draws to a close, thoughts begin to turn toward future courses. Whether this message reaches you in home ports or on the high seas, I offer my hope that the Christmas season and the New Year ahead bring joy, hope, and peace to you and your families.

C. R. BENDER,
Admiral, U.S. Coast Guard,
Commandant.

CONTENTS

FEATURE

	Page
Ground Detection Devices	223

DEPARTMENTS

Maritime Sidelights	227
Merchant Marine Casualty Statistics	228
Amendments to Regulations	235
Annual Index Volume 27	239

COVERS

FRONT COVER: A convoy of freighters moves through the Great Lakes in the wake of the Coast Guard Icebreaker *Mackinaw* in this silhouette photo made somewhere along the frigid passage. A lookout on the icebreaker keeps vigilant watch over the brood of merchant carriers enroute to Chicago.

BACK COVER: "Be safe for a happy holiday", *Courtesy of the National Safety Council.*

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

DIST. (SDL NO. 91)

A: abcdew(2); fghijklmnopqrstuv(1)
B: n(40); c(16); e(5); f(4); gh(3); biknq(1)
C: abcdefgimnou(1)
D: i(5); abdeklmnsuvx(1)
E: d(1)
F: p(1)
Lists 141M, CG–13, CG–20

PROCEEDINGS
OF THE
MERCHANT MARINE COUNCIL

Published monthly at Coast Guard Headquarters, Washington, D.C. 20591, under the auspices of the Merchant Marine Council, in the interest of safety at sea. Special permission for republication, either in whole or in part, with the exception of copyrighted articles or pictures, is not required provided credit is given to the Proceedings of the Merchant Marine Council. Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, May 21, 1969.

GROUND DETECTION DEVICES

Gordon B. Sims, Jr.

Electrical Engineering Branch, U.S. Coast Guard Headquarters

The following article on ground detection devices is the third of a series of articles concerning the design and use of electrical equipment aboard ship. The purpose of these articles is not to make the reader an instant electrician, and it is emphasized that unqualified personnel should not undertake the repair or adjustment of electrical equipment. Rather, the purpose is to remove some of the mystique and misconceptions concerning shipboard electrical equipment and, in particular, to instill an awareness and understanding by the operating personnel of the existence and purposes of the marine electrical regulations.

In order that these articles can be of maximum use to the industry, questions, comments, or recommendations concerning this or future articles are earnestly solicited. Correspondence should be addressed to Commandant (MMT–1), U.S. Coast Guard, Washington, D.C. 20591.

INTRODUCTION

WHILE OFTEN TAKEN lightly, grounds can be a source of fire and electric shock. In an ungrounded system a single ground has no appreciable effect on current flow. However, if low impedance grounds occur on conductors of different potentials, very large currents may result. In the case of grounded systems a single low impedance ground on the ungrounded conductor can result in large fault currents. These current flows that often exceed the current-carrying capacity of the conductors of the system are definitely a fire hazard and, as discussed in a previous article, any grounding of an energized conductor is a potential shock hazard.

In order to provide for ready detection of grounds and thereby aid in the maintenance of the electrical system on merchant vessels, Coast Guard regulations require that ground detection means be provided. There are numerous methods used for the detection of grounds, but only the methods most commonly used on merchant vessels will be described herein.

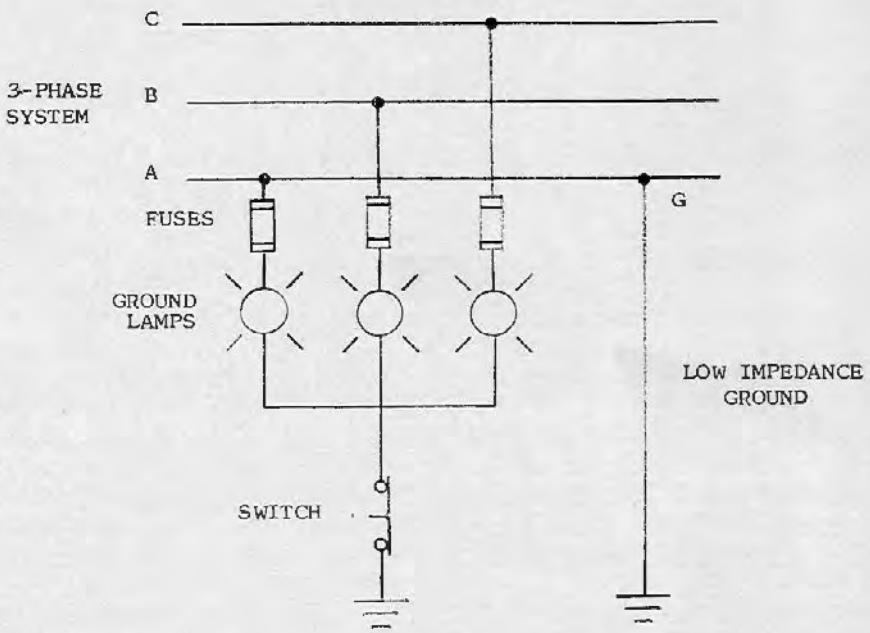


Figure 1.

GROUND LAMPS

For ungrounded electrical distribution systems ground detection lamps are most widely used. This method is illustrated by *Figure 1.*

The ground lamps are connected to the three phases in a "Wye" with the common point grounded. A normally closed switch is provided in the ground connection. If no ground is present on the system, phase voltage will be applied to each lamp and the lamps will be illuminated at equal intensity. If line "A" is grounded at point "G" by a low impedance ground, the lamp connected to line "A" will be shunted out and the lamp will be dark. The other two lamps will be energized at line voltage and will be brighter than usual. If a high-resistance ground occurs on any line, the lamp connected to that lamp will be dimmed slightly and the other two lamps will brighten slightly. The pushbutton switch is provided in the ground connection to aid in detecting high impedance grounds that produce only a slight shift from

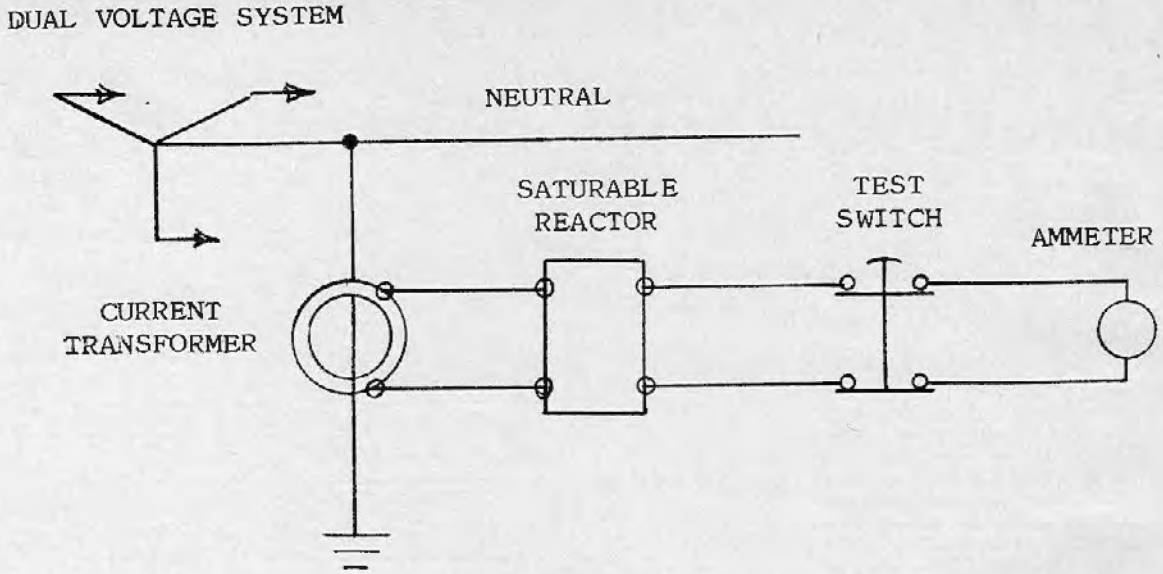


Figure 2.

normal in the voltages across each lamp. When the ground connection is opened, the voltage across each lamp returns to normal, or phase, value and each lamp will glow at the same intensity. By providing this means of obtaining a contrast between normal voltage and voltages that have shifted slightly, small changes in intensity of the lamps, which may otherwise go unnoticed, can be detected.

GROUND DETECTION AMMETER

For detecting grounds in dual-voltage A.C. electrical distribution system with a grounded neutral a conventional ammeter is used. This ammeter is wired in series with the connection between the neutral and ground. As this meter has to be able to sustain the maximum fault current available, it has to have a full scale deflection which is on the order of 500 amperes. High impedance grounds with a correspondingly low current through the ground connection can not be read on such a meter. Only low impedance grounds with relatively high currents can be detected.

Improved means are available for detecting grounds in dual-voltage A.C. systems. To provide for the detection of high impedance grounds with the corresponding low ground current, in recent years, the Coast Guard has specified that the ground detection ammeter have a full scale deflection of not more than 10 amperes for A.C. system. Of course, the ammeter and associated equipment must be capable of sustaining, without damage, maximum fault current available. This feature has usually been provided for by the use of a special transducer such as a saturable reactor in the meter circuit. An example of a typical A.C. meter installation is shown in *Figure 2*.

The scale of the ammeter on some detectors is non-linear. For example, on one ground detector unit the movement of the pointer between the markings for 0 and 0.1 amperes is greater than the movement of the pointer between 8 and 10 amperes.

This provides for ease in detecting pointer movement at low current values, or greater sensitivity, when high impedance grounds are present on the system.

When the secondary circuit of a current transformer is opened there is always a danger of very high voltage being induced on the secondary conductors. Therefore, where a current transformer is used in a ground detection system, a suitable protective device must be provided near the current transformer to prevent high voltage in the event of an open secondary circuit. For some A.C. ground detection devices, high voltage build-up is prevented by the saturable reactor.

GROUND DETECTION VOLTMETER

On older vessels with an ungrounded electrical distribution system a ground detector voltmeter may be encountered. The method is suitable for giving an indication of the degree of ground impedance and for a D.C. system, it can be used to calculate the actual resistance of the ground. The connections for the ground detector meter are usually as indicated in *Figure 3*.

The voltmeter is arranged so that it can be connected between each conductor, or phase, and ground. If there are no grounds on the system,

the voltmeter readings will be low. If the voltmeter readings between any conductor and ground is high, the insulation resistance to ground is low. For D.C. systems the actual insulation resistance can be computed by the formula:

$$R = Rv\left(\frac{E}{V_p + V_n} - 1\right)$$

Where:

R=insulation resistance to ground.
Rv=resistance of the voltmeter.
E=line voltage.
Vp=voltmeter reading between positive and ground.
Vn=voltmeter reading between negative and ground.

A quick inspection will show that if $Vp+Vn$ approaches line voltage, the insulation resistance approaches zero, and if $Vp+Vn$ approaches zero, the insulation resistance approaches infinity.

