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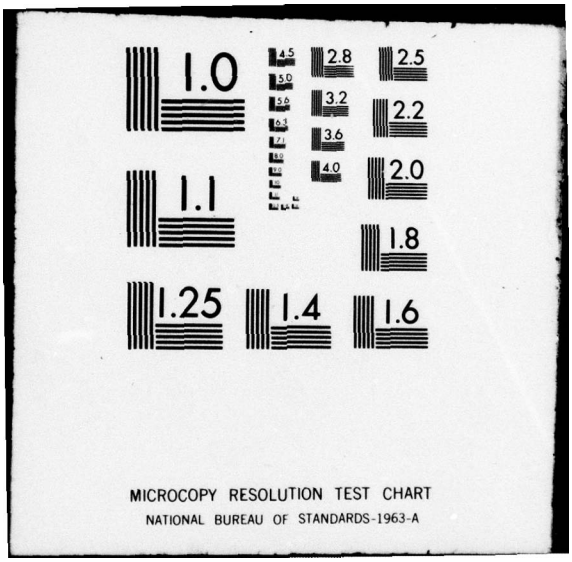
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Report No. CG-D-61-78

COLLISION ACCIDENT INVESTIGATIONS FOR 1977 SEASON

FINAL REPORT

APRIL 1978

Prepared for

U.S. DEPARTMENT OF TRANSPORTATION
United States Coast Guard
Office of Research and Development
Washington, D.C. 20590

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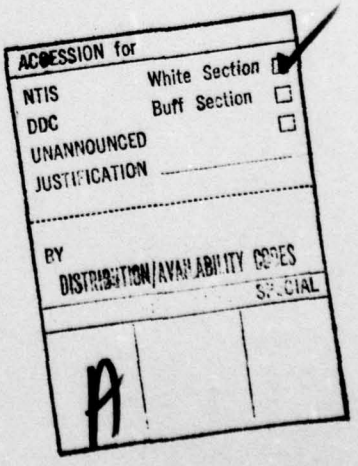

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J. Clarke, J. Eldredge & W. Muhler

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J. J. DAVIS ASSOCIATES, INC.
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15. Supplementary Notes
This report covers six months of a multi-year accident investigation program. The U. S. Coast Guard's Project Officer for this report was ENS. W. M. HUNT, JR.

16. Abstract
This report details the results of six in-depth boating accident investigations. The accidents were selected from 76 collisions reported by Coast Guard and state units. The procedures for selecting accidents for investigation are detailed. Summaries of each accident investigated are given. Each of the accident investigation report are attached as appendices to the report.

- 1 -

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1.0 INTRODUCTORY SUMMARY

A program to conduct indepth investigations of selected boating accidents has been initiated by the Coast Guard. These investigations are conducted with two purposes in mind: to add to the Boating Accident Data file and to insure the design safety of recreational boats sold to the public. This report presents findings of accident investigations conducted between July and December of 1977. The accident investigations presented in this report deal with collision related accidents.

A brief summary of the accidents investigated in this report is given as well as the detailed accident investigation reports. The summary of each accident is presented as the final section of this report; and the actual reports themselves are attached as appendicies to this report. Each individual accident investigation report contains the following sections with applicable information:

- o general information
- o narritive description of accident
- o psycho/socio and human factors
- o probable causes
- o recommendation
- o attached figures and illustrations
- o accident data section

This report also explains procedures used for selecting accidents to be investigated and details the contents of the above data sections.

2.0 ACCIDENTS RECEIVED FOR CONSIDERATION

Coast Guard Headquarters has directed operating units within the 48 contiguous states of the United States to report boating accidents that met the criteria to J.J. Davis Associates, Inc. The following criteria for types of accidents to be reported was established for the 1977 season:

1. Collisions
2. Capsizings
3. Swampings
4. Cases of apparent overpowering

Accident notifiction was made by means of a WATS line maintained by J.J. Davis Associates, Inc. This WATS line is maintained soley for the purpose of receiving these boating accident reports.

