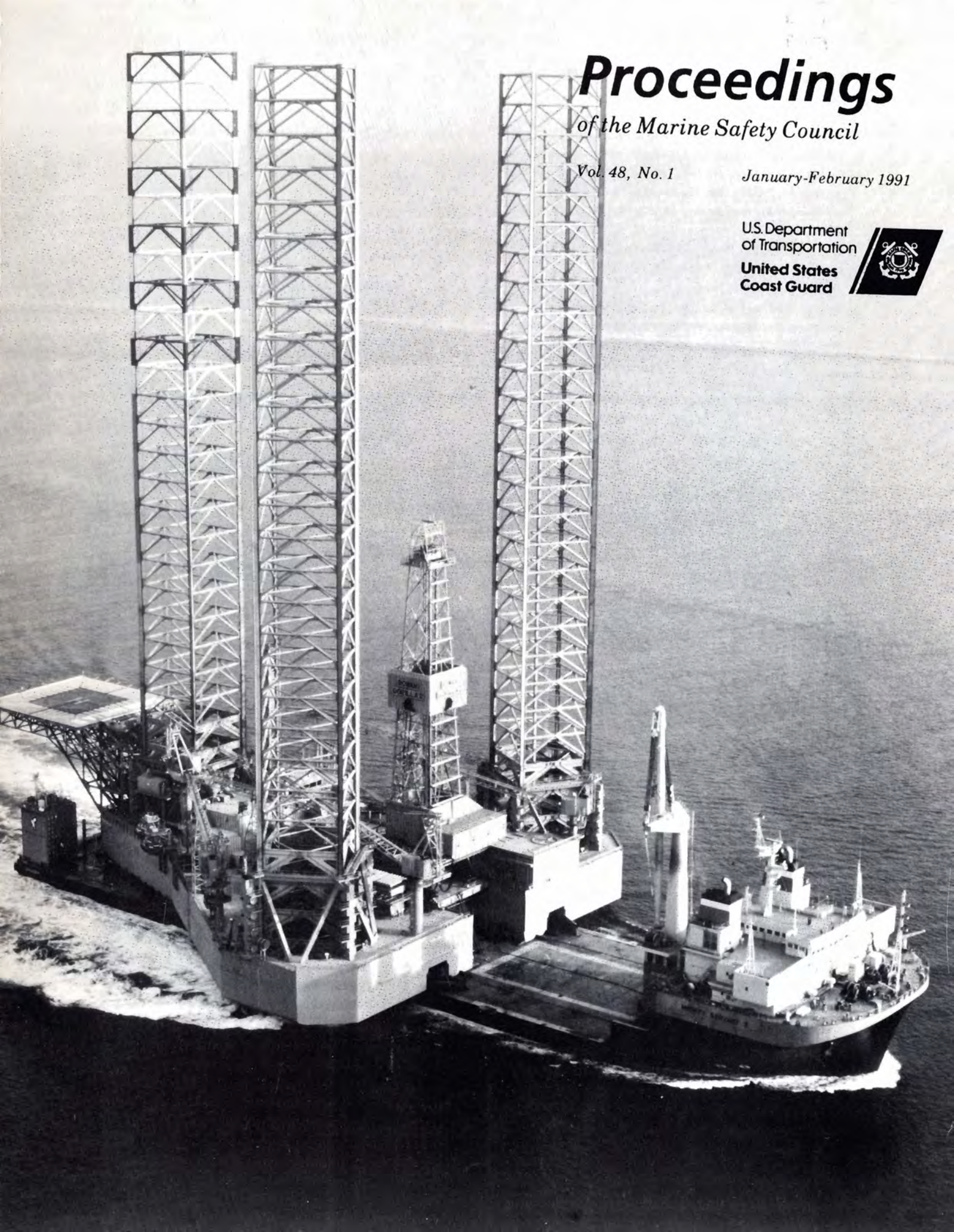

Proceedings

of the Marine Safety Council

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U.S. Department of Transportation
United States Coast Guard

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Proceedings

of the Marine Safety Council

January-February 1991 *Vol. 48, No 1*

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Cover

Rowan Gorilla II, a mobile offshore drilling unit, is towed piggyback on a deck barge. The rig is a sister vessel of *Rowan Gorilla I,* which sank in the North Atlantic in late 1988. (See page 26)

Buoys will be buoys

The cover photo of the November-December 1990 issue of *Proceedings* was identified incorrectly as featuring an anchor buoy. It was a navigation buoy, as was the buoy pictured on page 6. We apologize for the errors.

Editor's Reminder:

Dear Reader:

If you have not already filled out the brief survey and business-reply postcard enclosed in the November-December 1990 Proceedings, please do so. We want to provide you with the very best marine safety magazine possible, but first we need to know a little bit about you.

Thank you for your cooperation.
Betty Murphy

Casualty lessons

LCDR Bill Riley

On April 19, 1990, an explosion rocked the tank barge Apex 2002 as it was being repaired at the Greenville Johnny Shipyard on the West bank of the Mississippi River at Port Allen, Louisiana, near Baton Rouge. Miraculously, there was no loss of life.

The vessel

The *Apex 2002* is a double-skinned tank barge with a box bow and a raked stern. The spaces between the inner and outer skin are referred to as wing voids and double-bottom voids. The barge has three cargo tanks and four wing/double-bottom voids, in addition to the bow and stern voids.

There once were heating coils installed in the void space under the cargo tanks, which are externally framed. These coils consist of steel channels welded directly to the tank bottom, interconnected with steam supply and return lines passing outboard to the wing-void space and on up to the deck.

At an undetermined date, the steam lines had been cut just inboard of the wing-void space, rendering the heating coils inoperative.

Cargo

At some time before the casualty, the number four void space of the *Apex 2002* was discovered to contain natural (casinghead) gasoline, which had apparently leaked from the cargo tank.

Two days prior to the explosion, the barge was taken to the "gas-freeing plant" at the Greenville Johnny Shipyard (This "plant" is one of a number of permanently moored barges at the "shipyard." It serves as a platform for cleaning and gas-freeing operations.)

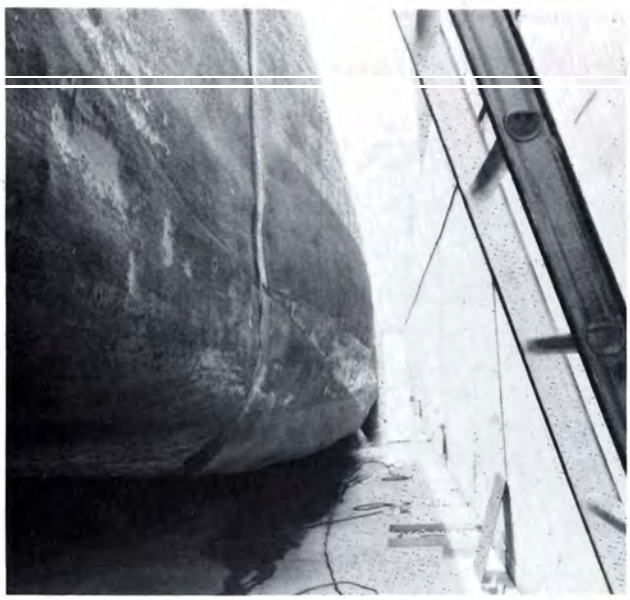
Inspection

On April 18, the cleaning and gas-freeing of the *Apex 2002* was considered complete and a marine chemist was summoned to inspect the barge.

Following his inspection, the chemist issued a certificate at 1:30 p.m. which did NOT state "safe for hot work" in so many words. It read:

Caution:
(1) Fire watch
(2) Fresh air blowers all entry/hot work.

Continued on page 2



(left) The explosion pushed out the starboard aft side shell of the Apex 2002.

(below) The hull of the Apex 2002 was torn away from a wing-void bulkhead by the explosion.

(Photos by Michael J. Schiehl)

Continued from page 1

The chemist now claims that he never intended that any hot work be done under his certificate, and that he gave VERBAL instructions to the shipyard foreman to call him back for further inspection after rust scale in the bottom of the void space had been removed from the "fire fall area." This is where sparks and hot slag might fall from hot work activities.

The chemist said he did not see and was not aware of the abandoned heating coils on his inspection.

Repair

The inspection certificate did not explicitly authorize local shifting. However, on the afternoon of April 18, the *APEX 2002* was shifted from the "gas-freeing plant" to the "repair plant," which was another nearby barge.

On the morning of April 19, the barge was rechecked for oxygen and combustible gases. The findings included 21 percent oxygen and zero percent LEL (lower explosive limit of hydrocarbon vapors) in all tanks and voids.

An air test was conducted, pressurizing the number four void and spraying soap on the interior of the number two and three cargo tanks. Two cracks were discovered in the number three tank bottom. At about 5 p.m., hot work was started to repair the cracks.

No further marine chemist inspections were performed. There was no forced ventilation in use and no fire watch posted in the void space.

Explosion

Shortly after 5 p.m., the workers on the barge felt a slight "rumbling" just before the force of the explosion within number four void knocked them off balance. One worker on deck noticed rust and gray smoke coming out of the wing void hatch during the explosion.