On A.C. systems the ground detection voltmeter readings indicate only qualitative information about the insulation resistance to ground. If the voltmeter reading between a conductor and ground is low, the insulation resistance to ground is high. If the voltmeter reading is high, the insulation resistance to ground is low.

3-PHASE SYSTEM

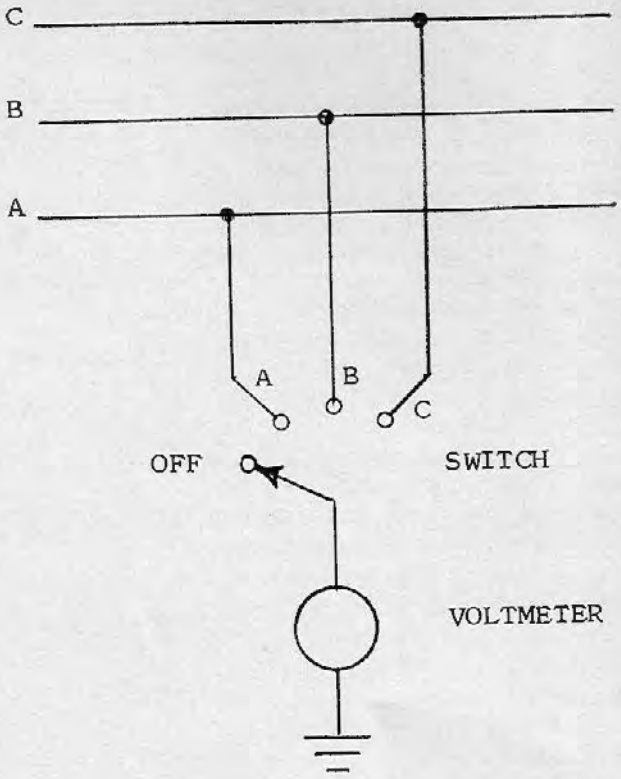


Figure 3.

The A.C. voltmeter cannot give quantitative values because of the capacitive reactance that exists between each conductor and ground of A.C. systems.

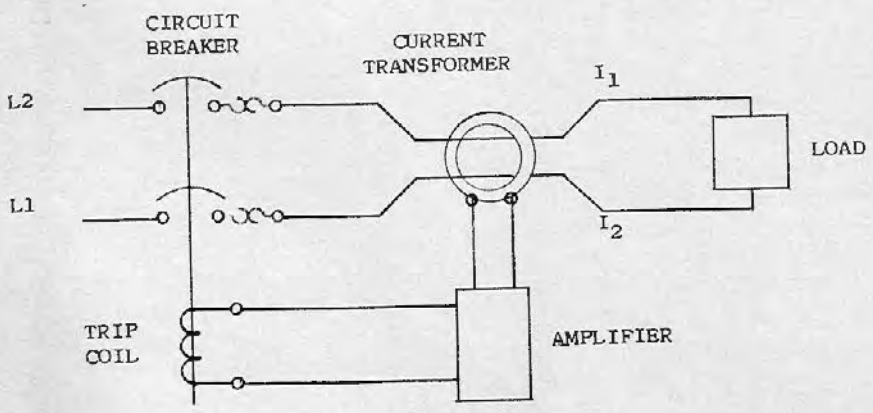


Figure 4.

GROUND FAULT DETECTOR

There is another device that should be discussed even though it is not yet generally found on merchant vessels. This device offers great potential for the protection of personnel from electric shock and for the prevention of electrical fires. It should prove especially valuable in situations where grounding of frames of portable tools does not provide sufficient protection of personnel from shock hazards. For example, it would provide protection against harmful shock where personnel are required to use portable electric tools in confined, highly conductive locations, such as tanks and boiler drums, where a large portion of the body may contact the conducting surfaces. This device is known as a ground fault detector.

The value of a ground fault detector lies in its ability to detect very

small values of ground current (milliamperes) and even microamperes. It is designed to open the circuit when ground current reaches a predetermined value. By rapidly opening the circuit, thus removing the potential source when grounds are detected, this device can be used to greatly reduce the risk of serious shock and electrical fires.

An electrical current of 50 milliamperes, or less, may be fatal if it is sustained by a person for a length of time in the order of seconds. Much larger currents can be sustained without injury for shorter durations. The ground fault detector can be designed to operate in a fraction of a second at very low values of current.

The ground fault detector is basically an extremely sensitive current transformer used in conjunction with an amplifier and an automatic circuit breaker. The unit is calibrated to trip the circuit breaker when a predetermined unbalance of current in the circuit is detected by the current transformer. A typical detector is indicated in *Figure 4*.

If there is no ground present on the conductors and load which are protected by the device, I_1 and I_2 are equal and the algebraic sum of current passing through the turns of the current transformer is zero. Under this condition no signal is transmitted to the amplifier. However, if a conductor or device becomes grounded I_1 and I_2 will he unequal and a signal will be sent to the amplifier. The difference between I_1 and I_2 is the ground current I_G indicated in Figure 5 which does not pass through the turns of the current transformer.

When the ground leakage current I_g, reaches a predetermined value the amplifier will signal the operating coil of the circuit breaker to "trip" the breaker. This will deenergize the circuit, terminating the hazard. Models of the ground fault detectors are available that will operate at values of ground current that are well below lethal values.

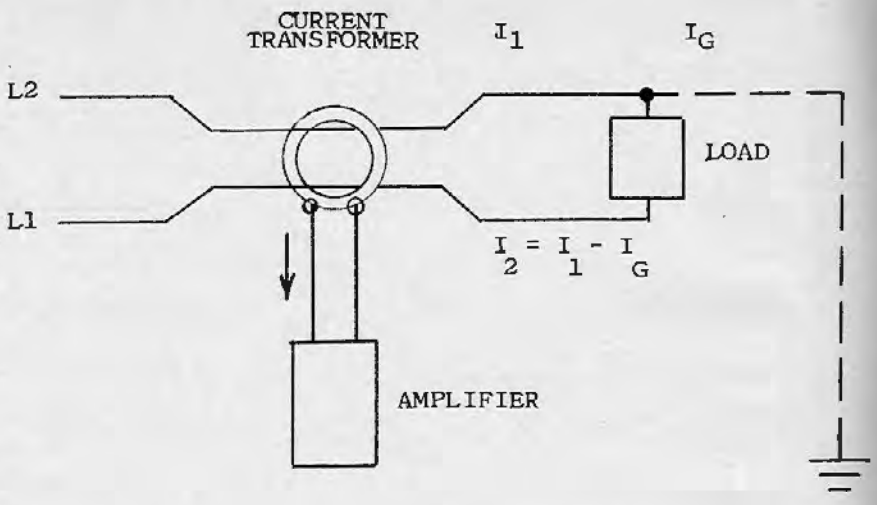


Figure 5.

CONCLUSION

It is hoped that the reader has a better understanding of ground detection devices. It is also hoped that he has a better awareness as to the importance of ground detection devices in providing for the protection of life and property aboard merchant vessels.

As with most safety items, ground detection devices must be used in order for their full benefit to be realized. Not only should these devices be utilized, but prompt action should be taken to locate and eliminate grounds once they are detected. The only purpose for detecting grounds is to eliminate them.

I'm sure that most of us would not deliberately reach into a switchboard and grab a 450-volt bus bar. Working on an electrical installation with unintentional grounds can be similar to such an act. Where grounds are present, frames of portable tools, motors, appliances, enclosures, etc. can become energized at full phase voltage. In such a case, an unsuspecting person could become the ground detector with dire consequences.

It should be noted that a ground fault detector does not limit ground leakage current. If a system suddenly developed a direct ground, the ground current that would result would be of the same magnitude with or without the ground fault detector. However, the ground fault detector would detect the ground and open the circuit breaker in a few cycles (60 Hz). As the hazard associated with electric shock is a function of current magnitude and duration, it is evident that rapid deenergizing of the faulted circuit is most important.

One other comment on the ground fault detector. It could be a valuable tool for checking portable tools. Portable tools could be plugged into a circuit protected by a ground fault detector set at a few milliamperes and operated for a short while. The ground fault detector would detect any leakage above the value for which the detector was set.

In summary, use the ground detection devices that have been provided, and when grounds are detected do something about it. ⚓

LYKES VESSELS HONORED FOR SAFETY

The S.S. Christopher Lykes *was the No. 1 ship in the Lykes Lines fleet safety competition in 1969. Here members of the crew assemble on deck in New Orleans to receive the annual safety awards. Front row, from left, are Ordinary Seaman C. C. Sullivan, Steward J. Henry, Port Steward D. E. Davillier, Able Seaman A. J. Perry, Ordinary Seaman A. E. Green, Boatswain W. Johnson and Engine Cadet W. E. Perry. Back row, left to right, are Ordinary Seaman A. Johnson, Able Seaman J. A. Peretta, Deck Utility I. F. Ross, Capt. G. A. Madison, Master of the vessel; Capt. G. F. Price, Jr., Assistant Manager of the Marine Division; First Assistant Engineer W. E. Shilling, Stevedore Safety Inspector D. B. Edwards, Capt. C. H. Waring, Manager of the Accident Prevention Division; Port Engineer W. Barker, Chief Mate J. H. Smith and Third Mate C. E. Jensen. These competitions always yield excellent results.*

Sixteen ships of the global fleet of Lykes Bros. Steamship Co., Inc., were cited for their 1969 safety records when an analysis of the Lykes fleet operations revealed they had completed the year free of lost time injuries.

The Lykes fleet had an exposure record of 19,714,536 man-hours in 1969, a reduction of 9.8 percent when compared with 1968, attributable to the fact that some ships were idled early in the year by a longshoremen's strike. Lost time injuries in the fleet declined 20.9 percent in 1969 compared with the previous year.

Five of the ships, the *Mason Lykes, Christopher Lykes, Charlotte Lykes, Louise Lykes* and *Reuben Tipton* repeated their 1968 records free of lost time injuries. It marked the fourth time and third consecutive year for the *Charlotte;* the third time for both the *Louise Lykes* and *Reuben Tipton,* and the second consecutive year for the *Mason Lykes,* the top ship in the fleet in 1968.

Winning the coveted No. 1 spot as the safeest ship in the Lykes fleet in 1969 was the S.S. *Christopher Lykes.* Working as a team, with a determined effort to duplicate their 1968 record, officers and crew of the "*Christopher*" accumulated 424,584 man-hours of exposure and the best over-all record of all 16 award winning ships.

Other ships cited were the *Ashley Lykes, Brinton Lykes, Charles Lykes,* both the *Clipper Dolly Turman* and the C–2 Class *Dolly Turman,* the *Frederick Lykes, Joseph Lykes, Lipscomb Lykes, Mason Lykes, Thompson Lykes, Velma Lykes* and *Zoella Lykes.*

The fleet analysis revealed that unlicensed personnel accounted for 91.2 percent of all lost time injuries in the Lykes fleet in 1969; engine room officers 5.9 percent, and deck officers had a record of 2.9 percent.