During the six months covered by this report, a total of 286 accidents involving recreational boats were reported to J.J. Davis Asscoiates, Inc. During that period 78 capizing/swamping accidents were reported as well as 76 collisions. From these accidents, 7 were selected for indepth investigation concerning capsizings or swampings and 6 collisions were selected.

3.0 SCREENING OF ACCIDENTS

3.1 Screening Criteria

Of the accidents that were reported, a relatively small number met the criteria for accident investigation. A set of criteria were established to ensure the most return from every accident investigated. The following factors were considered before making the decision to investigate an accident:

- the accident involved a boat less than 26 feet in length. (In this manner, it was hoped that the accidents investigated would be representative of the vast majority of recreational boats.)
- the boat be available for further investigation.
- witnesses and/or survivors be available for questioning.
- geographic considerations (In this manner, transportation logistics and costs were optimized via multiple investigations per trip).

3.2 Screening Procedure

Coast Guard units had been instructed to report boating accidents in as timely a manner as possible. In most cases this resulted in the transmission of only partial information. When an accident notification was received by J.J. Davis Associates, Inc. that met the selection criteria, initial screening procedures were implemented. These procedures involved:

- a call back to the Coast Guard station to obtain additional information.
- calls to suvivors and witnesses to conduct a preliminary interview about the accident. During this stage the investigator is able to determine the degree of cooperation that the witness would offer as well as establishing appointments for on-the-scene interviews.

- o review of the data collected by the program manager to determine if indepth investigation was warranted.

- o Coast Guard headquarters was notified of the accident and a message sent to the reporting unit verifying the purpose of a visit by J.J. Davis Associates, Inc.

4.0 DATA ACQUIRED THROUGH INVESTIGATION

The information contained in each of the individual accident reports is presented as follows:

- o General Information-

This section details information about the operator and the passengers of the boat. It presents such informaiton as the operator's experience and background, his general attitude about safety, and the purpose in mind for the boating activity of that day.

- o Narrative Description of Accident-

This section is sub-divided into 3 sections: pre-accident, accident, and post accident.

The Pre-Accident section sets the stage for the actual accident. It details such factors as the weather on scene, the location of the accident, and relevant environment factors. It also details any actions on the part of the operator or passengers which may have had a causal relationship to the accident.

The Accident section provides the scenario for the actual accident. This section normally commences with the initiating action which led to the accident. This section describes what the occupants of the boat were doing as the accident took place.

The Post Accident discusses the recovery phase of the accident. It details the condition of the boat and persons just after the accident and relates rescue operations, whether self-rescue by the occupants happened or rescue was through another vessel.

- o Psycho/Socio and Human Factors-

This section is sub-divided into three sections: relevant operator factors, counterbalancing factors, and the interaction of the above factors.

The Relevant Operator Factors detail those conditions that played upon the operator's decision to take the courses that he did. In this section, stressors such as alcohol, fatigue, glare, etc. are detailed. Other non stressor factors such as the operator's awareness that the boat had low freeboard are also discussed in this section.

The Counterbalancing Factors section details those factors that would tend to eliminate or overcome relevant operator factors. Such factors as education and experience normally play a role in this area.

The section describing the interaction of those factors discusses in detail how each of the factors played a role in the actions of the operator.

o Probable Causes-

The precise cause of the accident is summarized in this section. In those cases where multiple causes played a role in the accident the primary cause is identified and contributing causes are also listed. Where there is insufficient evidence to show the direct cause of the accident, the investigator's opinion is presented and so labeled.

o Recommendations-

This section details recommended actions which could substantially reduce the risk of reoccurence of a similar accident. Where applicable, recommendations are made in the fields of education, enforcement, and technical standards.

o Figures and Illustrations-

In this section pertinent information is presented in the form of illustrations and diagrams. These include loading diagrams, accident diagrams and photographs of damaged areas on boats.

o Accident Data Section-

This secton presents all of the data collected to be used as a backup for the narrative section of the report. All of the data collected during the investigation is presented in this section and is made available for review of sections of the accident investigation which are not discussed in detail in the narrative portion.