Following the explosion, a second marine chemist responded to investigate. He noted the presence of the abandoned heating coils and obtained high combustible gas readings near the coils. He also found natural gasoline residue in the coils.

(The explosion damaged the barge structurally and it began to take on water. To keep it from sinking, it was immediately moved to a floating drydock for temporary repairs. It was then permitted to proceed to Greenville, Mlssissippi, for permanent repairs. Damage was estimated at $90,000.)

Causes

Neither the shipyard nor the first marine chemist complied with National Fire Protection Association (NFPA) Standard 306, which specifies controls for gas hazards on vessels to be repaired.

The deck of the APEX 2002 after its starboard aft section had been repaired.
Photo by MK2 Weylin Dawson

The hot work being performed in the number three cargo tank ignited fuel, which apparently was cargo residue which had leaked and accumulated in the network of obsolete and improperly disconnected heating coils in the number four void space under the tank.

A contributory cause was the unsafe condition of the heating coils, which had been disconnected but not removed, causing the fuel residue to accumulate.

Ironically, the hot work was being performed to repair the leakage, which it ignited, causing the explosion.

Lessons learned

There are a number of lessons to be learned from this casualty.

(1) **Heating coils under a cargo tank should not be disconnected without being completely removed.** ***There is too great a risk that cargo leaks into the void would be trapped in the coils, and that the abandoned coils would be overlooked in gas-freeing, as actually happened.***

(2) **Modifications to heating coils must be reported to and authorized by the appropriate Coast Guard Officer in Charge, Marine Inspection (OCMI).** ***In this case, the Coast Guard has no record of the heating coils in question prior to the accident.***

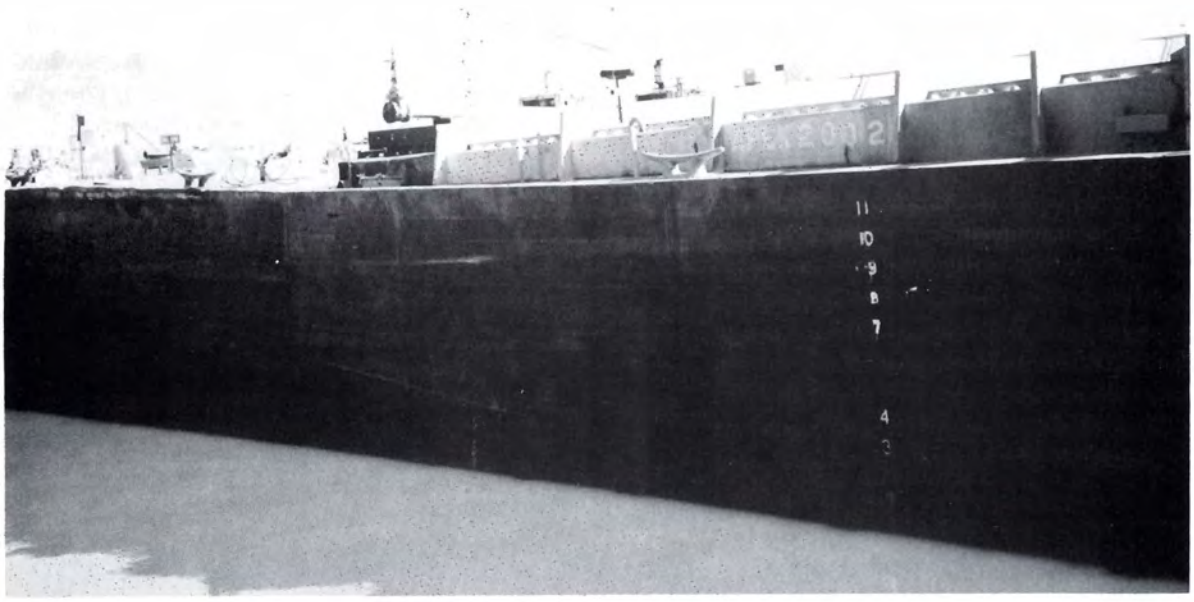
(3) **Marine chemists must write explicit certificates in accordance with NFPA Standard 306, and not rely on verbal instructions to shipyard personnel.**

(4) **Shipyard personnel must be aware of and comply with stated and implied limitations of a marine chemist's certificate.** ***In this case, unauthorized shifting of the barge, and I or the air test, may have released trapped gases from the heating coils. Also, the lack of forced ventilation may have permitted the explosive mixture to accumulate in the void near the hot work area.***

One exception in this case is that ignoring the requirement for a fire watch may have prevented fatalities, because the fire watch would have been in the space where the explosion occurred.

LCDR Bill Riley is an investigator assigned to the Marine Safety Office in New Orleans, Louisiana.

The repaired hull section where the explosion occurred.
Photo by MK2 Weylin Dawson



Drugs are deadly
in more than one way
Thomas J. Pettin

In December 1988, a large freighter under modification sustained fire damage on three decks and two men lost their lives -- needlessly.

At least one of these men might be alive today, if drugs had not been involved.

Chain of events

Hot debris and molten metal fell to the floor of the elevator shaft as two welders burned holes in the roof. The men were employed by a fish processing company to modify the vessel for crab harvesting.

After they stopped working, the welders noticed smoke coming from the shaft and retreated to a nearby fire station. They grabbed a hose, but there was no water because the isolation valve to all main deck fire stations had been turned off.

One of the welders then left the ship to notify fire officials, while the other warned other workers aboard of the fire. No one sounded the vessel's general alarm, which was operational.

Fortunately, the fire fighters arrived on time to extinguish the flames and save the vessel. Shortly thereafter, however, it was determined that two other workers, who were last seen trying to extinguish the fire, were missing. Their bodies were later found near the elevator shaft.

Findings

Autopsies on both victims pinpointed the cause of their deaths to be cyanide and carbon monoxide inhalation. The deaths were ruled accidental.

Drugs and drug paraphernalia were found in one of the victim's pockets. In addition, his urine contained cocaine.

According to the toxicologist who performed the body fluid tests, cocaine normally assimilates in the system in about one hour after ingestion. The medical examiner indicated that the victim most likely took the drug shortly before he died.

The body fluids of the second victim tested negative for illegal drugs.

A large commercial fishing industry vessel.

This is the forward elevator shaft where the fire took place.

It was determined that burning polyurethane foam insulation produced violent, rapidly spreading flames, high temperatures and a large amount of toxic smoke.

The toxicologist stated that the cyanide was from the smoke, and that the levels for it and the carbon monoxide were above those necessary to cause death.

Conclusions

The underlying cause of the casualty was carelessness on the part of the two welders. They were not aware of the hot slag falling to the bottom of the shaft and, therefore, did not post a fire watch at the site. Also, they did not attempt to cool the molten slag.

A contributing cause was the polyurethane foam insulation on the vessel. It had little fire resistance, allowing easy ignition when contacted by the hot slag.

NOTE: Navigation and Vessel Inspection Circular No. 8-80, "Fire Hazards of Polyurethane and Other Organic Foams," warns of the serious fire hazards involving these foams, which are commonly used for insulation aboard vessels. The circular states that when exposed to fire, the foams "burn with rapid flame spread, high temperature, toxic gases and voluminous quantities of smoke."

The circular also spells out ways to prevent hot work from accidentally igniting foam. It recommends that foam insulation be covered with 22 USSG steel or another suitable noncombustible material with at least a 15-minute fire rating.

In addition, the circular specifies that one or more charged fire hoses be laid out near exposed foam insulation when hot work is being performed.

Had the provisions in this circular been applied on the vessel, this casualty may have been averted.

Another contributing cause was the lack of fire-fighting water service to the main deck, which hampered early efforts to put out the fire.

The severity of the casualty most likely would have been significantly reduced if the structural fire protection of the vessel had not been

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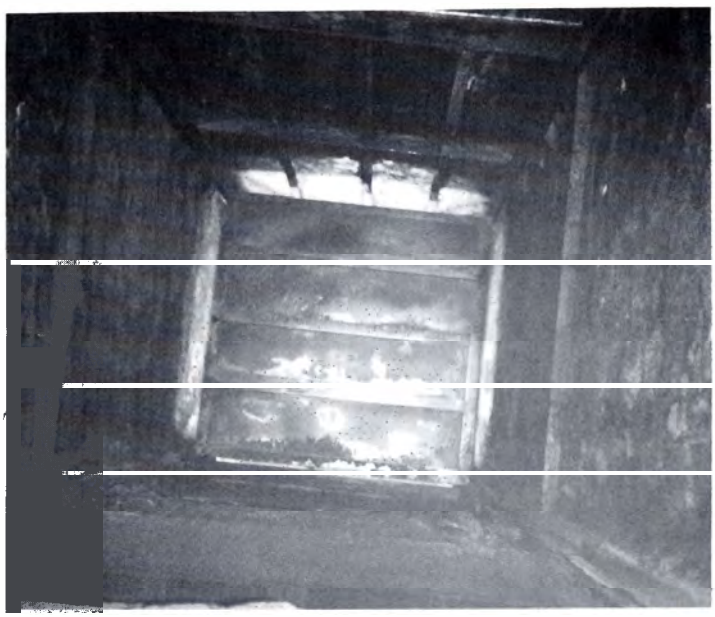


An internal view of the elevator shaft shows the fire damage

A look at the bottom of the shaft shows where hot slag fell, igniting the fire.