Lost time injury ratings of the National Safety Council determined the winning ships in the Lykes fleet. Each ship receives a framed commendation and is permitted to display the National Safety Council's green safety cross as a symbol of their record. A bronze plaque also goes to the *Christopher Lykes* as the No. 1 ship in the Lykes fleet. ⚓

STATISTICAL SUMMARY OF CASUALTIES TO COMMERCIAL VESSELS [1]

1 July 1969 to 30 June 1970
Fiscal year 1970

	Nature of Casualty																	
	Collisions; crossing, meeting and overtaking	Collisions, while anchored, docking or undocking	Collision, fog	Collisions with piers and bridges	Collisions, all others	Explosion and/or fires—cargo	Explosion and/or fires—vessel's fuel	Explosion and/or fire—boilers, pressure vessel	Explosion and/or fire—structure, equipment, all others	Grounding with damage	Grounding without damage	Founderings, capsizings and floodings	Heavy weather damage	Cargo damage	Material failure—structure and equipment	Material failure—machinery and engineering equipment	Casualty not otherwise classified	Total
Number of casualties	197	163	35	409	289	15	21	8	133	317	223	122	43	23	296	198	90	2,582
Number of vessels involved	645	428	90	692	416	16	22	8	146	430	240	158	47	28	334	198	165	4,063
Number of inspected vessels involved	193	131	23	264	174	11	1	6	40	152	134	15	26	23	170	158	49	1,570
Number of uninspected vessels involved	452	297	67	428	242	5	21	2	106	278	106	143	21	5	164	40	116	2,493
PRIMARY CAUSE	Number of vessels																	
Personnel fault:																		
Pilots—State	15	6	5	17	3					7	17	1					4	75
Pilots—Federal	10	9	3	54	4		1		1	14	23						3	122
Licensed officer—documented seaman	32	28	13	65	29	2		1	7	57	39	6	1	1	8	14	8	309
Unlicensed—undocumented persons	180	67	23	119	52	1			5	105	28	21		1	6		20	628
All others	16	25	9	22	5	3	1		13	13	16	5	1	3	9		25	166
Calculated risk		2		7	3					6	3						1	22
Restricted maneuvering room	8	3		9	5					1	4						1	31
Storms—adverse weather		23		29	23					43	26	19	20	15	59	1	16	274
Unusual currents	4	3		21	5					5	2		16				1	57
Sheer, suction, bank cushion											3							3
Depth of water less than expected				2	3					11	37				1			54
Failure of equipment	7	11		28	14		7	7	31	37	19	21	1	3	143	177	4	510
Unseaworthy—lack of maintenance					2				3	3	1	18	4		49	2	4	86
Floating debris—submerged object	2	2		10	137					5		5			7	3	1	172
Inadequate tug assistance	3	6		8	4					5	3	1						30
Fault on part of other vessel or person	368	242	37	293	117	1	1		11	111	17	30	4	5	32		35	1,804
Unknown—insufficient information		3		8	10	9	12		75	7	2	31			20	1	42	220
ADDITIONAL CONTRIBUTING FACTORS TO CAUSE OF CASUALTY																		
Hull and associated parts:																		
Plates and framing—steel	2	9		17	58				2	23		17	4		93	1	8	234
Planks and framing—wood		2	1		25		1	1	1	10		3	2		33		5	84
Tanks					3	2	3		8	3		2	1		6	1	1	30
Holds and hatches		1				7			7			2			7		1	25
Superstructure—bulkheads, decks	2			1	1		1		12		1	3	1		11	1	2	36
Ladders, gangways, rails and guards												1			6		1	8
Masts, booms and cargo gear				6	1				1			2			19	2	3	34
Rudder and stern tube	1	3		6	10					5		2	1		11	3		42
Watertight closures										1		12	1	1	6	1	4	26
Quarters and living spaces			1						8									9
Navigation and safety:																		
Lookout	20	5	4	3	8					18		1	1		3			63
Docks-piers—congested area	11	72	3	273	19				2	9	12		4				3	406
Channels—restricted areas	211	43	9	35	54				1	110	109	5			4		13	594
Buoys—aids to navigation				3	38					20	15							76
Excessive speed	12	9	6	15	8					3	2	1		1			2	59
Poor visibility	11	11	47	15	9					31	18						3	145
Steering gear	6	4		2	4				1	15	7	1				2		42
Radar	3	3	12	4						4	3							29
Fathometer—depth of water					12					4	2		1		1		1	21
Engine order telegraph		3		3						1	1					1		9
Navigation equipment—other	1	1	1	1	1					8	4	1	1		1		1	21
Navigation lights	6	3		2	4												1	16
Navigation signals	83		11	6	2					1								103
Weather (generally)	8	35	2	61	39					37	27	19	16	6	28	1	19	298
Currents and tides	27	41	1	133	27					54	44	12			8	1	25	373
Lifesaving equipment									1			1	3		17		5	27
Firefighting equipment									3						2			5
Miscellaneous:																		
Yard repairs				2	1	1	2		17	2		4			7	10	1	47
Improper loading or storage		2			3	12	1	1	9	9	2	26	4	20	35	1	7	132
Tug assisting	243	89	18	278	84				6	103	22	20	1	4	18		18	904
Anchor equipment		27	1	2	8				1	12	12				27	2	2	94
Towing equipment	9	6		16	17					19	2	10		1	8	1	12	101
Mooring equipment	6	110	7	13	18		1		3	10	8	2	11	1	13		57	260
Fishing equipment	7	1		1	2					7		8			1	1	5	33
Deck equipment—all other				2	1				1	1				1	4		1	11
Engineering:																		
Main propulsion machinery	6	12		18	47		14		18	27	9	6	1		35	84	7	284
Boiler parts and accessories				3	2		3	11	11	4		7	1		19	133		194
Machinery—all other					3							2			4			9
Tools and working spaces									1						2	2		5
Generators and other electrical equipment		1			1		2		13	3	2		1			24		47
Wiring, lights, controls	1	1		2		1	3		32	4	1	1			9	4		59
Steward's department:																		
Galley and steward's department equipment									12									12

STATISTICAL SUMMARY OF CASUALTIES TO COMMERCIAL VESSELS [1]—Continued

1 July 1969 to 30 June 1970 Fiscal year 1970	Nature of casualty: Collisions; crossing, meeting and overtaking	Collision, while anchored, docking or undocking	Collision, fog	Collisions with piers and bridges	Collisions, all others	Explosion and/or fires—cargo	Explosion and/or fires—vessel's fuel	Explosion and/or fire—boilers, pressure vessel	Explosion and/or fire—structure, equipment, all others	Grounding with damage	Grounding without damage	Founderings, capsizings and floodings	Heavy weather damage	Cargo damage	Material failure—structure and equipment	Material failure—machinery and engineering equipment	Casualty not otherwise classified	Total
TYPE OF VESSEL																		
Inspected vessels:																		
Passenger and ferry—large	----	----	3	7	3	----	----	1	1	2	3	----	1	1	2	6	----	30
Passenger and ferry—small	6	5	4	4	9	----	----	----	7	16	7	5	2	----	5	6	6	82
Freight	13	46	6	90	77	7	1	3	15	40	72	5	13	17	106	111	20	642
Cargo barge	12	6	----	10	10	----	----	----	1	19	1	2	----	4	9	----	4	78
Tankships	17	14	1	35	26	2	----	2	6	12	36	3	5	----	20	27	5	211
Tank barge	138	53	9	115	39	2	----	----	10	58	12	----	1	----	15	7	11	463
Public	1	1	----	----	1	----	----	----	----	----	2	----	1	----	3	1	1	17
Miscellaneous	6	6	----	3	9	----	----	----	----	5	1	----	3	1	10	----	2	47
Uninspected vessels:																		
Fishing	48	36	4	9	46	----	10	----	48	104	35	45	10	----	48	38	18	489
Tugs	229	83	23	247	106	1	1	1	29	101	19	46	1	3	47	7	32	976
Foreign	45	54	14	30	13	4	----	----	4	27	41	4	2	----	5	1	4	248
Cargo barge	87	54	9	124	27	----	----	----	4	35	8	26	1	2	39	----	54	470
Miscellaneous	43	70	17	18	50	----	10	1	21	11	3	22	7	----	25	4	8	310
GROSS TONNAGE																		
300 tons or less	293	192	42	240	180	1	20	2	96	211	66	108	20	4	129	47	67	1,718
Over 300 to 1000 tons	181	77	22	209	75	2	1	----	20	81	12	33	4	3	48	2	57	827
Over 1000 to 10,000 tons	142	127	17	181	112	8	1	3	22	95	83	14	12	10	99	88	25	1,039
Over 10,000 tons	29	32	9	62	49	5	----	3	8	43	79	3	11	11	58	61	16	479
LENGTH																		
Less than 100 feet	259	171	27	189	162	1	20	2	88	188	56	99	18	2	107	41	54	1,484
100 to less than 300 feet	319	149	45	345	135	3	1	----	34	158	33	49	6	7	93	9	80	1,466
300 to less than 500 feet	30	58	8	69	43	8	----	2	15	40	50	6	10	7	54	74	18	492
500 feet and over	37	50	10	89	76	4	1	4	9	44	101	4	13	12	80	74	13	621
AGE																		
Less than 10 years	299	167	38	279	131	7	8	----	38	148	61	52	9	8	74	26	55	1,400
10 to less than 20 years	193	112	25	212	111	4	5	2	54	127	55	41	9	4	88	22	57	1,121
20 to less than 30 years	101	97	21	139	108	3	4	3	39	97	84	38	26	14	119	129	36	1,058
30 years and over	52	52	6	62	66	2	5	3	15	58	40	27	3	2	53	21	17	484
LOCATION OF CASUALTY	Number of casualties																	
Inland—Atlantic	20	24	7	71	46	5	6	----	27	62	77	16	2	1	29	11	13	417
Inland—Gulf	110	59	12	121	67	3	5	----	33	76	67	21	14	2	34	12	24	660
Inland—Pacific	11	14	2	48	34	3	4	1	25	53	18	25	6	1	33	27	9	314
Ocean—Atlantic	5	----	3	----	6	1	1	----	8	10	1	6	5	12	43	29	4	134
Ocean—Gulf	11	10	2	5	31	----	2	1	13	19	8	9	2	----	26	15	5	159
Ocean—Pacific	2	----	----	2	13	1	----	3	8	18	2	20	11	4	35	59	6	184
Great Lakes	4	12	----	52	40	----	----	1	1	23	18	6	----	1	17	12	1	188
Western rivers	26	16	6	85	32	1	2	----	13	34	6	15	----	----	40	----	20	296
Ocean—other	----	1	----	3	4	----	----	----	----	8	5	2	2	1	9	16	1	52
Foreign waters	8	27	3	22	16	1	1	2	5	14	21	2	1	1	30	17	7	178
TIME OF DAY																		
Daylight	77	88	23	222	142	6	15	5	57	140	104	71	23	14	188	129	55	1,359
Nighttime	105	67	9	161	121	9	4	3	69	156	104	39	19	9	95	51	29	1,050
Twilight	16	8	3	26	26	----	2	----	7	21	15	----	----	----	13	18	6	173
ESTIMATED LOSSES—UNITS OF THOUSANDS																		
Vessel	4,604	2,294	1,187	3,645	5,554	5,474	572	183	13,292	10,336	26	5,797	1,681	38	8,024	3,760	2,807	69,274
Cargo	738	39	141	437	62	459	14	----	101	2,699	----	476	202	891	11,017	19	65	17,360
Property	327	440	13	6,647	1,367	----	4	----	56	530	1	37	6	37	219	15	930	10,629
VESSELS TOTALLY LOST																		
Inspected	1	----	----	----	3	2	----	----	5	3	----	2	1	----	8	3	2	30
Uninspected	16	6	3	8	39	----	13	----	53	45	----	49	16	----	53	2	15	318

[1] Statistics concerning recreation and pleasure boating accidents are published in CG 357.