5.0 SUMMARY OF INDEPTH INVESTIGATIONS

Included on the following pages are brief narrative summaries of the accidents investigated during this report. Each summary highlights the applicable portions from each section of the report.

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-1
Date of Accident: July 17, 1977
Invistigation Date: July 19, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-35

SUMMARY

This accident was a collision involving a 19 foot (5.7m) Sea Ray inboard-outboard striking a 19 foot (5.7m) Aqua Sport outboard. The area was a relatively congested channel near Fire Island, Long Island. The seas were calm with some large wakes from passing traffic. Visibility was good but there was a slight haze.

The Aqua Sport (Boat #1) had just weighed anchor near Buoy 8 in the Fire Island inlet and was turning to starboard very slowly (approximately 2 mph (3.2 kph)) to head back into the inlet. The Sea Ray (Boat #2) had been out beyond the inlet and was in the process of heading for the beach to the south of the inlet. The operator of Boat #2 was not concentrating on the operaton of his boat and when he returned his attention to the helm, the collision was imminent. Boat #2 struck Boat #1 on the starboard side just forward of the helm position and rode over the gunwale across the centerline. It then slid aft approximately 3 to 4 feet (.9m) and returned to the water on the starboard side of Boat #1. Both vessels were able to proceed under their own power to the beach where an injured 5-year-old child was removed to a hospital. The county police came to the scene on normal patrol and notified the Coast Guard of the accident. All occupants had PFDs available and they were worn by the children in Boat #1.

Boat #1 was heavily loaded with eleven people on board (4 adults and seven children) and operated by a 39-year-old male who is a very experienced boater. Boat #2 was operated by a 16-year-old male with 4 years of somewhat limited boating experience. Alcohol may have been a factor in his actions.

The primary cause of the accident was the inattention of the operator of Boat #2. A contributing cause was a lack of sufficient caution on the part of the operator of Boat #1.

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-2
Date of Accident: August 20, 1977
Investigation Date: August 23, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-88

SUMMARY

This accident involved a 25 foot (7.5m) Trojan Cabin Cruiser which collided with a partially submerged barge. The barge was clearly marked on charts of the area and the operator of the boat was aware of its location.

The boat was being used for a leisurely cruise at the end of a day of doing maintenance work on the boat's interior. The operator and all passengers routinely cruise at night and were all familiar with the area. The sky was clear and there was a light breeze. The water conditions were calm. Visibility was poor due to darkness but there were many lights on shore. The boat approached the Francis Scott Key Bridge in Baltimore Harbor from the south and started a slow turn to port. During the turn the operator became disoriented and before he could recover his bearings the boat struck an unlighted, partially submerged barge. The passengers quickly determined that the boat would sink and donned PFDs. They radioed the Coast Guard for assistance and climbed on the barge as the boat sank. They were later removed from the barge by Coast Guard personnel.

The primary cause of this accident was the disorientation of the operator which resulted in part from fatigue. Contributing factors were the fact that the barge was unlighted and the over confidence of the operator.

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COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-3
Date of Accident: October 5, 1977
Investigation Date: October 11, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-207

SUMMARY

This collision involved a 19 foot (5.7m) Inboard/Outboard powered runabout striking a bridge abutment while travelling at a speed of about 45 mph (72 kph). The accident occurred at 2315 along the Intracoastal Waterway (ICW) near Fort Lauderdale, Florida.

The weather on scene was clear, seas calm with little or no wind. The operator was a 23 year old male with very little boating experience. He had no formal boating education. The operator and the only passenger, a 19 year old female, had only been boating for about 15 minutes when the accident occurred.