Continued from page 5

weakened by numerous open or missing hatchways and doors.

The victims

Both of the victims knew about the fire in time to leave the vessel safely. Instead, they chose to fight the rapidly growing fire with portable extinguishers. Had they realized the futility of their efforts and quickly abandoned the ship, they probably would be alive today.

One of the victims had drugs and drug paraphernalia on his person, and very recently ingested cocaine. It is reasonable to conclude that his judgment may have been impaired, and his involvement with drugs was a contributory cause of his death.

Footnote

Following the casualty, the fish processing company hired a private contractor to conduct urine analysis on all employees. According to company management, 60 percent tested positive for drugs. They were terminated.

The company now requires prospective employees to be tested for drugs prior to being hired.

Thomas J. Pettin is a program analyst in the Coast Guard's Marine Safety Evaluation Branch, Office of Marine Safety, Security and Environmental Protection.

Drug testing regulations

YN2 Robert Grant

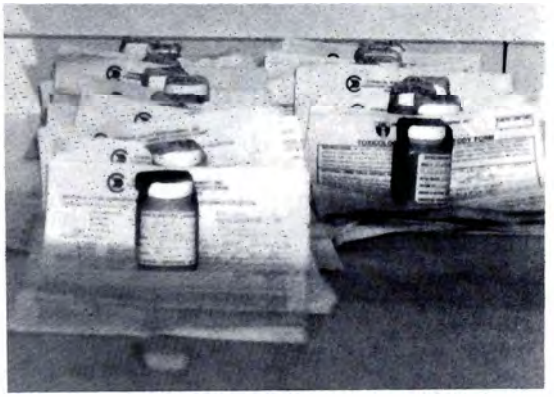
1988 final rule

On November 21, 1988, the Coast Guard published a final rule entitled, "Programs for chemical drug and alcohol testing of commercial vessel personnel," in the *Federal Register.* The goals of this rule are:

1. To discourage the use of intoxicants by commercial vessel personnel, and to promote a drug-free and safe work environment.

2. To reduce drug- and alcohol-related marine casualties.

3. To enhance maritime transportation industry safety.



Step 1) *Specimen jars and identification forms are matched.*

The 1988 final rule requires five types of testing:

1. Pre-employment

2. Periodic

3. Reasonable cause

4. Post-accident

5. Random

The federal district court for the District of Columbia enjoined the implementation of the random test requirements. The Coast Guard is drafting new random drug regulations, which are expected to be published soon.

Currently, marine industry employers are responsible for conducting pre-employment, post-accident and reasonable cause testing of vessel crewmembers, while employees are responsible for periodic testing.

These employers must conduct pre-employment tests before hiring individuals to serve as crewmembers aboard United States commercial vessels. They must conduct

Continued on page 8

How drugs are tested

Technicians at American Medical Laboratories, a NIDA-certified testing facility in Fairfax, Virginia, follow specific procedures in conducting drug tests. They:

- Provide employers special kits to collect specimens.
- Match specimens with employee information forms.
- Produce by computer adhesive-backed bar codes with pertinent employee data.
- Affix bar codes to aliquots (test tubes containing specimen samples),
- Conduct initial aliquot screenings.
- Subject "positive" screening results to gas chromotography/mass spectrometry (GCMS) tests.
- Report positive confirmation test results to employers.

(Photographs taken at the American Medical Laboratories illustrate these steps.)

Step 2) ID data is entered into a computer, which prints out the bar codes.

Continued from page 7

reasonable cause tests when they have sufficient reason to suspect employees of using drugs. They must conduct post-accident (or post-serious marine incident) drug and alcohol tests on vessel personnel directly involved in serious marine casualties.

The employers must maintain records of negative test results for one year and positive results for five years. They must also report all positive results involving individuals holding Coast Guard licenses or merchant mariner's documents to the local Marine Safety Office. These records must be made available to the Coast Guard upon request.

Whenever a physical examination is required for a license or merchant mariner's document application, the applicant must pass a periodic test.

Sections of the rule

The Coast Guard's drug testing regulations are contained in Title 46, Code of Federal Regulations, Parts 4 and 16.

Part 4

This section outlines the marine industry employer's responsibilities when a serious marine incident occurs.

It states, "when a marine employer determines that a casualty or incident is, or is likely to become, a serious marine incident, the marine employer shall take all practicable steps to have each individual engaged or employed on board the vessel who is directly involved in the incident chemically tested for evidence of drug and alcohol use."

It establishes requirements for specimen collection and transmission to laboratories, and responsibilities for reporting results to the Coast Guard.

Part 16

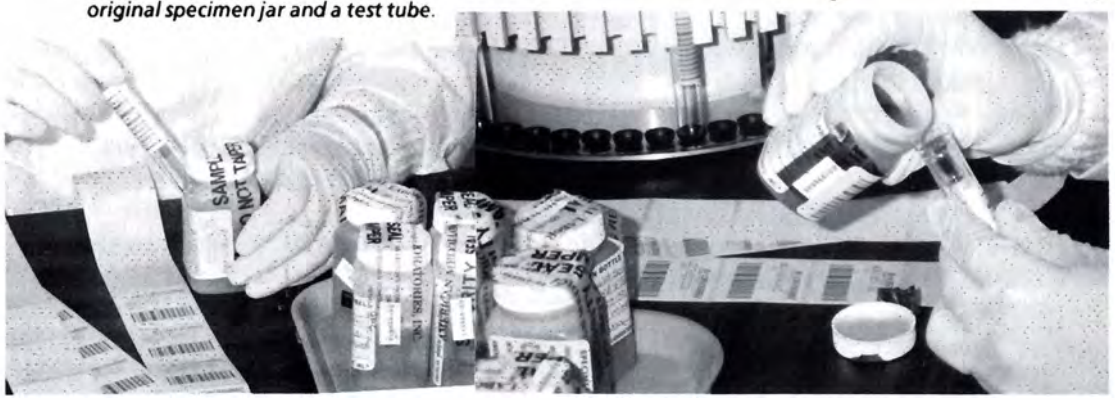
The 1988 final rule added a new Part 16, which contains four sections.

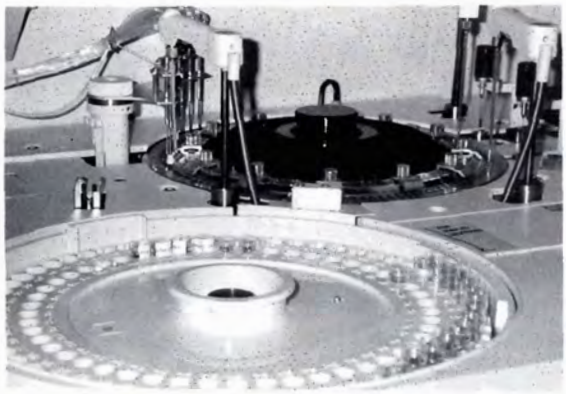
A) Contains general requirements which apply to chemical testing of commercial vessel personnel.

B) Discusses types of chemical testing required. It outlines a graduated scale of compliance with the regulations for employers, and contains criteria for determining when to conduct various drug tests.

Step 3) The bar code is attached to the original specimen jar and a test tube.

Step 4) A specimen sample or "aliquot" is poured into the matching bar-coded tube for testing





Step 5) Aliquots are screened for drugs in this machine.

C) Establishes standards to be met when conducting chemical testing for dangerous drugs. This section provides the marine industry employer with general guidelines for collection and transmittal procedures. It also provides guidance on testing and reporting.

D) Requires employee-assistance programs,which include education and training for all crewmembers. While employers can use such programs to promote drug rehabilitation of employees, the 1988 final rule does not require this.

Test Procedures

Drug tests must be conducted according to Department of Transportation (DOT) "Procedures for transportation workplace drug-testing programs," published in the *Federal Register* on December 1, 1989.

The DOT procedures explain how to conduct each phase of the drug-testing process. For example, they outline specific procedures which must be followed when collecting specimens and transmitting them to testing laboratories. Only laboratories certified by the Department of Health and Human Services may be used.

Rigorous procedures are set forth for laboratories to follow in maintaining quality control of their drug-testing operations. Also included are procedures the labs must follow when receiving and testing urine samples.

Finally, the procedures state record-keeping and reporting requirements which employers, employees and certified drug-testing labs must follow. Medical review officers and chain-of-custody forms play important roles in this process.

Drugs tested

DOT procedures require testing for five drugs. They are marijuana, cocaine, opiates, amphetamines and phencyclidine (PCP).

Marine industry employers should note that the 1988 final rule also requires them to test for alcohol in post-accident cases by taking blood or breath specimens.