409-083—70——2

STATISTICAL SUMMARY OF DEATHS/INJURIES DUE TO A VESSEL CASUALTY[1]

1 July 1969 to 30 June 1970 Fiscal year 1970	Nature of casualty																	
	Collision; crossing, meeting and overtaking	Collision, while anchored, docking or undocking	Collision, fog	Collisions with piers and bridges	Collisions, all others	Explosion and/or fires—cargo	Explosion and/or fires—vessel's fuel	Explosion and/or fire—boilers, pressure vessel	Explosion and/or fire-structure, equipment, all others	Grounding with damage	Grounding without damage	Founderings, capsizings and floodings	Heavy weather damage	Cargo damage	Material failure—structure and equipment	Material failure—machinery and engineering equipment	Casualty not otherwise classified	Total
Number of casualties	8	4	5	3	8	4	6	1	23	5	.....	30	3	.....	26	3	12	141
Number of persons deceased/injured inspected vessels	1/1	1/..	../6	../1	.....	3/2	.....	.....	1/18	../1	.....	../2	.....	.....	31/8	../2	1/6	38/47
Number of persons deceased/injured uninspected vessel	7/6	1/2	2/2	1/1	7/4	1/1	1/9	4/4	16/22	4/2	.....	47/..	9/..	.....	22/2	3/..	15/3	140/58
Number of persons deceased/injured	8/7	2/2	2/8	1/2	7/4	4/3	1/9	4/4	17/40	4/3	.....	47/2	9/..	.....	53/10	3/2	16/9	178/105
PRIMARY CAUSE																		
Personnel fault:																		
Pilots—State	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pilots—Federal	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Licensed officer—documented seaman	1	1	1	1	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	7
Unlicensed—undocumented persons	3	1	1	2	3	1	.....	.....	3	2	.....	8	.....	.....	1	.....	2	27
All others	2	.....	.....	.....	.....	1	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	8
Calculated risk	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Restricted maneuvering room	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Storms—adverse weather	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	8	3	.....	4	.....	2	18
Unusual currents	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Sheer, suction, bank cushion	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Depth of water less than expected	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Failure of equipment	.....	.....	.....	.....	.....	.....	1	1	7	2	.....	.....	.....	.....	19	3	1	34
Unseaworthy—lack of maintenance	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	1	3
Floating debris—submerged object	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Inadequate tug assistance	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fault on part of other vessel or person	2	2	3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	9
Unknown—insufficient information	.....	.....	.....	.....	1	1	4	.....	7	.....	.....	12	.....	.....	2	.....	3	30
TYPE OF VESSEL INVOLVED																		
Inspected vessels:																		
Passenger and ferry—large	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	../..
Passenger and ferry—small	1/..	.....	../6	.....	.....	.....	.....	.....	.....	../1	.....	.....	.....	.....	.....	.....	../3	1/10
Freight	.....	.....	.....	../1	.....	.....	.....	.....	../1	.....	.....	../2	.....	.....	30/6	../2	../2	30/14
Cargo barge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tankships	.....	.....	.....	.....	.....	2/2	.....	.....	1/13	.....	.....	.....	.....	.....	.....	.....	.....	3/15
Tank barges	.....	.....	.....	.....	.....	1/..	.....	.....	../4	.....	.....	.....	.....	.....	.....	.....	.....	1/4
Public	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1/1	1/1
Miscellaneous	../1	1/..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1/2	.....	.....	2/3
Uninspected vessels:																		
Fishing	3/1	.....	.....	../1	6/..	.....	../2	.....	7/6	3/1	.....	28/	9/..	.....	12/2	.....	9/..	77/13
Tugs	.....	../2	2/..	1/..	.....	../1	1/3	.....	2/1	.....	.....	8/..	.....	.....	2/..	.....	6/3	22/10
Foreign	2/..	.....	.....	.....	.....	1/..	.....	.....	2/2	.....	.....	2/..	.....	.....	1/..	.....	.....	8/2
Miscellaneous	2/5	1/..	../2	.....	1/4	.....	../4	4/4	5/13	1/1	.....	9/..	.....	.....	7/..	3/..	.....	33/35
PARTICULARS OF PERSON DECEASED/INJURED																		
Papers of deceased/injured:																		
Licensed by Coast Guard	.....	../1	../2	../1	.....	1/1	.....	.....	1/10	1/..	.....	3/..	.....	.....	8/2	.....	3/1	17/18
Documented by Coast Guard	.....	.....	.....	.....	../1	1/..	.....	.....	2/5	.....	.....	1/1	.....	.....	22/4	../2	2/3	28/16
No license or document	6/7	2/1	2/6	1/1	7/3	1/2	1/9	4/4	12/24	3/3	.....	43/1	9/..	.....	22/4	3/..	11/5	127/70
Other—unknown—foreign	2/..	.....	.....	.....	.....	1/..	.....	.....	2/1	.....	.....	.....	.....	.....	1/..	.....	.....	6/1
Status or capacity on vessel:																		
Passenger	2/1	.....	/6	.....	2/1	.....	../1	.....	.....	../1	.....	3/..	.....	.....	.....	.....	../2	7/12
Longshoreman—harbor worker	.....	.....	.....	.....	.....	1/..	.....	.....	../2	.....	.....	.....	.....	.....	1/..	.....	.....	2/2
Crewmember	6/6	2/1	2/2	1/2	5/3	3/3	../5	.....	14/33	3/2	.....	42/2	9/..	.....	46/10	3/2	15/7	151/78
Other	.....	../1	.....	.....	.....	.....	1/3	4/4	3/5	1/..	.....	2/	.....	.....	6/..	.....	1/..	18/13
Activity engaged in:																		
Off duty	.....	../1	.....	.....	1/1	../3	.....	3/2	5/4	.....	.....	3/..	.....	.....	../1	.....	.....	12/12
Deck department duties	2/2	1/1	3/2	1/1	3/2	2/..	../5	.....	2/15	2/2	.....	14/1	.....	.....	12/3	.....	8/6	49/40
Engine department duties	.....	.....	.....	.....	.....	1/..	.....	.....	1/4	.....	.....	../1	.....	.....	1/1	../2	1/..	4/8
Stewards department duties	.....	.....	.....	.....	.....	.....	.....	../2	1/1	.....	.....	.....	.....	.....	.....	.....	2/1	3/4
Handling cargo	.....	.....	.....	.....	.....	1/1	.....	.....	2/1	.....	.....	.....	.....	.....	1/1	.....	.....	4/2
Fishing	3/..	1/..	.....	.....	1/..	.....	.....	.....	4/1	.....	.....	18/..	9/..	.....	6/..	3/..	4/..	49/1
Drills	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	../1	.....	.....	../1
Passenger	2/1	.....	/6	.....	2/1	.....	../1	.....	.....	../1	.....	.....	.....	.....	.....	.....	../2	4/12
Other and unknown	1/4	.....	.....	../1	.....	.....	1/3	1/..	2/14	2/..	.....	12/..	.....	.....	33/3	.....	1/..	53/25
Location of vessel:																		
At dock	.....	.....	.....	.....	.....	4/3	../6	.....	11/22	.....	.....	.....	.....	.....	6/2	../2	1/1	22/36
At anchor	.....	2/1	2/..	.....	.....	.....	1/3	4/4	2/7	../1	.....	2/..	.....	.....	6/3	.....	.....	19/19
Underway	8/7	../1	../8	1/2	7/4	.....	.....	.....	4/11	4/2	.....	45/2	9/..	.....	41/5	3/..	15/8	137/80
PART OF BODY INVOLVED																		
Head and upper limbs	../4	.....	../2	.....	../1	.....	../2	3/..	2/12	../1	.....	.....	.....	.....	4/4	.....	.....	9/26
Back and lower limbs	../1	../2	../1	../1	../1	.....	../2	../1	../5	../1	.....	.....	.....	.....	1/1	.....	../6	1/22
Multiple injuries (internal and external)	../2	.....	../5	1/1	../2	../3	1/5	1/3	6/23	../1	.....	../2	.....	.....	2/5	../2	1/3	12/57
Death—heart	.....	.....	.....	.....	1/..	.....	.....	.....	1/..	.....	.....	.....	.....	.....	.....	.....	.....	2/..
Death—drowning	7/..	1/..	2/..	.....	6/..	2/..	.....	.....	2/	3/	.....	38/..	7/..	.....	38/..	.....	12/..	118/..
Death—other	1/..	1/..	.....	.....	.....	2/..	.....	.....	6/	1/	.....	0/	2/	.....	8/..	3/..	3/..	36/..

[1] Statistics concerning recreational boating accidents are published in CG-357.