The primary cause of this accident was the operator's inability to handle the boat. This was brought about by his inexperience with boating and with that boat and by the excessive speed with which he was operating. Contributing factors were the operator's inattention caused by the conversation with the passenger and a somewhat confusing display of lights near the bridge. There are restaurants and bars on both sides of the bridge and the lights from these establishments tend to obscure the lights on the bridge.

PFDs were available but not used. Stressors such as fatigue and glare are not considered to be factors in this accident. Alcohol may have played some role but a distinct causal effect cannot be established.

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-4
Date of Accident: October 14, 1977
Investigation Date: October 18, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-226

SUMMARY

This collision involved a 17 foot (5.1m) runabout striking a 22 foot (6.6m) sailboat on the starboard side, amidship. The sailboat, Boat #2, was emerging from the channel under the MacArthur Causeway in Miami when the accident occured. Boat #1 was traveling at a high speed, parelleling the causeway approximately 80 feet (24m) north of it. Before the operator of Boat #1 realized what was happening the collision occured.

The weather on scene was excellent; the water calm, winds light, and the sky clear. Even though the sun was low and in the face of operator #1, glare was not a factor in this accident. The major factor in this accident was the inattention of operator #1.

PFDs were available but not used. Stressors such as fatigue and alcohol were not causal factors in this accident.

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-5
Date of Accident: October 29, 1977
Investigation Date: November 2, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-237

SUMMARY

This mid-morning collision involved two 15 foot (4.5m) boats. Boat #1 was a heavy skiff powered by a 115hp outboard engine. It had 5 people on board, 5 hunting dogs, and 5 shotguns and assorted hunting gear. Boat #2 was an open lightweight motor boat powered by a 85hp outboard engine. The boat was rated for a maximum horsepower of 70. There was one person on board. Both boats were travelling in opposite directions along a narrow river, Bayou Segnette, at high speeds. Boat #1 was estimated to be moving at a speed of 20mph (32kph) and Boat #2 at 30mph (48kph).

The weather on scene was clear, water calm, wind light and visibility good. The bayou is narrow in spots, 120 feet (36m) and winds through numerous turns. The primary cause of this accident was the excessive speeds of both vessels involved. The environmental factors of the turns of the bayou and the tree stumps along the shoreline contributed to the cause of the accident.

Coast Guard approved PFDs were aboard both boats in sufficient quantities but were not used. Stressors such as alcohol, glare, and fatigue were not factors in this accident. All of the occupants of both boats were injured in the accident, three of them fatally.

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-6
Date of Accident: November 20, 1977
Investigation Date: November 30, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-259

SUMMARY

This collision involved a 14 foot (4.2m) Johnboat powered by a 25hp outboard engine. This boat struck a submerged tree trunk while cruising on a river. The operator and his one passenger were thrown onto the floor of the boat by the impact, injuring the operator. Both occupants were wearing PFDs (type II) but the passenger's came off as he swam to the river bank to seek help.

The accident happened in the early morning as the two occupants were on their way to a hunting area. The river was flooded due to recent rains, and the sky was cloudy and visibility poor. There was a fast current running but the water was flat. The winds were moderate, 10mph (16kph), out of the south. The accident occurred on an isolated portion of the Calcasieu River, northeast of Lake Charles, Louisiana.

The primary cause of this accident was the operator's decision to go boating. The secondary causes were the speed at which the boat was operated (excessive for the amount of debris present) and the flooded condition of the river. The operator's over confidence with the boat and the river was the primary factor in his decision to go boating.

Stressors such as alcohol, fatigue, or glare did not play a role in this accident.

APPENDIX A

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-1
Date of Accident: July 17, 1977
Invistigation Date: July 19, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-35

SUMMARY

This accident was a collision involving a 19 foot (5.7m) Sea Ray inboard-outboard striking a 19 foot (5.7m) Aqua Sport outboard. The area was a relatively congested channel near Fire Island, Long Island. The seas were calm with some large wakes from passing traffic. Visibility was good but there was a slight haze.