Only qualified medical personnel may take employees' blood specimens, but any appropriately trained personnel may administer breath tests.

Continued on page 10

***Step 6)** (left) Chemicals are mixed into a "positive" aliquot to prepare for a "confirmation" test. **Step 7)** (below) Centrifugal force machine separates drug properties from the aliquot, forming a concentrate.*

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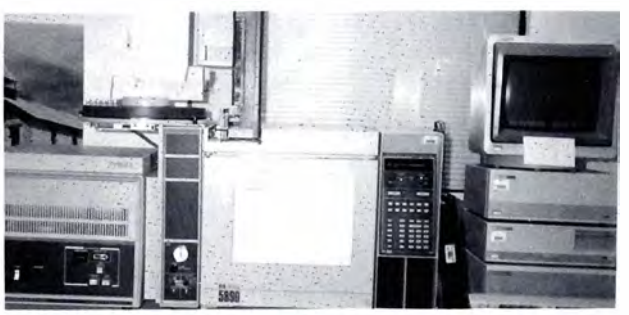
Conclusion

President Bush stated, "America's fight against epidemic illegal drug use cannot be won on any single front alone. It must be waged **everywhere** -- -- at every level of federal, state and local government, and by every citizen in every community across the country."

The maritime community must do its share. One way is by showing full support for the drug-testing programs described in this article.

YN2 Robert Grant is a Coast Guard reservist on active duty assigned to special projects in the Marine Investigation Division of the Office of Marine Safety, Security and Environmental Protection.

Step 8) (left) A lab technician begins the final drug analysis of the concentrate on the GCMS machine. (below).



DOT DRUG TESTING PROGRAM

The Coast Guard's 1988 final rule on drug testing for the marine industry is only one part of the Department of Transportation's war on drugs. Indeed, DOT has made the implementation of its chemical drug testing programs a top priority for all modes of transportation.

To stress the importance of these programs and to ensure that all transportation employers understand the regulations, DOT conducted a number of broad-based educational forums.

From late 1989 through March 1990, DOT held nine seminars on drug regulations for transportation employers around the country.

On October 30, 1990, DOT took another innovative step to publicize the drug-testing programs. It conducted a day-long seminar on the regulations in Alexandria, Virginia, which was broadcast to 1,300 people in 20 cities.

This seminar consisted of two parts: a taped presentation updating the status of drug-testing regulations in all modes of transportation, and a live broadcast. Participants throughout the country engaged in a direct question-and-answer dialogue with DOT representatives via satellite transmissions.

Videotapes of and materials distributed at the October 30 seminar are available to employers for training purposes at:

Office of the Secretary
Drug Enforcement/ Program Compliance
Room 10200 - DOT
400 Seventh St., S.W.
Washington, D.C. 20590
Telephone:202-366-3784

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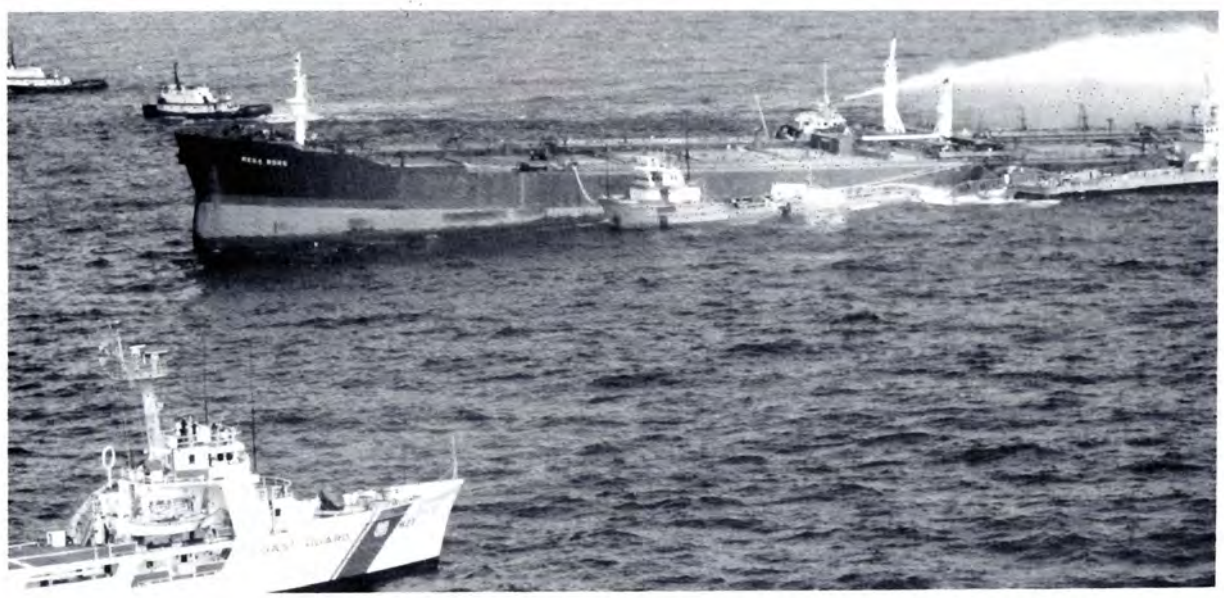
Firefighting boats tackle fire aboard the Norwegian tanker Mega-Borg in June 1990.



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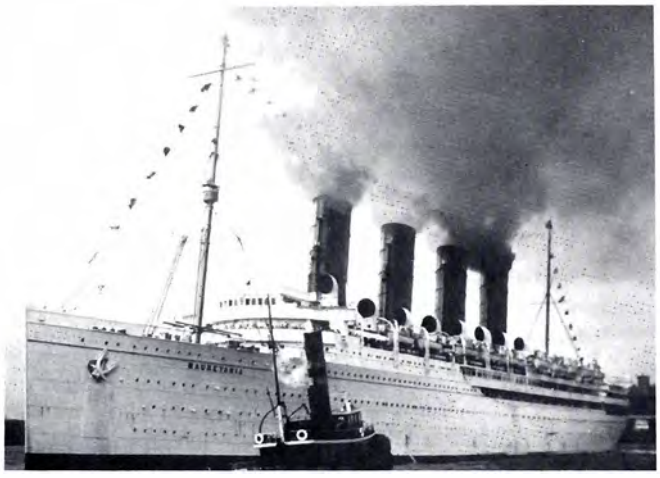
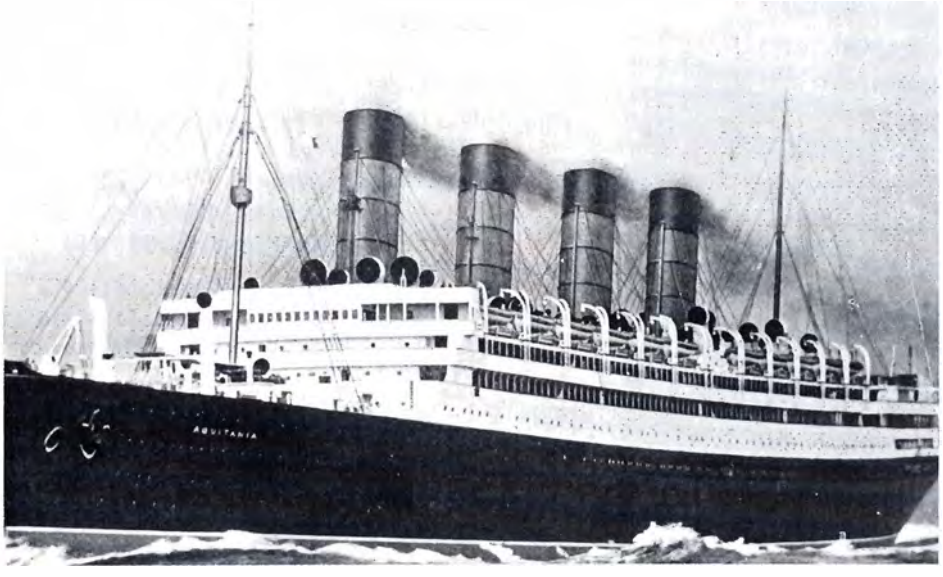


Luxurious passenger liners of old --
(left) Mauretania - built in 1907
(below) Aquitania - built in 1914



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A cruise ship of today, Song of Norway, departs Martinique on a Caribbean journey.