STATISTICAL SUMMARY OF DEATHS ON BOARD COMMERCIAL VESSELS[1]

(Not Involving a Vessel Casualty)

1 July 1969 to 30 June 1970

Fiscal year 1970

Total 420	CAUSE OF DEATH	Nature of death: Natural Cause	Homicide	Suicide	Disappearance	Slips and falls—ladders	Slips and falls—gangways	Slips and falls—on deck	Slips and falls—other	Falls from vessel—into water	Falls into holds or tanks	Struck by objects; falling, dropped or moving	Exposure and asphyxiation	Struck against, crushed, bumped into objects	Operating machinery and tools	Burns and scalds (other than electrical)	Electrical shock and burns	Caught in lines, chains or wire ropes	Pinching and crushing	Heavy weather	Overexertion, sprains and strains	Cuts, lacerations, bruises and punctures	Altercations and misconduct	Unknown or insufficient information
11	Intoxication	----	----	----	----	2	----	1	1	6	1	----	2	----	----	----	----	----	----	----	3	----	----	4
178	Physical deficiency or handicap	154	----	----	----	----	----	----	----	12	----	1	1	1	----	----	----	----	----	----	----	----	----	----
59	Unsafe movement or posture	----	----	----	----	----	1	----	2	50	4	1	----	----	----	----	----	----	1	----	----	----	----	1
36	Psychological—immaturity, insanity	2	3	8	----	----	----	----	----	22	----	----	----	----	----	----	----	----	----	----	----	----	----	----
47	Unsafe practice	----	----	----	----	2	----	----	3	22	9	5	3	----	----	----	----	----	2	----	----	1	----	----
2	Violation of law or regulation	----	----	----	----	----	----	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----
45	Human errors	1	----	1	----	----	----	1	1	25	4	5	1	----	1	----	1	1	3	----	----	----	----	----
5	Decks—slippery or cluttered	----	----	----	----	----	----	----	1	3	1	----	----	----	----	----	----	----	----	----	----	----	----	----
4	Weather conditions	----	----	----	----	----	----	1	----	2	----	1	----	----	----	----	----	----	----	----	----	----	----	----
1	Poor maintenance or housekeeping	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----
0	Inadequate lighting	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
6	Inadequate rails or guards	----	----	----	----	----	2	----	----	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----
11	Failure of equipment	----	----	----	----	----	----	----	----	1	1	6	1	----	----	2	----	----	----	----	----	----	----	----
0	Inadequate supervision	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
3	Inadequate life preservers	----	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----
2	Inadequate tools or equipment	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----
0	Inadequate protective equipment	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
5	Improper use of tools or equipment	----	----	----	----	----	----	1	----	1	----	2	----	----	----	----	----	----	1	----	----	----	----	5
5	Miscellaneous causes	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
	TYPES OF VESSELS INVOLVED																							
	Inspected vessels:																							
39	Passenger and ferry—large	22	----	3	----	----	----	----	----	10	----	----	1	----	----	----	----	----	1	----	1	----	----	1
17	Passenger and ferry—small	10	1	1	----	----	----	----	----	3	----	1	1	----	----	----	----	----	----	----	----	----	----	----
134	Freight ships and barges	70	----	2	----	3	2	2	5	20	13	6	1	1	----	----	----	----	3	----	2	1	----	3
36	Tankships and barges	25	1	----	----	----	----	----	----	9	----	----	1	----	----	----	----	----	----	----	----	----	----	----
2	Public	1	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----
19	Miscellaneous	5	----	1	----	1	----	1	----	6	----	----	2	----	1	1	----	----	----	----	----	----	----	1
	Uninspected vessels:																							
62	Fishing	13	----	----	----	----	----	----	----	42	----	2	1	----	----	----	1	1	----	----	----	----	----	2
54	Tugs	8	----	----	----	----	----	1	2	37	----	2	----	----	----	----	2	----	1	----	----	----	----	1
23	Foreign	1	----	1	----	----	1	----	1	5	6	6	----	----	----	----	----	----	1	----	----	----	----	1
34	Miscellaneous	2	1	1	----	----	----	----	1	20	1	4	1	----	----	1	----	----	1	----	----	----	----	1
	TIME OF DAY																							
233	Daytime	89	2	5	----	3	----	3	6	79	9	15	5	1	1	2	3	1	5	----	1	----	----	3
184	Nighttime	55	1	3	----	1	3	1	3	61	10	5	2	----	----	----	----	----	1	----	1	----	----	7
33	Twilight	13	----	1	----	----	----	----	----	13	1	1	1	----	----	----	----	----	1	----	1	1	----	----
	PARTICULARS OF DECEASED																							
	Papers of deceased:																							
43	Licensed by Coast Guard	32	----	1	----	----	----	----	1	5	----	1	2	----	----	----	----	----	----	----	1	----	----	----
123	Documented by Coast Guard	68	2	4	----	3	2	2	2	30	1	2	2	1	----	----	----	----	1	----	1	----	----	2
228	No license or document	56	----	3	----	1	----	2	5	113	10	13	4	----	1	2	3	1	5	----	1	1	----	1
26	Other—unknown—foreign	1	1	1	----	----	1	----	1	5	9	5	----	----	----	----	----	----	1	----	----	----	----	1
	Status or capacity on vessel:																							
52	Passenger	36	----	2	----	----	----	----	----	12	----	----	1	----	----	----	----	----	----	----	----	----	----	1
32	Longshoreman—harbor worker	2	----	----	----	1	----	----	2	5	10	6	----	----	----	----	----	----	5	----	----	1	----	----
275	Crewmember	111	2	6	----	3	3	4	6	104	7	11	4	1	----	1	2	----	2	----	2	----	----	6
61	Other	8	1	1	----	----	----	----	1	32	3	4	3	----	1	1	1	1	----	----	1	----	----	3
	Activity engaged in :																							
125	Off duty	63	1	6	----	1	3	1	----	38	----	----	2	----	----	----	----	----	----	----	2	1	----	7
101	Deck department duties	21	----	1	----	1	----	3	6	52	6	8	1	----	----	----	1	----	1	----	----	----	----	----
29	Engine department duties	17	1	----	----	1	----	----	----	3	1	1	1	1	----	1	1	----	1	----	----	----	----	----
12	Stewards department duties	9	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----
19	Handling cargo	----	----	----	----	----	----	----	1	1	5	7	----	----	----	----	----	----	5	----	----	----	----	----
48	Fishing	15	----	----	----	----	----	----	----	29	----	3	----	----	----	----	----	1	----	----	----	----	----	----
2	Drills	1	----	----	----	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	1
44	Passenger	28	----	2	----	----	----	----	----	13	----	----	----	----	----	----	----	----	----	----	----	----	----	2
40	Other and unknown	3	1	----	----	1	----	----	2	13	8	2	4	----	1	1	1	----	----	----	1	----	----	----
	Location of vessel:																							
173	At dock	42	2	4	----	2	3	2	6	59	19	12	3	1	----	----	3	----	7	----	3	1	----	4
14	At anchor	2	----	----	----	2	----	----	----	5	----	2	2	----	----	2	----	----	----	----	----	----	----	1
233	Underway	113	1	5	----	----	----	2	3	89	1	7	3	----	1	----	----	1	----	----	----	----	----	5
	PART OF BODY INVOLVED																							
31	Head and upper limbs	----	----	1	----	3	2	1	6	----	3	10	----	1	1	----	----	----	2	----	----	1	----	----
0	Back and lower limbs	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
39	Multiple injuries (internal and external)	----	1	----	----	----	----	2	3	----	11	11	2	----	----	2	2	----	5	----	----	----	----	----
148	Death—heart	142	1	1	----	----	----	----	----	3	----	----	1	----	----	----	----	----	----	----	1	----	----	3
162	Death—drowning	1	----	4	----	----	1	----	----	148	3	----	----	----	----	----	1	1	----	----	2	----	----	7
40	Death—disease, other	14	1	3	----	1	----	1	----	2	3	----	5	----	----	----	1	----	----	----	----	----	----	----

[1]Statistics concerning recreation and pleasure boating accidents are published in CG-357.

STATISTICAL SUMMARY OF PERSONNEL INJURIES ON BOARD COMMERCIAL VESSELS[1]

(Not Involving a Vessel Casualty)

Total	1 July 1969 to 30 June 1970 Fiscal year 1970	Nature of injury																		
		Slips and falls—ladders	Slips and falls—gangways	Slips and falls—on deck	Slips and falls—other	Falls from vessel—into water	Falls into holds or tanks	Struck by objects; falling dropped or moving	Exposure and asphyxiation	Struck against, crushed, bumped into objects	Operating machinery and tools	Burns and scalds (other than electrical)	Electrical shock and burns	Caught in lines, chains or wire ropes	Pinching and crushing	Heavy weather	Overexertion, sprains and strains	Cuts, lacerations, bruises and punctures	Alternations and misconduct	Unknown or insufficient information
1923	CAUSE OF INJURY																			
55	Intoxication	7	2	3	16	2	----	----	----	3	----	2	----	----	1	----	2	5	9	3
72	Physical deficiency or handicap	5	----	2	8	----	----	----	----	3	----	----	----	----	----	----	43	4	2	5
551	Unsafe movement or posture	81	18	41	79	2	4	30	----	46	1	6	----	7	12	1	173	38	2	10
66	Psychological—immaturity, insanity	1	----	1	3	----	----	----	1	----	----	2	----	----	----	----	3	13	41	1
426	Unsafe practice	32	3	8	51	1	4	93	3	18	9	30	5	17	40	1	49	48	----	14
25	Violation of law or regulation	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	2	22	----
278	Human errors	24	6	20	31	2	2	38	----	25	3	18	1	7	35	1	18	36	----	11
131	Decks—slippery or cluttered	16	2	51	13	----	----	2	----	10	----	1	----	----	1	2	26	3	2	2
122	Weather conditions	4	----	13	20	1	----	19	----	13	----	3	----	1	10	10	10	16	----	2
15	Poor maintenance or housekeeping	2	----	1	3	----	----	6	----	----	----	----	----	----	----	----	----	2	1	----
2	Inadequate lighting	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1	----
5	Inadequate rails or guards	----	----	----	3	----	----	1	----	----	----	1	----	----	----	----	----	----	----	----
81	Failure of equipment	3	----	1	7	----	1	42	----	1	----	7	1	1	----	1	6	8	----	2
12	Inadequate supervision	----	----	1	1	----	----	4	----	----	----	2	----	1	1	----	----	2	----	----
0	Inadequate life preservers	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
8	Inadequate tools or equipment	----	----	----	----	----	----	2	----	----	----	1	----	----	----	----	2	3	----	----
6	Inadequate protective equipment	----	----	----	----	----	----	2	----	1	----	2	----	----	----	----	----	1	----	----
60	Improper use of tools or equipment	3	----	----	4	----	----	10	----	1	10	4	----	2	1	----	3	20	----	2
8	Miscellaneous causes	----	----	----	2	----	----	1	----	1	----	----	----	1	1	----	----	2	----	----
	TYPES OF VESSELS INVOLVED																			
	Inspected vessels:																			
126	Passenger and ferry—large	9	1	23	17	----	----	15	----	9	----	3	1	1	6	----	23	11	3	4
19	Passenger and ferry—small	1	1	2	4	----	----	2	----	----	----	----	----	2	----	----	----	5	2	----
1,487	Freight ships and barges	146	27	103	183	4	10	191	3	96	19	60	4	18	74	10	290	148	61	40
122	Tankships and barges	14	2	6	16	1	1	9	1	9	3	9	----	1	3	2	17	19	7	2
1	Public	----	----	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
32	Miscellaneous	1	----	1	8	----	----	7	----	1	----	1	2	----	2	1	1	3	2	3
	Uninspected vessels:																			
55	Fishing	----	----	1	3	----	----	12	----	1	1	4	----	9	7	3	1	10	----	3
40	Tugs	2	----	2	4	2	----	9	----	5	----	----	----	5	4	----	4	3	----	----
2	Foreign	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
39	Miscellaneous	3	----	4	5	1	----	5	----	1	----	2	----	1	6	----	3	4	3	1
	TIME OF DAY																			
1,354	Daytime	127	17	90	150	4	5	205	2	79	19	57	6	26	76	12	242	157	40	41
477	Nighttime	42	12	46	78	4	5	40	2	30	3	17	1	9	24	2	73	40	33	7
92	Twilight	9	2	6	13	----	1	5	----	4	1	5	----	3	2	2	24	6	5	4
	PARTICULARS OF PERSON INJURED																			
	Papers of person injured:																			
199	Licensed by Coast Guard	20	6	11	25	----	1	21	----	11	4	16	1	2	8	2	33	29	7	2
1,547	Documented by Coast Guard	152	24	117	199	6	8	195	4	102	19	53	5	20	76	11	293	152	65	46
176	No license or document	6	1	14	17	2	2	34	----	9	----	10	1	15	18	3	13	22	5	4
1	Other—unknown—foreign	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
	Status or capacity on vessel:																			
27	Passenger	----	1	6	6	----	----	2	----	1	----	1	----	1	3	1	1	3	1	----
7	Longshoreman—harbor worker	----	----	----	----	----	----	5	----	1	----	----	----	----	----	----	----	----	----	1
1,847	Crewmember	177	30	136	230	7	9	233	4	120	23	71	7	35	94	15	337	194	75	50
42	Other	1	----	----	5	1	2	10	----	----	----	7	----	1	5	----	1	6	2	1
	Activity engaged in:																			
296	Off duty	27	16	25	56	3	1	5	2	19	----	2	----	1	13	3	30	38	48	7
766	Deck department duties	54	7	56	112	5	5	156	----	54	5	9	1	24	31	7	157	66	1	6
498	Engine department duties	59	5	27	44	----	3	55	2	30	17	51	4	2	20	1	107	58	11	2
255	Stewards department duties	35	2	27	17	----	----	12	----	17	----	9	2	----	24	2	42	25	6	35
5	Handling cargo	----	----	----	----	----	----	3	----	1	----	----	----	----	----	----	----	----	----	1
45	Fishing	----	----	4	1	----	----	12	----	----	1	----	----	9	6	2	1	9	----	----
6	Drills	2	----	----	2	----	----	----	----	----	----	----	----	----	1	----	----	1	----	----
22	Passenger	----	1	3	6	----	----	1	----	1	----	1	----	1	3	1	1	3	----	----
30	Other and unknown	1	----	----	3	----	2	6	----	----	----	7	----	----	4	----	1	3	2	1
	Location of vessel:																			
866	At dock	72	29	44	103	7	7	123	2	46	7	36	6	21	52	2	152	74	58	25
18	At anchor	1	----	3	3	----	----	6	----	----	----	----	----	1	----	----	----	2	----	----
1,041	Underway	105	2	95	135	1	4	121	2	76	16	43	1	15	50	14	187	127	20	27