The Aqua Sport (Boat #1) had just weighed anchor near Buoy 8 in the Fire Island inlet and was turning to starboard very slowly (approximately 2 mph (3.2 kph)) to head back into the inlet. The Sea Ray (Boat #2) had been out beyond the inlet and was in the process of heading for the beach to the south of the inlet. The operator of Boat #2 was not concentrating on the operaton of his boat and when he returned his attention to the helm, the collision was imminent. Boat #2 struck Boat #1 on the starboard side just forward of the helm position and rode over the gunwale across the centerline. It then slid aft approximately 3 to 4 feet (.9m) and returned to the water on the starboard side of Boat #1. Both vessels were able to proceed under their own power to the beach where an injured 5-year-old child was removed to a hospital. The county police came to the scene on normal patrol and notified the Coast Guard of the accident. All occupants had PFDs available and they were worn by the children in Boat #1.

Boat #1 was heavily loaded with eleven people on board (4 adults and seven children) and operated by a 39-year-old male who is a very experienced boater. Boat #2 was operated by a 16-year-old male with 4 years of somewhat limited boating experience. Alcohol may have been a factor in his actions.

The primary cause of the accident was the inattention of the operator of Boat #2. A contributing cause was a lack of sufficient caution on the part of the operator of Boat #1.

GENERAL INFORMATION

Boat #1

The two families on board Boat #1 had left the pier approximately 2 1/2 hours before the accident. They had been eating lunch for about 20 minutes while anchored near Buoy 8 Fire Island Inlet. There were eleven people on board - 4 adults and 7 children. The total weight of passengers was 915 lbs. (411.8 kg) while the capacity plate listed the maximum load of persons as 855 lbs (384.8 kg). However, the boat was loaded below the maximum total load limit for persons and gear of 1,610 lbs (724 kg). The boat was being used on loan before being delivered to a customer.

The operator of Boat #1 was a 39-year-old male who is a very experienced boater and has been employed as a marine mechanic for approximately 20 years. He is experienced with this particular boat as his firm contracts for repair with the distributor for Aqua Sport and he operates their boats on a regular basis. His experience with this particular boat was limited, as it was a new vessel. He has not attended any formal boating safety courses.

The operator's experience and knowledge of boating is extensive. All persons other than himself and the other adult male were wearing personal floatation devices and the boat was equipped with all required Coast Guard approved gear. He is a middle class resident of the Long Island area and is a native to these waters. His immediate experience has been directly related to the number of vessels requiring "on water testing" and the availability of boats for weekend pleasure trips. The operator considers himself to be an excellent boater and a good swimmer and appears to be in good physical condition.

During the interview the operator gave the impression of being a cautious boater with great knowledge. When asked if his operation of the boat or the boat itself were causal factors in the collision he replied that he should have had more persons on board looking for other vessels due to the congestion in the area.

Boat #2

The operator of Boat #2 was a 16-year-old male who had been boating for approximately four years. His experience is limited to two boats: the one involved in the collision and a 16 foot (4.8 m) inboard-outboard owned prior to this year. He reports his experience as approximately 250 to 300 hours as an operator. He has never taken a boating safety class.

The operator is a high school student. His father is in the automobile salvage business, and they live in a middle class neighborhood. The operator does not work on a scheduled basis and only "fills in" when necessary at this father's business. The operator's knowledge

of marine rules and regulations is severely limited and the operator does not seem interested in gaining the required knowledge. He did not seem mature for his age and displayed very poor judgment of speed, distance and time. His estimate of the buoy being 300 to 400 yards (360m) off Democrat Beach was totally inaccurate (actual distance about 65 yards (58.5m) off the beach). During the trip from the operator's house to the marina where he boat was docked, his driving displayed excessive speed for the roads traveled and his estimate of the distance to the marina proved extremely inaccurate.