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Nordic Empress (Liberian cruise ship),9-10/90 - p 31 & 67
Nordic Prince (Norwegian cruise ship), 9-10/90 - p 5
Norway (Bahamian cruise ship). 9-10/90 - p 5, 7 & 58
Oceanic (British passenger liner), 9-10/90 - p 5 & 9
Ocracoke (Coast Guard cutter), 3-4/89 - p 30
Ogden Wilamette (U.S. tankship), 8-9/88 - p 139
Olympic (British passenger liner), 9-10/90 - p 8
Omi Yukon (tankship), 6-7/88 - p 113
Orcades (British passenger liner), 9-10/90 - p 4
Oriana (British passenger liner), 9-10/90 - p 4 & 12
Oronsay (British passenger liner), 9-10/90 - p 4
Orsova (British passenger liner), 9-10/90 - p 4
Outrage (Coast Guard vessel), 8-9/89 - p 113
Paris (French passenger liner), 9-10/90 - p 8
Parthia (British cargo passenger liner), 9-10/90 - p 11
Pendennis Castle (British passenger liner), 9-10/90 - p 4
Phoenix World City (proposed cruise ship), 9-10/90 - p 14-15

Continued on page 24

Continued from page 23

Statistics of casualties -- 1988

Annually, the Coast Guard's Marine Investigation Division (G-MMI) publishes a summary of the involvements of commercial vessels and related personnel in various types of casualties. The primary source of this data is the CASMAIN database which was created to satisfy the internal and external demand for commercial vessel casualty information. The current information base has been continuously updated, maintained, and improved since 1981.

Marine casualty reporting

The authority to require notification and reporting of a marine casualty is contained within 46 USC 6101. The authority to require reporting of casualties involving offshore oil and gas exploration, production, and support activities is derived from the Outer Continental Shelf Lands Act, 43 USC 1331, *et. seq.*

The primary vehicle for reporting marine casualties is Form CG-2692, Report of Marine Accident, Injury, or Death. This form provides instructions and reporting criteria for casualties involving vessels, mobile offshore drilling units, outer continental shelf facilities and commercial diving as well as the personnel involved in these activities.

Whenever possible, the form is completed by those directly involved in the casualty, i.e., owner or operator of a vessel or facility. Descriptive information and instructions are included to aid in the completion of specific sections.

The completed form is submitted to one of the many local field offices (Marine Safety Office, Marine Safety Detachment, Marine Inspection Office) for verification, screening and possible further investigation. In the latter case, the completed reports are forwarded to Coast Guard headquarters for further action and comment and inclusion in the historical files.

It should be noted that report of incidents not meeting the specified criteria are closed to file at the field unit level and are not in this summary.

Note: The reporting threshold for personnel injuries (incapacitated for 72 hours or more) was eliminated in 1987. This will account for any major increases in the numbers of injuries between 1987 and years prior to that.

Casualties excluded from this report

Casualties involving only pleasure craft are not represented in these statistics. These incidents are included in the report published yearly by the Office of Navigation Safety and Waterway Services, part of the Coast Guard's Auxiliary, Boating, and Consumer Affairs Division (G-NAB).

There is also reason to suspect that a small percentage of casualties meeting the criteria are not reported due to ignorance of the requirement to do so.

Major marine casualties

Major marine casualties are those incidents involving a vessel, other than a public vessel (as defined in 46 CFR 4.03-40), which result in one of the following:

- The loss of six or more lives.
- The loss of a mechanically propelled vessel of 100 or more gross tons (GT).
- Property damage initially estimated at $500,000 or more.
- "Serious threat" (as determined by the Commandant with concurrence by the National Transportation Safety Board's Chairperson) to life, property, or the marine environment by hazardous materials.

In 1988, there were 3786 marine accidents involving 6316 commercial vessels. Of these, 349 resulted in a total loss of the vessels involved,and of these, 218 were fishing vessels.

There were 5967 vessels involved in accidents not resulting in a total loss. Of these, 1107 were fishing vessels.

Continued on page 26

Continued from page 25

There were 43 deaths and 39 injuries in accidents with vessels which were a total loss. There were 49 deaths and 259 injuries from accidents involving vessels which were not totally lost. In addition, there were 111 deaths and 943 injuries not associated with vessel casualties, such as man overboard.

There were a total of 56 major marine casualties in 1988. One of these casualties required a marine board of investigation. A description follows.

Rowan Gorilla I casualty

At 4:05 p.m. on December 15, 1988, the 297-foot-long mobile offshore drilling unit *Rowan Gorilla I* capsized and sank in the North Atlantic Ocean about 500 nautical miles southeast of Halifax, Nova Scotia.

A self-elevating type drilling rig, the *Rowan Gorilla I* was under tow by the 245-foot-long Bahamian tug *Smit London* from Halifax to Great Yarmount, United Kingdom, when the towline broke around 2:20 a.m. on the 15th during a severe storm.

The 27 persons aboard the drilling rig abandoned in a survival capsule in 50-foot seas and 60-knot winds at 1:40 pm. They were rescued by the *Smit London* crew at noon onDecember 16, when the seas subsided to about 15 feet.

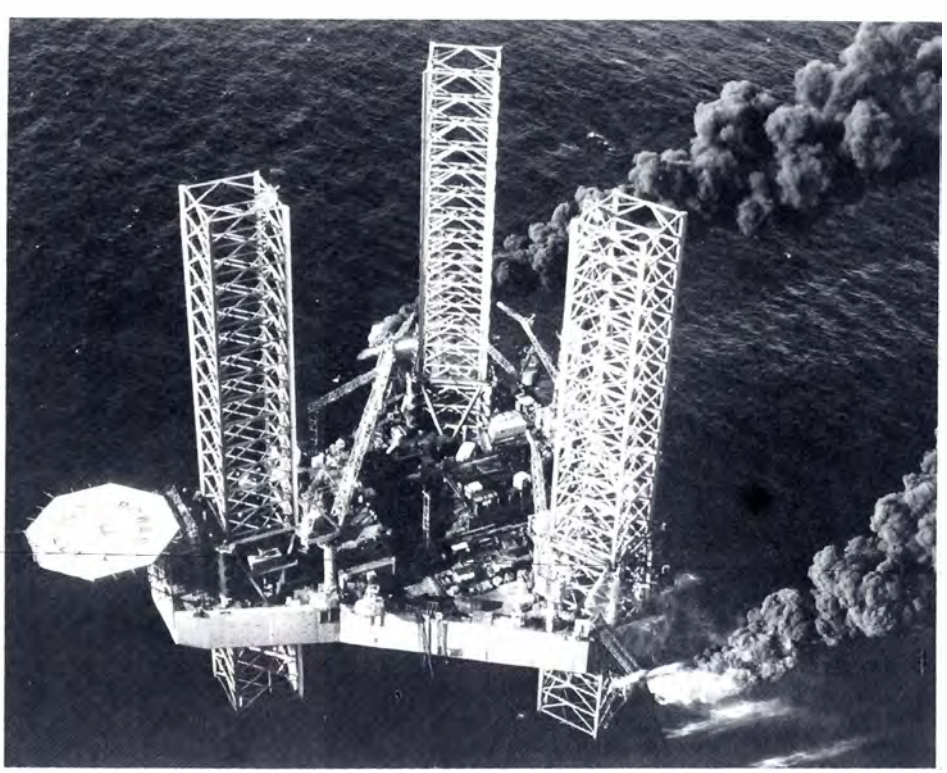
The estimated value of the *Rowan Gorilla I* was $90 million.

Statistical summary

These statistics summarize casualties for the entire United States flag commercial fleet and foreign flag vessels in United States waters. The Coast Guard went to great lengths to assure the completeness and consistency of this tabulation. Specific analysis, however, must consider the techniques used to compile this summary.

The Marine Safety Evaluation Branch of the Marine Investigation Division, Office of Marine Safety, Security and Environmental Protection will gladly explain data summary methods to anyone requesting this assistance.

Suggestions for changes or improvements in the statistics should be addressed to Commandant (G-MMI-3), U.S. Coast Guard, 2100 Second Street, S.W., Washington, D.C. 20593-0001.



Before the casualty, the Rowan Gorilla I, burns off oil and gas during well-testing operations.

COMMERCIAL VESSEL TOTAL LOSSES 1988

TABLE 1

VESSEL TYPE/GTONS	CASUALTY NATURE: FOUNDERED	FIRE/EXPLOSION	COLLISION	GROUNDING	HULL/MACH DMG	MISSING	OTHER	TOTAL
FREIGHTSHIP								
SUBTOTAL	*0*	*3*	*3*	*2*	*2*	*0*	*0*	*10*
LT 100 GT								0
100-199		2						2
200-299								0
300-499								0
500-1599				1				1
1600-4999				1				1
5000-9999								0
10,000-19,000					1			1
GE 20,000		1	3		1			5
PASSENGER SHIP								
SUBTOTAL	*6*	*4*	*1*	*2*	*0*	*1*	*0*	*14*
LT 100 GT	6	4	1	2		1		14
100-1599								0
1600-4999								0
GE 5000								0
TUG/TOWBOAT								
SUBTOTAL	*19*	*8*	*2*	*4*	*0*	*0*	*3*	*36*
LT 100 GT	12	3		1			1	17
100-199	5	3	1				1	10
200-299				1			1	2
300-999		1	1	1				3
GE 1000	2	1		1				4
TANK BARGE								
SUBTOTAL	*1*	*0*	*2*	*0*	*0*	*0*	*4*	*7*
LT 500 GT								0
500-999			2					2
GE 1000 GT	1						4	5
MODU								
SUBTOTAL	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*1*
LT 300 GT								0
GE 300 GT				1				1
PLATFORM								
SUBTOTAL	*0*	*1*	*2*	*0*	*0*	*0*	*1*	*4*

(cont. next col.)