See footnote at end of table.

STATISTICAL SUMMARY OF PERSONNEL INJURIES ON BOARD COMMERCIAL VESSELS[1]
Continued
(Not Involving a Vessel Casualty)

Total	1 July 1969 to 30 June 1970 Fiscal year 1970	Nature of injuries																		
		Slips and falls—ladders	Slips and falls—gangways	Slips and falls—on deck	Slips and falls—other	Falls from vessel—into water	Falls into holds or tanks	Struck by objects; falling, dropped or moving	Exposure and asphyxiation	Struck against, crushed bumped into objects	Operating machinery and tools	Burns and scalds (other than electrical)	Electrical shock and burns	Caught in lines, chains or wire ropes	Pinching and crushing	Heavy weather	Overexertion, sprains and strains	Cuts, lacerations, bruises and punctures	Altercations and misconduct	Unknown or insufficient information
	Part of body injured:																			
97	Head and neck	5	----	5	24	----	----	22	----	14	----	----	----	----	1	----	------	10	14	2
69	Eye and face	1	----	----	4	----	1	37	----	1	----	11	1	1	----	----	----	3	9	----
133	Arm and shoulder	14	2	16	20	1	----	15	----	11	----	12	----	3	7	1	17	8	3	4
350	Hand	10	2	17	13	1	----	29	----	14	20	7	5	17	73	----	27	85	5	25
231	Leg and hip	23	6	21	33	1	2	30	1	35	1	3	----	3	6	1	26	36	----	3
287	Foot	23	9	12	18	1	2	62	----	16	----	14	----	7	4	2	91	22	3	1
261	Back	31	2	33	30	1	----	5	----	11	1	1	----	1	----	----	129	7	4	5
56	Body—external	11	1	5	7	----	----	7	1	1	1	6	----	----	1	----	8	4	3	----
101	Body—internal	15	4	10	23	1	1	5	1	8	----	----	----	1	3	2	12	6	5	4
21	Hernia	1	----	2	2	----	----	----	----	----	----	----	----	----	----	----	16	----	----	----
293	Multiple body injuries	41	5	20	62	----	4	37	----	10	----	23	----	4	6	10	13	22	32	4
24	All other injuries	3	----	1	5	2	1	1	1	1	----	2	1	----	1	----	------	------	1	4
	ADDITIONAL CONTRIBUTING FACTORS TO CAUSE OF INJURY																			
597	Human element	36	7	54	63	1	2	52	1	26	13	19	1	9	15	4	111	89	80	14
70	Decks—slippery or cluttered	7	2	19	18	1	1	4	----	4	----	----	----	----	1	1	12	----	----	----
49	Weather conditions	2	2	8	3	1	----	3	----	4	----	2	----	----	10	1	6	5	----	2
16	Poor maintenance or housekeeping	3	----	2	3	----	----	1	----	2	----	----	----	----	----	----	1	2	1	1
16	Inadequate lighting	1	----	----	4	----	3	----	----	3	----	----	----	1	----	----	2	2	----	----
17	Inadequate rails or guards	3	1	----	3	1	1	2	----	----	----	----	----	----	1	1	----	4	----	----
8	Failure of equipment	----	----	----	----	----	----	3	----	1	----	1	----	----	----	----	2	1	----	----
57	Inadequate supervision	1	----	2	6	----	----	21	1	----	----	5	----	4	2	1	11	2	----	1
19	Inadequate tools or equipment	----	----	----	5	----	----	3	----	----	----	----	1	----	1	----	7	1	----	1
32	Inadequate protective equipment	1	----	1	3	----	----	12	----	2	1	3	----	1	----	----	1	6	----	1
124	Improper use of tools or equipment	2	----	1	13	----	----	36	----	9	7	9	----	2	10	----	10	22	----	3
113	Hull structure	8	----	22	31	----	----	6	----	7	----	1	----	2	3	5	21	7	----	----
51	Holds, hatches, tanks	3	----	1	16	----	4	3	1	2	----	2	----	----	5	----	8	5	1	----
168	Ladders, gangways, stairs	91	12	3	13	1	2	6	----	10	----	----	----	----	1	----	23	4	----	2
66	Masts, booms, cargo gear	2	----	1	7	----	1	17	----	3	----	----	1	3	8	----	16	7	----	----
27	Watertight closures	----	----	1	7	----	----	2	----	2	----	----	----	----	12	1	1	1	----	----
58	Living spaces	2	----	8	13	----	----	3	1	8	----	1	----	1	4	2	9	6	----	----
17	Fishing equipment	----	----	----	----	----	----	4	----	----	----	----	----	5	4	1	----	3	----	----
2	Navigational equipment	----	----	----	----	----	----	----	----	----	----	----	----	----	2	----	----	----	----	----
14	Lifesaving equipment	1	----	----	5	----	----	----	----	2	----	----	----	----	1	----	3	2	----	----
3	Firefighting equipment	----	--	1	----	----	----	1	----	----	----	----	----	----	----	----	1	----	----	----
0	Communications equipment	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
0	Yard repairs	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
23	Improper loading, stowage and ventilation	2	----	4	4	----	----	1	----	2	----	----	----	----	3	2	5	----	----	----
12	Ground tackle	----	----	----	----	----	----	2	----	----	----	----	----	4	2	----	2	2	----	----
4	Tugs and towing equipment	----	----	----	2	----	----	2	----	----	----	----	----	----	----	----	----	----	----	----
87	Mooring equipment	----	----	1	3	----	----	46	----	1	----	----	----	10	3	1	13	7	----	2
4	Miscellaneous deck department equipment	----	----	----	3	----	----	----	----	1	----	----	----	----	----	----	----	----	----	----
4	Main propulsion machinery	----	----	----	----	----	----	1	----	----	1	1	----	----	1	----	----	----	----	----
30	Boiler parts and accessories	1	----	----	2	----	----	4	----	2	----	16	1	----	3	----	5	4	----	1
42	Auxiliary machinery	6	----	3	8	----	----	2	----	6	1	4	----	----	----	----	8	4	----	----
6	Electrical equipment	----	----	----	----	----	----	1	----	----	1	1	2	----	----	----	1	----	----	----
66	Galley equipment	2	----	7	8	----	----	5	----	1	----	7	----	----	4	1	10	2	----	19

[1] Statistics concerning recreation and pleasure boating accidents are published in CG-357.

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 5–70

29 JUNE 1970

Subj: Bulk Liquid Cargoes; Guide to Compatibility of Chemicals.

PURPOSE

This circular publishes a "Guide to Compatibility of Chemicals."

DISCUSSION

a. The enclosed Guide is based in part upon information provided to the Coast Guard by the National Academy of Sciences—U.S. Coast Guard Advisory Committee on Hazardous Materials, and represents the latest information available to the Coast Guard on chemical compatibility.

b. The accidental mixing of one chemical cargo with another can in some cases be expected to result in a vigorous and hazardous chemical reaction. The generation of toxic gases, the heating, overflow, and rupture of cargo tanks, and fire and explosion are possible consequences of such reactions.

c. The purpose of the enclosed compatibility chart is to show chemical combinations believed to be dangerously reactive in the case of accidental mixing. It should be recognized, however, that the compatibility chart provides a broad grouping of chemicals with an extensive variety of possible binary combinations. Although one group, generally speaking, can be considered dangerously reactive with another group where an "X" appears on the chart, there may exist between the groups some combinations which would not dangerously react. The compatibility chart should therefore not be construed or used as an infallible guide. It is offered as an aid in the safe loading of bulk chemical cargoes, with the recommendation that proper safeguards be taken to avoid accidental mixing of binary mixtures for which an "X" appears on the chart. Proper safeguards would include consideration of such factors as avoidance of the use of common cargo and vent lines and carriage in adjacent tanks having a common bulkhead.

d. The following procedure explains how the Guide should be used in determining compatibility information:

(1) Determine the reactivity group of a particular product by referring to the reactivity groups listed on pages 3–6 of the Guide.

(2) Enter the chart, on page 2 of the Guide, with the reactivity group. Proceed across the page. An "X" indicates a reactivity group which represents an unsafe combination with the product in question.