The operator was quite concerned during the interview that his father would not allow him to keep the boat. The boat had numerous mechanical problems that season and his father was discouraged by the boat and his son's involvement in this accident.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

Boat #1

The people in Boat #1 had just finished lunch (no alcoholic beverages were consumed) and were weighing anchor to proceed back through the inlet. The adult male passenger was at the forward hatch retrieving the anchor and stowing the anchor line. The operator had started the engine and begun a 180 degree turn towards the bay. The operator had the Navy top up at this time and later indicated that this tip may have restricted his visibility. (Inspection of similar Navy tops on Aqua Sports indicated no restricted visibility except when the operator is standing between the seats.) The operator was seated at the helm. The eleven persons on board were not involved in any other activities at this time and most were sitting quietly.

Boat #2

The operator, one male passenger, age 16, and one 15-year-old female passenger had been pleasure cruising in the bay for about three hours. They decided to go out the inlet to the ocean to dig clams. After entering the ocean through the Fire Island inlet, the operator decided that the sea conditions were not favorable for clamming. He then decided to return to the bay. While returning through the inlet, the operator saw Boat #2 at anchor near Buoy 8.

He was operating the boat from a kneeling position on the forward helm seat. When operated below planing speed (10-15 mph (29 kph)), the bow rides very high which restricts forward visibility significantly. The operator was kneeling on the helm seat to overcome this visibility restriction. The operator claims that at this time

he smelled an unusual odor in his boat and identified it as smoke from his engine compartment. He then looked back at the engine, attempting to identify the problem and brought it to the attention of his passengers. While the investigator's interview with the operator did not result in any amount of believability that the operator's attention was distracted by engine trouble, it is believed that he was distracted from his duties as operator of the boat.

When the operator again looked forward, his boat was approximately 10 feet (2.9m) from hitting Boat #1.

Pre-Accident/Weather

The weather at the time of the accident was clear with some haze. Visibility was good and the water was calm to a light chop estimated at 1 foot (.3m) or less. The air temperature at the time of the accident was 36 degrees Fahrenheit; the wind was light (2 to 3 miles per hour) from the southwest. At the time of the accident the tide was running in towards the bay and a moderate current was present. Weather was not a contributing cause to this accident although water conditions, due to large wakes, were indicated as a possible factor by one operator (operator of Boat #2).

At the time of the accident, both vessels were approximately 50 yards (45m) off Democrat Beach and just southwest of Buoy number 8. Other vessels were in the area (within 50 to 100 yards, 45-90m) accident occurred near the channel on a busy weekend afternoon. Although the area was congested the other boats did not appear to be an influencing factor. No witnesses from other vessels were available at the time of this investigation nor were any reported by the Coast Guard. The environmental factors at the time were not considered to be a contributing factor in this accident, other than the possible influence of large vessel wakes which may have increased the override if the collision occurred while Boat #2 was on the crest of a wave.

Accident

Boat #1

After completing about 30 degrees of their turn the operator of Boat #1 saw Boat #2 bearing down on him at a high speed and knew that a collision was not avoidable. He yelled to keep down and dove for the clear space between the two seats directly behind the windshield.

Boat #2

When the operator of Boat #2 saw Boat #1 directly ahead of him, it was too late to try to avoid the accident. He claimed that he was in neutral at this time and dead in the water. He reported that a swell picked him up and dropped him on the other boat's port side. This version of the accident cannot be substantiated.

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Investigative Finding

At approximately 1445 Boat #2 struck Boat #1 with the impact occurring about 4 feet (1.2m) aft of the bow and just forward of the windshield on the starboard side. Boat #2 overrode Boat #1 to just aft of the port side forward passenger seat. It then slid aft three to four feet (1.2m) and returned to the water on the starboard side of Boat #1. At some time during this episode, the five-year-old passenger, who was sitting on a cooler just aft of the helm, received a laceration on his right arm which later required 15 stiches. This probably resulted from the shattering of a CB radio antenna which had been mounted near his position. The male passenger on Boat #1, who had been in the forward hatch, grabbed the horn and bow rail of Boat #2 immediately after impact and attempted to hold the two boats apart. He pushed Boat #2 clear after impact and ended up on its foredeck as the boats separated. No other injuries were incurred by any of the people on both boats.