VESSEL TYPE/GTONS	CASUALTY NATURE: FOUNDERED	FIRE/EXPLOSION	COLLISION	GROUNDING	HULL/MACH DMG	MISSING	OTHER	TOTAL
TANKSHIP								
SUBTOTAL	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*2*
LT 100 GT				1				1
100-1599								0
1600-4999								0
5000-9999								0
10,000-19,999					1			1
20,000-39,999								0
40,000-99,999								0
GE 100,000								0
OFFSHORE SUPPLY								
SUBTOTAL	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*1*
LT 100 GT	1							1
100-199								0
200-499								0
GE 500 GT								0
FISHING VESSEL								
SUBTOTAL	*104*	*32*	*26*	*31*	*4*	*3*	*18*	*218*
LT 100 GT	73	24	12	23	4	2	12	150
100-199	10	3	4	5		1	3	26
200-499	1		1	1				3
500-999								0
GE 1000 GT								0
STATE NUMBERED	20	5	9	2			3	39
FREIGHT BARGE								
SUBTOTAL	*16*	*0*	*2*	*4*	*0*	*0*	*2*	*24*
LT 100 GT								0
100-999	10		2	4			1	17
GE 1000 GT	3						1	4
UNKNOWN	3							3
MISCELLANEOUS								
SUBTOTAL	*11*	*5*	*9*	*5*	*0*	*0*	*2*	*32*
LT 100 GT	4	5	8	1			1	19
GE 100 GT (SP)			1	1				2
GE 100 GT (NSP)	7			3			1	11
U.S. TOTALS	*158*	*53*	*47*	*50*	*7*	*4*	*30*	*349*
FOREIGN FLAG								
SUBTOTAL	*2*	*1*	*0*	*3*	*0*	*0*	*0*	*6*
FREIGHT		1		2				3
TANK								0
OTHER	2			1				3

TABLE 2

COMMERCIAL VESSEL TOTAL LOSSES 1988

VESSEL TOTAL LOSSES

VESSEL TYPE	0 - 4 YEARS		5 - 9 YEARS		10-14 YEARS		15-19 YEARS		20-24 YEARS		25-29 YEARS		30 + YEARS		UNKNOWN		TOTAL
FREIGHTSHIP	2	4	1	2							1						10
TANKSHIP	1				1												2
PASSENGER SHIP	1	2	1	2	2	2	4										14
TUG/TOWBOAT		6	7	2	4	4	11	2									36
OSV*					1												1
MODU**			1														1
PLATFORM	1		1												2		4
FISHING VESSEL	7	31	24	18	19	13	58	9									179
STATE #	11	3	2	3	3	2	7	8									39
BARGES																	
TANK		4	2		1												7
FREIGHT			4	3	7	2	3	5									24
MISC	6	7		2	3	2	7	5									32
TOTALS	*29*	*57*	*43*	*32*	*41*	*25*	*91*	*31*									*349*

CASUALTY NATURE									
FOUNDERED	11	26	16	10	21	8	47	19	158
FIRE/EXPLOSION	7	7	11	2	9	6	10	1	53
COLLISION	5	8	3	9	3	2	8	9	47
GROUNDING	2	10	3	6	6	5	16	2	50
HULL/MACH DAMAGE	2	1				2	2		7
MISSING			2	1			1		4
OTHER	2	5	8	4	2	2	7		30
TOTALS	*29*	*57*	*43*	*32*	*41*	*25*	*91*	*31*	*349*

(D)EATHS AND (I)NJURIES ASSOCIATED WITH VESSEL TOTAL LOSSES

VESSEL TYPE	FOUNDERED		FIRE/EXPLOSION		COLLISION		GROUNDING		HULL/MACH DMG		MISSING		OTHER		TOTAL	
	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I
FREIGHTSHIP				3											0	3
TANKSHIP															0	0
PASSENGER SHIP						1									0	1
TUG/TOWBOAT	1					1								1	1	2
OSV*															0	0
MODU**															0	0
PLATFORM															0	0
FISHING VESSEL	19	5		3	1			1			8		7	2	35	11
STATE #	4		1	4		2									5	6
BARGES																
TANK															0	0
FREIGHT															0	0
MISC		3		7	2	6									2	16
TOTALS	*24*	*8*	*1*	*17*	*3*	*10*	*0*	*1*	*0*	*0*	*8*	*0*	*7*	*3*	*43*	*39*

PERSONNEL CATEGORY																
LIC OFF															0	0
CREW	21	8	1	10	1	6		1			8				31	25
PASS				7	2	3							7	3	9	13
OTHER	3					1									3	1
TOTALS	*24*	*8*	*1*	*17*	*3*	*10*	*0*	*1*	*0*	*0*	*8*	*0*	*7*	*3*	*43*	*39*

*OFFSHORE SUPPLY

**MOBILE OFFSHORE DRILLING UNIT

COMMERCIAL VESSEL NON-TOTAL LOSSES 1988

TABLE 3

VESSEL TYPE/GTONS	CASUALTY NATURE: FLOODED	FIRE/EXPLOSION	COLLISION	GROUNDING	HULL/MACH DMG	WEATHER	OTHER	TOTAL
FREIGHTSHIP								
SUBTOTAL	*6*	*17*	*116*	*129*	*139*	*5*	*32*	*444*
LT 100 GT	3		6	3	8		1	21
100-199	1		3	2	1		1	8
200-299		2	2	2	1			7
300-499		1	4	9	1	1	2	18
500-1599		3	16	37	6		4	66
1600-4999			10	1	4			15
5000-9999		3	12	5	19		4	43
10,000-19,999	1	5	30	31	38	2	8	115
GE 20,000	1	3	33	39	61	2	12	151
PASSENGER SHIP								
SUBTOTAL	*9*	*14*	*62*	*84*	*142*	*1*	*23*	*335*
LT 100 GT	9	13	48	67	83	1	19	240
100-1599		1	7	6	30		1	45
1600-4999			4	6	26		1	37
GE 5000			3	5	3		2	13
TUG/TOWBOAT								
SUBTOTAL	*33*	*36*	*477*	*896*	*127*	*5*	*94*	*1668*
LT 100 GT	14	9	129	122	38	2	48	362
100-199	12	12	207	179	53	3	32	498
200-299	4	5	49	89	15		6	168
300-999	3	8	85	444	21		8	569
GE 1000		2	7	62				71
TANK BARGE								
SUBTOTAL	*6*	*13*	*190*	*307*	*49*	*5*	*15*	*585*
LT 100 GT			12	3	1			16
100-499			5	6		1	1	13
500-999	4	4	44	72	11		2	137
GE 1000	2	9	129	226	37	4	12	419
MODU								
SUBTOTAL	*1*	*1*	*22*	*1*	*14*	*1*	*6*	*46*
LT 300 GT			3		2		1	6
GE 300 GT	1	1	19	1	12	1	5	40
PLATFORM								
SUBTOTAL		*3*	*18*	*7*	*16*		*8*	*52*
TANKSHIP								
SUBTOTAL	*2*	*12*	*65*	*56*	*93*	*5*	*22*	*255*
LT 100 GT			3	2	3		1	9
100-1599	1	1	6	7	4		2	21
1600-4999		1	7	6	5		2	21
5000-9999			6	2	2			10
10.000-19,999		3	13	13	20		8	57
20,000-39,999	1	4	18	14	26	1	6	70
40,000-99,999		2	12	12	29	2	3	60
GE 100,000		1			4	2		7
OFFSHORE SUPPLY								
SUBTOTAL	*1*	*5*	*40*	*1*	*9*	*0*	*8*	*64*
LT 100 GT		2	9	1	2		3	17
100-199		1	5				1	7
200-499	1	2	25		7		4	39
GE 500			1					1
FISHING VESSEL								
SUBTOTAL	*125*	*65*	*153*	*126*	*326*	*3*	*309*	*1107*
LT 100 GT	83	35	84	84	224	2	198	710
100-199	25	17	40	23	52	1	52	210
200-499	1		3	2	1		1	8
500-999		2	2		2		1	7
GE 1000 GT		2	2		1		1	6
STATE NUMBERED	16	9	22	17	46		56	166
FREIGHT BARGE								
SUBTOTAL	*13*	*16*	*252*	*618*	*25*	*1*	*69*	*994*
LT 100 GT			2	4			2	8
100-199	8	10	149	470	12		47	696
GE 1000	5	6	76	109	11	1	12	220
UNKNOWN			25	35	2		8	70
MISCELLANEOUS								
SUBTOTAL	*9*	*14*	*151*	*168*	*30*	*3*	*42*	*417*
LT 100 GT	2	2	69	16	11		20	120
GE 100 GT (SP)		10	15	15	13	2	6	61
GE 100 GT (NSP)	7	2	67	137	6	1	16	236
U.S. TOTALS	*205*	*196*	*1546*	*2393*	*970*	*29*	*628*	*5967*
FOREIGN FLAG								
SUBTOTAL	*2*	*8*	*93*	*92*	*65*	*4*	*18*	*282*
FREIGHT	1	5	54	57	40		10	167
TANK		3	29	27	20		6	85
OTHER	1		10	8	5	4	2	30

(cont. next col.)