(3) At the end of the line, proceed down. An "X" again indicates groups representing unsafe combinations.

e. For example, acrylonitrile falls within Group No. 14, Monomers and Polymerizable Esters. Acrylonitrile should be segregated from acids, caustics, amines, alkanolamines, halogenated compounds, alcohols, glycols, glycol ethers, phenols, alkylene oxides, ammonia, halogens, ethers, acid anhydrides. The note to the right of the chart indicates that epichlorohydrin should be segregated from acrylonitrile also.

f. It is recognized there are wide variations in the reaction rates of individual chemicals within the broad groupings shown reactive by the compatibility chart. Some individual materials in one group will react violently with some of the materials in another group and cause great hazard; others will react slowly, or not at all. In order to improve the usefulness of the Guide, identification of specific binary combinations which are found not to be dangerously reactive, even though an "X" appears on the chart for those two chemicals, is desired. The combinations so identified will be listed in subsequent revisions to the Guide provided:

(1) Nonreactivity is established by laboratory testing simulating conditions found in transportation.

(2) The test used in determining reactivity, while not yet firmly established, should include the following:

(a) Commercial products should be used.

(b) Proportion of each reactant should be varied so as to simulate mixing that should take place aboard the vessel.

(c) The duration of the test should be of sufficient length to determine the possibility of delayed reaction.

(3) Test results should include the following:

(a) Change in temperature (ΔT)

(b) Change in pressure (ΔP)

(c) Identification of reaction products.

(4) The test procedure together with results obtained should be forwarded to Commandant (MHM) for review. If found acceptable, the combination will be listed in the Guide as "not dangerously reactive as tested in accordance with the outlined test procedure."

ACTION

a. Certificates of Inspection for U.S. certificated tank vessels will contain an endorsement which specifies that cargoes should be loaded in a compatible manner. The Guide is offered to assist the owners and operators of tank vessels in determining compatibility of various chemical cargoes.

b. Commandant (MHM) will issue copies of this Circular to the owners of foreign vessels upon the completion of plan review, and a copy will be attached as an enclosure to the Letter of Compliance. Coast Guard Boarding officers will check foreign vessels' stowage plans

to determine whether stowage is in accordance with the Guide. If a discrepancy is observed, the Coast Guard Captain of the Port may direct the master to transfer the cargoes to comply with the Guide.

c. Questions concerning the Guide should be referred to the Commandant (MHM).

Copies of this circular with enclosure (1) may be obtained at the local marine inspection office or by writing Commandant (CAS–2), U.S. Coast Guard, Washington, D.C. 20591. ‡

AMENDMENTS TO REGULATIONS

Withdrawal of Proposed Rule Making

MEASUREMENT OF VESSELS

DEPARTMENT OF TRANSPORTATION

Coast Guard

[46 CFR Part 69]

1. In the Federal Register of February 28, 1970 (35 F.R. 3916), there was published a notice of proposed rule making and of a public hearing to be held on March 30, 1970, in Washington, D.C., by the Merchant Marine Council on Items PH 1–70 to PH 12–70, inclusive, of the Merchant Marine Council Agenda (CG–249), dated March 30, 1970. The notice invited interested persons to submit written data, views, arguments, or comments concerning the proposals to the Commandant (CMC) of the Coast Guard to be received by March 27, 1970, and to attend the hearing and present oral or written statements on the proposals.

2. Item PH 9–70 of the agenda was entitled "Measurement of Vessels—Limitations of Deep Floors, Frames, Double Bottoms and Side Frames." Many communications were received from interested persons stating that the time afforded by the notice was insufficient to permit detailed study of the proposals contained in that time.

3. Accordingly, in the Federal Register of March 24, 1970 (35 F.R. 5012), there was published another notice which extended the time to submit written data, views, arguments, or comments concerning Agenda Item PH 9–70 until September 1, 1970.

4. Oral presentations were heard at the public hearing on March 30, 1970. Numerous communications were received urging that, among other things, the proposed changes be dropped since if adopted they would disrupt many industries using vessels of up to 500 gross tons; the proposed changes be deferred until after it has been determined whether the International Convention on the Tonnage Measurement of Ships, 1969, will come into force and make the present tonnage measurement rules obsolete; specific language amending the proposed changes be adopted; and meetings be held between Coast Guard and industry representatives to develop new criteria for applying licensing, manning, vessel inspection and other safety requirements which are affected by tonnage measurement.

5. Meetings were held with several industry groups at which the proposed changes to the vessel measurement rules were considered at great length. Data, views, arguments, and comments concerning the proposed rule changes presented at the meetings generally resulted in a consensus among the industry representatives that the common objective of the Coast Guard and other tonnage measurement authorities throughout the world should be that gross tonnage be made an accurate index to vessel size. Despite favoring this objective, the industry representatives urged that the changes proposed in Agenda Item PH 9–70 be canceled or deferred since the changes, in themselves, would not cause the objective to be attained. They expressed great concern that the problems which would arise in connection with enforcement of the proposed changes could not be resolved before similar problems would have to be dealt with in connection with the definitive attainment of the desired objective upon ratification and implementation of the International Convention on Tonnage Measurement of Ships, 1969.

6. The Coast Guard carefully considered all representations made in the matter and concluded that it would be advantageous to defer the changes to 46 CFR Part 69 proposed in Agenda Item PH 9–70 until it can be determined whether the International Convention will be ratified and put into force at an early date.

7. Accordingly, Item PH 9–70, the proposal to amend 46 CFR Part 69 so as to limit the extent to which floor timbers and certain other structural members will be considered as boundaries for space to he included in the gross tonnage of a vessel as presented in the Federal Register of February 28, 1970 (35 F.R. 3919), is withdrawn. The proposal or a similar proposal may be published subsequently in the Federal Register if it becomes apparent that the coming into force of the International Convention on Tonnage Measurement of Ships, 1969, will be unduly delayed; or regulations similar to those provided by the Convention will not be adopted for vessels in domestic trade; or if other circumstances occur which make such a proposal necessary in connection with the Coast Guard's

obligation to meet its responsibilities under the law.

Dated: October 9, 1970.

T. R. SARGENT,
Vice Admiral,
U.S. Coast Guard,
Acting Commandant.

[F.R. Doc. 70-13808; Filed, Oct. 13, 1970; 8:49 a.m.]

(Federal Register of October 14, 1970.)

Title 46 Changes

Chapter I—Coast Guard, Department of Transportation

SUBCHAPTER K—MARINE INVESTIGATIONS AND SUSPENSION AND REVOCATION PROCEEDINGS

PART 137—SUSPENSION AND REVOCATION PROCEEDINGS

Offenses Involving Narcotic or Dangerous Drugs

A notice of rule making was published in the Federal Register of May 27, 1970 (35 F.R. 8291) and amended by a document published on June 10, 1970 (35 F.R. 8945) to revise § 137.03–3 and to add a new § 137.03–4. The notice proposed to extend the policy of requiring an order of revocation, presently applicable to offenses involving narcotic drugs, including marijuana, to include proven offenses involving the possession, use, sale or association with other dangerous drugs, not classified as narcotic drugs. The notice also proposed to authorize the examiner in cases involving marijuana to enter an order less than revocation whenever he is satisfied that the use, possession or association was the result of experimentation and the person charged submits satisfactory evidence that this use will not recur. Interested persons were invited to submit written comments on the proposal and to arrange for conferences with appropriate Coast Guard personnel. In addition to publication in the Federal Register, the notice was mailed to persons who had indicated a desire to be informed of notices of proposed rule making. No conferences were requested and only one written comment was received. This comment favored the proposal. Accordingly, this document effectuates the proposal without change.

Part 137 is amended by revising § 137.03–3 and by adding § 137.03–4 to read as follows:

§ 137.03–3 Possession of narcotics; prima facie case.

When a charge of misconduct is supported by a specification alleging possession of narcotic drugs, including marijuana, or dangerous drugs, evidence of possession is enough to support a finding of misconduct, unless the examiner is satisfied by other evidence that the possession was not wrongful.

§ 137.03–4 Offenses for which revocation of licenses or documents is mandatory.

Whenever a charge of misconduct by virtue of the possession, use, sale or association with narcotic drugs, including marijuana, or dangerons drugs is found proved, the examiner shall enter an order revoking all licenses, certificates and documents held by such a person. However, in those cases involving marijuana, where the examiner is satisfied that the use, possession or association, was the result of experimentation by the person and that the person has submitted satisfactory evidence that such use will not recur, he may enter an order less than revocation.

(R.S. 4450, as amended, Sec. 6(b)(1), 80 Stat. 937; 46 U.S.C. 239, 49 U.S.C. 1655 (b)(1); 49 CFR 1.46(b) (35 F.R. 4959))

Effective date. This amendment shall become effective 30 days following the date of publication in the Federal Register.

Dated: October 14, 1970.

C. R. BENDER,
Admiral, U.S. Coast Guard,
Commandant.

[F.R. Doc. 70-14078; Filed, Oct. 19, 1970; 8:46 a.m.]

(Federal Register of October 20, 1970.)

Chapter I—Coast Guard, Department of Transportation

REPORTS OF HAZARDOUS MATERIALS INCIDENTS

A notice of proposed rule making was published in the Federal Register of October 29, 1969 (34 F.R. 17446) to amend Part 146 of Title 46 of the Code of Federal Regulations to include a requirement for the immediate reporting of serious incidents involving hazardous materials, as well as a requirement for reporting certain information concerning all hazardous materials incidents whether or not an immediate notification is required. The Merchant Marine Council held a public hearing on this proposal on January 12, 1970, in Washington, D.C. Interested persons were given the opportunity to submit written comments both before and at the public hearing and to make oral comments at the public hearing. A total of 19 written comments were received and three of the organizations making written comments also presented oral comments to the Council at the public hearing. At an executive session held on February 5, 1970, the assigned members of the Council duly considered the proposed amendments in the light of all the comments received.

A number of changes in the proposed amendments have been made as a result of the comments received from the public. Two comments pointed out that the proposal to amend Subchapter N of Title 46 of the Code of Federal Regulations to include inflammable and combustible liquid cargoes in bulk is contrary to the basic statute and other regulations in Subchapter N. In fact, the statute which legislates with respect to the carriage of explosives or dangerous substances (R.S. 4472, as amended: 46 U.S.C. 170) and certain provisions of Subchapter N which regulates these substances when carried in a package, container, portable tank, highway or railroad vehicle expressly exclude from their purview the carriage of inflammable or combustible liquid cargoes in bulk. For this reason,

the Council recommended that the proposal to add these reporting requirements to Subchapter N be changed to add these requirements to Part 2 of Subchapter A, Title 46 of the Code of Federal Regulations. Subchapter A concerns procedures of the Coast Guard applicable to the public and Part 2 contains present reporting requirements for marine casualties. These requirements are not limited by the nature of the cargo carried by the vessel or by the fact that the vessel has no cargo at the time of the casualty. In addition to including the basic requirements in Part 2, instead of Part 146 as in the notice, this document also includes references to these basic requirements in Subchapters D, H, I, N, O, T, and U. This change is one of form only, and does not by itself involve any change of substance in the basic reporting requirements.

Several of the comments voiced strenuous objection to the proposed requirement that the personnel of tank vessels be required to answer 32 questions on the report form relating to each and every unintentional release, no matter how small and inconsequential, that might occur during the loading and discharging of petroleum or liquid chemical cargoes in bulk. In response to these comments, the Council recommended that the reporting requirements for the unintentional release of bulk hazardous materials be separated from those for the unintentional release of packaged hazardous materials. The following exceptions are included to the reporting requirements for the unintentional release of hazardous materials carried in bulk: (1) Minor release during gauging or sampling operation; (2) minor release resulting from leakage around gaskets, flanges, or packing; (3) release which is contained in a drip pan; (4) venting of cargo vapor during loading, and (5) other minor leakage which is readily correctible. It is considered that these exceptions will relieve the personnel of tankers from the need to report unnecessary incidents. The further comment that the definition of hazardous materials be amended to delete the reference to "inflammable or combustible liquid cargo in bulk" was rejected by the Council. The acceptance of this suggestion would seriously weaken the fundamental objectives of this new reporting system.

The notice proposed that the immediate notification of the hazardous materials incident and the subsequent hazardous materials incident written report should be made to the Department of Transportation. The vast majority of the comments received objected to this provision and stressed that because of its operational and investigatory responsibilities, these reports should be made to the Coast Guard. In accordance with these comments the Council recommended that the immediate notification and the subsequent written report on Coast Guard Form CG 4752 of the unintentional release of bulk hazardous materials be made to the nearest District Commander of the Coast Guard; however, in order to have uniform reporting requirements within the Department of Transportation, the written report of the unintentional release of packaged hazardous materials shall be made on Form DOT F 5800.1 to the Secretary, Hazardous Materials Regulations Board, Washington, D.C. 20590.

The notice defined hazardous materials as "explosives or other dangerous articles or substances" as well as "inflammable or combustible liquid cargo in bulk" as used in title 46, United States Code, sections 170 and 391a, respectively. The Council recommended that this definition be expanded by indicating ten categories of substances embraced within the term, hazardous materials. This addition does not alter the definition contained in the notice, but makes it more meaningful to the average person who will be required to give notice of these accidents.

The notice proposed the reporting of an incident, inter alia, in which as a direct result of the hazardous materials it is estimated that the resumption of the normal operation of the vessel will be prevented for 2 hours or more. Several of the comments objected that this would require the reporting of many minor incidents. In response to these comments the Council concluded that there is justification for limiting the criteria for immediate notification and recommended that a change be made to the proposal. After consultation with the Department of Transportation's other operating administrations, the following changes in the criteria for immediate notification have been made: where an injured person is involved, hospitalization is the current criteria instead of the previous criteria of emergency medical treatment away from the scene of the incident; vessel or other property damage, or both, has been increased from the previous criteria of $5,000 to $50,000; and the requirement for notification where it is estimated that the resumption of normal operation of the vessel will be prevented for 2 hours or more has been eliminated and a new criteria has been established requiring notification of the incident if it is of such significance as to warrant reporting even though it does not involve a fatality, serious injury, property damage in excess of $50,000, or a continuing danger to life.

Accordingly, after due consideration of all the relevant matter, including the comments of interested persons and the recommendations of the Merchant Marine Council, the Commandant, U.S. Coast Guard has approved the amendments.

(Federal Register of October 31, 1970.)

AFFIDAVITS

The following affidavits were accepted during the period from September 15 to October 15, 1970:

Conval-Ohio Inc., 275 Main St., Wadsworth, Ohio 44281, VALVES and FLANGES.

Andale Co., 135 East Hancock St., Lansdale, Pa. 19446, VALVES.

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 will be furnished by mail to subscribers, free of postage, for $2.50 per month or $25 per year, payable in advance. The charge for individual copies is 20 cents for each issue, or 20 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. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1970 are now available from the Superintendent of Documents price: $3.75.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (5–1–68). F.R. 6–7–68, 2–12–69, 10–29–69.
115	Marine Engineering Regulations and Material Specifications (3–1–66). F.R. 12–18–68, 6–17–70.
123	Rules and Regulations for Tank Vessels (5–1–69). F.R. 10–29–69, 2–25–70, 6–17–70, 10–31–70.
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, 7–30–66, 8–2–66, 9–7–66, 10–22–66, 5–11–67, 12–23–67, 6–4–68, 10–29–69, 11–29–69.
172	Rules of the Road—Great Lakes (9–1–66). F.R. 7–4–69, 8–4–70.
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 (1–3–66). F.R. 12–6–66, 1–6–67, 9–27–67, 7–12–68, 6–5–69, 7–26–69, 10–29–69.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (9–1–66). F.R. 9–7–66, 5–11–67, 12–23–67, 6–4–68, 11–29–69.
190	Equipment Lists (8–1–68). F.R. 11–7–68, 11–8–68, 11–16–68, 11–19–68, 11–20–68, 12–11–68, 12–18–68, 2–11–69, 2–18–69, 2–21–69, 2–26–69, 3–15–69, 3–27–69, 4–4–69, 4–12–69, 4–19–69, 4–25–69, 4–26–69, 4–28–69, 5–3–69, 5–9–69, 6–18–69, 6–19–69, 7–1–69, 7–15–69, 7–17–69, 9–12–69, 9–25–69, 10–10–69, 10–11–69, 10–22–69, 10–31–69, 11–19–69, 12–13–69, 1–27–70, 1–30–70, 2–3–70, 2–26–70, 3–11–70, 3–14–70, 3–25–70, 4–14–70, 5–7–70, 5–27–70, 7–18–70, 7–21–70, 8–15–70, 9–29–70.
191	Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel (5–1–68). F.R. 11–28–68, 4–30–70, 6–17–70.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67) F.R. 3–30–68, 4–30–70, 10–20–70.
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 (5–1–68). F.R. 10–29–69, 5–15–70, 9–11–70.
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5–1–69). F.R. 10–29–69, 2–25–70, 4–30–70, 6–17–70, 10–31–70.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (8–1–69). F.R. 10–29–69, 2–25–70, 4–22–70, 4–30–70, 6–17–70, 10–31–70.
258	Rules and Regulations for Uninspected Vessels (5–1–70).
259	Electrical Engineering Regulations (3–1–67). F.R. 12–20–67, 12–27–67, 1–27–68, 4–12–68, 12–18–68, 12–28–68, 10–29–69, 2–25–70, 4–30–70.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69.
268	Rules and Regulations for Manning of Vessels (5–1–67). F.R. 4–12–68, 4–30–70.
293	Miscellaneous Electrical Equipment List (9–3–68).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (11–1–68). F.R. 12–17–68, 10–29–69.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (7–1–69). F.R. 10–29–69, 2–25–70, 4–30–70, 10–31–70.
329	Fire Fighting Manual for Tank Vessels (7–1–68).

CHANGES PUBLISHED DURING OCTOBER 1970

The following have been modified by Federal Registers:

CG–200, Federal Register, October 20, 1970.

CG–123, CG–256, CG–257, CG–323; and Subchapters A, N, O and U of Title 46 CFR, Federal Register, October 31, 1970.

ANNUAL INDEX—VOLUME 27

Page

Acceptable Hydraulic Components 73, 157
Affidavits 14, 38, 158, 178, 237
Aids to Navigation 25
Air Pressure Explodes Barrels 131
A Lifejacket Wasn't Enough 72
All Tied Up In Knots? 48
Amendments to Regulations 17, 36, 54, 72, 136, 156, 198, 217, 235
A New Look at Licensing of Merchant Marine Officers 43
Awards:
- Richard D. Hughes receives Seamanship Trophy posthumously 215
- Captain Johnny L. Jensen Master of SS U.S. *Conqueror* Receives The Distinguished Service Medal 130
- Lykes Vessels Honored for Safety 227
- M. V. *New Yorker* Wins Safest Ship Award for 1968 8
- SS *African Star* Wins Seamanship Trophy . . . 34

Be Alert When Handling Mooring Lines 9
Boarding Policy 117
Boating Accidents 112
Boating Safety Centers 116
Boating Safety Detachments 117
Boating Safety Instructor's School 113
Coast Guard Boating Publications 109
Coast Guard Has New Tool to Counter Tanker Oil Spills 166
Dangerous Cargo Information Card Manual Published 178
Drilling Rig *Dixilyn 8, Julie Ann* Capsizing and Sinking in Gulf of Mexico 206
Drive Against Vandals 71
Engineroom Waterfall 169
Fiber Lines 9
Fire Fighting In The Port of New York 191
Fixed Fire Fighting Systems 188
F/V "*Fenwick Island*" Capsizing in Atlantic Ocean . 62
Fusible Plug 14
Ground Concepts Related to Electrical Installations on Merchant Vessels 124
Ground Detection Devices 223
Handling of Intermodal Freight Containers 87
Hazardous Materials Transportation 79
Helping Radar Rescue 215

Page

Historic Journey of the Manhattan 26
IMCO Activities 133, 150, 205
International Ice Patrol Services—1970 23
Iron Coffins 61
Marine Environmental Fire and Safety Test Facility 183
Maritime Sidelights . . . 8, 49, 68, 152, 172, 194, 215, 227
Merchant Marine Personnel Statistics 196
Merchant Marine Casualty Statistics 228
National Safe Boating Week 115
National Safe Boating Week Materials Available . 113
Nautical Queries 10, 50, 69, 118, 151, 170, 195, 216
Navigation and Vessel Inspection Circulars:
- No. 7–69 12
- No. 8–69 15
- No. 9–69 16
- No. 10–69 38
- No. 11–69 51
- No. 12–69 52
- No. 0–70 135
- No. 1–70 154
- No. 2–70 155
- No. 3–70 174
- No. 4–70 175
- No. 5–70 234

New Commandant 123
1969—Year of Progress for the Auxiliary 110
Pilot Ladders—Who Cares? 153
Pollution in Prohibited Zones 70
Problems and Programs 99
Proposed Federal Boat Safety Act of 1970 103
Proposed Regulations 74
Public Hearing 129
Public Hearing 1970 Proposals 28
Reckless or Negligent Boat Operations 114
"So You Think You Know It All" 53
Stores and Supplies 16, 74, 138, 158, 178
Survival at Sea 163
Synthetics and Sunlight 72
The Anatomy of Marine Casualty Investigations . 4
The Inflatable Liferaft as A Rescue Vehicle 203
The Many Faces of Corrosion 148
The Positive Approach to River Safety 71
The Safe Way is the Best Way 155
20-Knot Ships—10-Knot Safety Programs 143

U.S. GOVERNMENT PR 1970