TABLE 4

COMMERCIAL VESSEL NON-TOTAL LOSSES 1988

NON-TOTAL LOSS VESSEL CASUALTIES

VESSEL AGE

VESSEL TYPE	0 - 4 YEARS		5 - 9 YEARS		10-14 YEARS		15-19 YEARS		20-24 YEARS		25-29 YEARS		30 + YEARS		UNKNOWN		TOTAL
FREIGHTSHIP	58	107	102	74	34	19	40	10	444								
TANKSHIP	27	46	74	52	16	11	28	1	255								
PASSENGER	74	71	52	41	20	19	58		335								
TUG/TOWBOAT	29	397	359	262	191	98	294	38	1668								
OSV*	2	40	17		2	1	2		64								
MODU**	9	23	8	3	1			2	46								
PLATFORM	3	8	8	5	5		6	17	52								
FISHING	59	149	177	121	116	42	243	34	941								
STATE #	22	17	21	17	30	10	30	19	166								
BARGES																	
TANK	7	103	148	138	83	41	50	15	585								
FREIGHT	19	292	208	162	85	23	27	178	994								
MISC	35	102	68	56	39	18	39	60	417								
TOTALS	*344*	*1355*	*1242*	*931*	*622*	*282*	*817*	*374*	*5967*								

CASUALTY NATURE									
FLOODED	8	36	30	22	30	17	53	9	205
FIRE/EXPLOSION	13	40	37	26	22	8	41	9	196
COLLISION	104	407	322	207	160	74	154	118	1546
GROUNDING	79	574	561	449	234	117	253	126	2393
HULL/MACH	101	194	187	133	102	41	192	20	970
OTHER	39	104	105	94	74	25	124	92	657
TOTALS	*344*	*1355*	*1242*	*931*	*622*	*282*	*817*	*374*	*5967*

(D)EATHS AND (I)NJURIES ASSOCIATED WITH VESSEL NON-TOTAL LOSSES

CASUALTY NATURE

VESSEL TYPE	FLOODED		FIRE/EXPLOSION		COLLISION		GROUNDING		HULL/MACH DMG		MISSING		OTHER		TOTAL	
	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I
FREIGHTSHIP				1						6					0	7
TANKSHIP			1	1						8		2			1	11
PASSENGER				5		30		4		9				1	0	49
TUG/TOWBOAT				4	19	32		2		5				3	19	46
OSV*			1			3									1	3
MODU**										7					0	7
PLATFORM				4					1	5					1	9
FISHING			4	4	1	37	3			2					8	43
STATE #				1	3	5	2								5	6
BARGES																
TANK				1											0	1
FREIGHT															0	0
MISC				1	13	68		3		5				1	14	77
TOTALS	*0*	*0*	*6*	*22*	*36*	*175*	*5*	*9*	*1*	*47*	*0*	*2*	*1*	*4*	*49*	*259*

PERSONNEL CATEGORY																
LIC OFF					8				3		1				0	12
CREW			5	18	17	68	5	3	1	34		1	1	4	29	128
PASS				3	16	89		6		10					16	108
OTHER			1	1	3	10									4	11
TOTALS	*0*	*0*	*6*	*22*	*36*	*175*	*5*	*9*	*1*	*47*	*0*	*2*	*1*	*4*	*49*	*259*

* OFFSHORE SUPPLY

** MOBILE OFFSHORE DRILLING UNIT

TABLE 5

COMMERCIAL VESSEL NON-CASUALTY-RELATED DEATHS AND INJURIES 1988

CASUALTY NATURE	VESSEL SERVICE: FREIGHTSHIP	TANKSHIP	PASSENGER SHIP	TUG/TOWBOAT	OFFSHORE SUPPLY	FISHING VESSEL	MOBILE DRILLING PLATFORM	FREIGHT/TANK BARGE	MISCELLANEOUS	TOTAL	PERSONNEL CATEGORY: CREW (INCL. LIC. OFF.)	PASSENGERS	OTHERS	TOTAL
DEATHS														
SLIP/FALL	3	2		3		2			1	11	7	1	3	11
OVERBOARD	5	1	3	17	1	13			3	43	34	3	6	43
DISSAPEAR	1		2	4		7		2	2	18	14	2	2	18
STRUCK BY OBJ	3					2			1	6	4		2	6
PINCH/CRUSH	1					1	1		1	4	3	1		4
BURN/SCALD										0				0
ELEC SHOCK										0				0
CUT										0				0
ENTANGLED			1							1		1		1
ASPHXA	3		1	3		5			3	15	11	3	1	15
SPRAIN/STRAIN										0				0
DIVING			4			6				10	2	8		10
UNK/NOC	2								1	3	1	1	1	3
TOTALS	*18*	*3*	*11*	*27*	*1*	*36*	*1*	*2*	*0*	*12*	*111*	*76*	*20*	*15*	*111*
INJURIES														
SLIP/FALL	71	47	33	25	17	13	82	104	2	26	420	270	22	128	420
OVERBOARD				3	2		1	3		1	10	9		1	10
DISSAPEAR											0				0
STRUCK BY OBJ	21	15	14	5	22	19	36	47	1	6	186	170	7	9	186
PINCH/CRUSH	13	6	5	5	7	12	32	38	1	5	124	112	5	7	124
BURN/SCALD	4	5	1	1	1	1	5	9		1	28	27		1	28
ELEC SHOCK		3			1		1				5	5			5
CUT	1	2	1	2	1	8	1	11		1	28	26	1	1	28
ENTANGLED	1		1	4		6		5			17	17			17
ASPHXA	1							1		2	4	2	2		4
SPRAIN/STRAIN	10	12	5	2	3		15	42		3	92	89	2	1	92
DIVING			6					1		3	10	2	5	3	10
UNK/NOC	7	4	1		1	4	2				19	18	1		19
TOTALS	*129*	*94*	*67*	*47*	*55*	*63*	*175*	*261*	*4*	*48*	*943*	*747*	*45*	*151*	*943*

TABLE 6

COMMERCIAL VESSEL CASUALTY SUMMARY 1988

CASUALTY CAUSE	CASUALTY NATURE: FOUNDERED	FIRE/EXPLOSION	COLLISION	GROUNDING	HULL/MACH DMG	MISSING	OTHER	TOTAL
PERSONNEL								
SUBTOTAL	*76*	*44*	*545*	*643*	*128*	*0*	*112*	*1548*
INATT. TO DUTY	6	2	30	37	2		7	84
ERROR JUDGEMENT	2	1	82	109	7		5	206
CARELESSNESS	3	7	9	4	8		5	36
LACK KNOWLEDGE	1		3	8	1		2	15
FAILED TO:								
ACCT WIND/CRNT	3		41	38			3	85
USE NAV EQUIP	2		2	4				8
USE RADIO			1		1			2
DETERMINE POSN			32	85			1	118
SET PASS AGREE			5					5
KEEP LOOKOUT	1		20	5				26
COMPLY RULE/REG			15	2			1	18
PROC. SAFE SPEED			7	1			1	9
YIELD RT OF WAY			1					1
STRESS				1	1			2
FATIGUE			3	4				7
PHYSIOLOGICAL	1						6	7
INTOXICATION	1		3	5				9
IMPROP LOADING	8	1		1	2		3	15
IMPROP MAINT	7	3	1	2	55		30	98
IMPROP MOORING	4		8	8	1		6	27
IMPROP RIGGING	2		2	2	5		2	13
IMPROP SAFETY	2	13	5	1	7		5	33
OPERATOR ERROR	25	6	259	271	18		21	600
OTHER	8	11	16	55	20		14	124
ENVIRONMENT								
SUBTOTAL	52	3	85	557	39	1	45	782
ADVERSE WEATHER	22	1	21	45	4		23	116
ADVERSE CURRENT	23		17	75	3	1	14	133
DEBRIS			3	1	19		2	25
ICE		1	1	1	4		2	9
LIGHTNING								0
SHOALING	1	1	3	266	1		1	273
SUBMGD OBJECT	3		21	26	6	0	3	59
CHANNEL HAZARD	2		15	31				48
INADEQUATE ATON								0
OTHER	1		4	112	2			119

(cont. next col.)

CASUALTY CAUSE	CASUALTY NATURE: FOUNDERED	FIRE/EXPLOSION	COLLISION	GROUNDING	HULL/MACH DMG	MISSING	OTHER	TOTAL
MATERIAL								
SUBTOTAL	*113*	*104*	*73*	*94*	*650*	*0*	*422*	*1456*
FAILED MATERIAL:								
STRUCTURAL	77	20	12	19	109		114	351
MECHANICAL	16	36	25	34	329		156	596
ELECTRICAL	4	43	3	6	97		19	172
CORROSION	2	1	1		3		2	9
NORMAL WEAR	1				18			19
IMPROPER WELD	1			1	3		1	6
IMPROPER RIVETING								0
STEERING FAILURE			10	15	30		13	68
FOULED PROPELLE	2		6	3	10		74	95
INADEQUATE:								0
LIGHTING								0
STABILITY	7						1	8
LIFSAVING EQUIP								0
FIREFGHTNG EQUIP								0
CONTROLS				1				1
LUBRICATION								0
MAINTENANCE								0
INSUFFICIENT FUEL			2		14		16	32
PROPULSION FAIL	1		11	7	21		21	61
FATIGUE FAILURE		1			3		1	5
OTHER	2	3	3	8	13		4	33
TOTALS	*241*	*151*	*703*	*1294*	*817*	*1*	*579*	*3786*

Chemical of the month 2/c Jennifer A. Rusiecki

Automotive gasoline

Whether we ask for leaded or unleaded, regular or super, or diesel -- or any other grade octanes available at the gas station -- we will get petroleum, the oil and gas of the earth's crust. Found in plentiful supply in sedimentary rocks of the crust, petroleum consists of complex hydrocarbon mixtures.

These mixtures are separated at the refinery into automotive gasoline, aircraft fuels, lubricants, fuel oils, asphalts and other derivatives.

Depending on the different grades produced, gasoline generally is greasy and oily to the touch, is a transparent light brown and has a strong odor.

Gasoline or "gas" is itself a complex mixture of volatile C4 to C12 hydrocarbons suitable for use in spark-ignited internal combustion engines with an octane number of at least 60.

Composition

The major gasoline components are branched paraffins, cycloparaffins and aromatics. Motor gasolines are made chiefly by a "cracking" process through which heavier petroleum fractions are made more volatile by thermal or catalytic decomposition.

A large proportion of finished motor fuel consists of cracked gasolines, which may be limited in future use because of their high content of olefin, a major cause of photochemical smog. Legislation is being enacted toward that end.

A good motor gasoline must possess three characteristics. (1) The fuel must burn smoothly in a running engine without "knocking." (2) The gasoline must start the car easily in cold weather. (3) The fuel system must become vapor locked when temperatures run high.

Fire/vapor hazards

Gasoline is very flammable. Flashback along a vapor trail may occur, and the vapor may explode if ignited in an enclosed area.

In the event of an accidental spill, try to stop the discharge and keep people away from it. Local health and wildlife officials, and water systems operators should be notified promptly.

Those responding to the spill should shut off ignition sources and call the fire department. The hazardous vapors can be dealt with by using a water spray upwind of the spill. All personnel involved must wear self-contained breathing apparatus and full protective clothing.

If fire breaks out, extinguish with a dry chemical, foam or carbon dioxide. Water is ineffective on a gas fire, because gasoline is water insoluble.

Health hazards

Inhalation may cause central nervous system depression, dizziness, headache and uncoordination. At high concentrations, it can even cause fatal pulmonary edema, anesthesia, coma and respiratory arrest.

Ingestion of gasoline brings about an irregular heartbeat, inebriation, vomiting, vertigo, fever and cyanosis. Prolonged exposure results in dermatitis and blistering of the skin.

Regulations

Gasoline is classified as a flammable liquid (3.1) by the International Maritime Organization and IMDG Code.

The Coast Guard regulates bulk shipments of gasoline under 46 CFR Subchapter O. The Department of Transportation regulations for break bulk shipment of gasoline can be found in 49 CFR Subchapter C.

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Automotive Gasoline

Chemical name: Automotive Gasoline

Formula: Complex mixture of hydrocarbons

Synonyms: Petrol, benzine and gas

Boiling point:

Initial:	39°C
Distilled after 10%	60°C
Distilled after 50%	110°C
Distilled after 90%	170°C
Final	204oC

Threshold limit values (TLV)

Time weighted average:	300ppm
Short term inhalation limit:	500ppm for 30 mins.

Explosive limits in air

Lower explosive limit:	1.3% volume
Upper explosive limit:	6.0% volume

Combustion properties

Flashpoint:	-50°F or -45°C
Autoignition temperature:	536 to 853°F

Densities

Vapor (air = 1):	3.0 to 4.0
Specific gravity (at 20°C):	.7321 @ 20°C (liquid)/ 3.4 (gas)
density:	<1.0

Identifier

U.N. number	1203
CHRIS Code	GAT
Cargo compatibility group	33 Misc. hydrocarbon mixture

Jennifer A. Rusiecki was a second class cadet at the Coast Guard Academy when this article was written as a special project in chemistry for LT Thomas Chuba

Nautical queries

January-February 1991

The following items are examples of questions included in the Third Mate through Master examinations and the Third Assistant Engineer through Chief Engineer examinations:

Engineer

1. Precautions you should observe when installing new safety valve escape piping include assuring that _____.

A. bends or elbows in the line do not exist.
B. rigid physical attachment of the safety valve escape piping to the safety valve body does not exist.
C. the quick-closing valve operates freely.
D. the piping leads directly to the bilge.

2. Axial movement in a gear-type flexible coupling is provided for by _____

A. each gear sliding on its shaft between retaining collars.
B. the variable oil clearance in the quill shaft.
C. external teeth on the floating member sliding between internal teeth on the shaft ring.
D. adjusting the pitch of the teeth on the pinion and high speed gears.

3. In an opposed-piston engine, what would happen if the lower crank lead were reduced from 12° to 0°?

A. The exhaust ports would open before the scavenging ports.
B. The scavenging ports would open before the exhaust ports.
C. Neither the exhaust nor the scavenging ports would open.
D. The exhaust and scavenging ports would open simultaneously.

4. An instrument used to detect explosive gas/air mixture that usually measures concentration in terms of the lower explosive limit is known as a _____

A. toxic vapor meter.
B. flame safety lamp.
C. gas absorption detector.
D. combustible gas indicator.

5. The operation of finishing a hole very smoothly and accurately is known as _____

A. boring.
B. sizing.
C. drilling.
D. reaming.

6. Why is it important to maintain good vacuum while operating astern?

A. Reduces windage loss in the astern section.
B. Prevents the ahead element from operating backwards.
C. Maintains proper temperatures in the ahead stage.
D. Limits the amount of time necessary to operate astern.

7. What is a characteristic of a semiportable CO_2 system?

A. Each cylinder must weigh less than 50 lbs.
B. The cylinders are mounted horizontally.
C. It has a portable hose and nozzle.
D. It has distribution piping installed permanently.

8. Excessive scale formation in a distilling plant may result from _____

A. Poor distillate quality.
B. Reduced evaporator capacity.
C. Low brine concentration.
D. Improper vacuum regulation.

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Deck

1. A radar display in which the orientation of the display is fixed so that the north is always at the top of the screen is called a/an_____.

A. relative display.
B. composite display.
C. stabilized display.
D. unstabilized display.

2. You have replaced the chart paper in the course recorder. Which of the following is NOT required to ensure that a correct trace is recorded.

A. Test the electrical gain to the thermograph pens.
B. Set the zone pen on the correct quadrant.
C. Line the course pen up on the exact heading of the ship.
D. Adjust the chart paper to indicate the correct time.

3. While in drydock, your vessel will be belt-gauged. This process involves _____

A. measuring the thickness of the tail shaft liner.
B. taking the vessel's offsets to check for hull deformation.
C. testing and examining the anchor cables for defective links.
D. drilling or sonic-testing the hull to determine the plate thickness.

4. You are on a broad reach on the port tack with the mainsail and spinnaker set. Which statement is true?

A. The spinnaker pole should be set at almost a right angle to the keel.
B. The mainsail sheet should be eased to where the mainsail is ready to quiver.
C. The spinnaker's leach must be kept open by every possible means.
D. The spinnaker's sheet should be led into a point well forward.

5. The shipping papers for the products being carried in your tankship are not required to contain the _____

A. exact quantity of the cargoes.
B. grades of the cargoes.
C. location of the delivery point (s).
D. name of the consignee (s).

6. When running free in a stiff breeze, the personnel in a lifeboat under sail should be distributed so that the _____

A. boat is on an even keel.
B. boat will luff if the tiller is released.
C. bow will pay off if the tiller is released.
D. boat will maintain course without using the rudder.

7. You are approaching a drawbridge and have sounded the proper whistle signal requesting it to open. You hear a signal of one prolonged and one short blast from the bridge. What action should you take?

A. Anchor or use an alternate route because the bridge is out of service for an extended period of time.
B. Approach to a point not closer than 400 yards from the bridge and await further signals.
C. Hold in the channel as the bridge will open within 15 minutes.
D. Approach under full control to pass through the bridge.

8. A plane that cuts the earth's surface and passes through the poles will always form ____ .

A. The equator.
B. A loxodromic curve.
C. A small circle.
D. A meridian

Answers

Engineer
1-B; 2-C; 3-D; 4-D; 5-D; 6-C; 7-C; 8-D

Deck
1-C; 2-A; 3-D; 4-C; 5-A; 6-B; 7-D; 8-D

If you have any questions concerning "Nautical Queries," please contact U.S. Coast Guard (G-MVP-5), 2100 Second St., SW, Washington, DC 20593-0001; telephone (202) 267-2705.