The additional weight of Boat #2 on the starboard gunwale caused water to enter Boat #1 over the transom. Immediately after Boat #2 slid clear, Boat #1 regained a normal attitude in the water and its cockpit began bailing. At no time during the accident did Boat #1's engine stall.

Damage to Boat #1 indicated a bow high position of Boat #2 at impact. This would indicate that Boat #2 was traveling at least 10-15 mph (24 kph) at impact.

Post-Accident

After surveying the damage to both boats and ascertaining that the only injury was to the five-year-old, both boats proceeded to Democrat Beach where assistance for the five-year-old was sought.

After both boats had arrived at Democrat Beach, witnesses on shore went to the assistance of the injured 5-year-old and kept the two operators separated until County police arrived on the scene. A bystander on the beach with a four-wheel drive vehicle transported the injured 5-year-old and his father, the adult passenger, to a local hospital. The County police department notified the Coast Guard Station Fire Island that the collision had occurred and requested their assistance. Coast Guard Station Fire Island was notified of the accident and at approximately 1545 the Coast Guard unit arrived on the scene and found that no further assistance was necessary. They then requested that both operators take their vessels to the station to complete the accident reports and to establish contact with the parties transported to the hospital. Both boats then proceeded to the station.

Coast Guard personnel later indicated that the operator of Boat #2 appeared to have been drinking and was not cooperative with any persons at the scene. Intoxication of this operator cannot be determined positively as no arrest was made by the County police, no blood samples collected nor any report made by the operator of alcohol consumption. The investigators feel that it is very probable, however that the operator had been drinking and that the social atmosphere on the boat led to the operator's inattention.

PSYCHO/SOCIO AND HUMAN FACTORS

Boat #1

A. Relevant Operator Factors

1. The operator was using a boat he was not experienced with and the boat was on loan.

2. The boat was heavily loaded with passengers being slightly over the stated passenger capacity. The fact that seven of the passengers were children and therefore weighed little was counteracted by the large number of people.

B. Counterbalancing Factors

1. The operator's experience as a boater was extensive.

2. The operator's employment as a marine mechanic (20 years) and his experience working with this model boat made him aware of its capabilities.

3. The relaxed atmosphere of a family picnic would tend to make the operator, and the passengers relax.

4. The boat was loaded below the maximum person load capacity.

C. Interaction of A and B Factors

The operator's experience with this model boat and the general practice of using the distributor's boats for family recreation would overcome any concern with the newness of this particular boat. His past experience in boating made him a very capable boater and it was apparent from the interview that he is generally safety conscious. These factors most likely outweighed any concern about the large number of passengers. The fact that the loading was definitely within the maximum person and gear capacity erroneously decreased concern about being above the stated passenger capacity. The relaxed atmosphere caused the operator and passengers to devote insufficient attention to other vessels.

Boat #2

A. Relevant Operator Factors

1. There was obviously a very social atmosphere on the boat which detracted from its operation.

2. The probable involvement of alcohol resulted in a reduction of the operator's attention, and impairment of his motor coordination.

3. The operator's concern about his father's disapproval of the boat may have been a factor after the accident but most likely did not play a role in the accident itself.

4. The operator's immature attitude reduced his recognition of the responsibilities of operating the boat.

B. Counterbalancing Factors

1. The operator has four years of accident free experience.

C. Interaction of A and B Factors

The factors listed in Section A were too powerful to be counteracted by the operator's experience. His inattention to operating the boat occurred even after he had noticed another boat in his vicinity. His involvement with his passengers (or possibly a smoking engine) caused him to ignore the movement of his boat in an area where many other boats were operating. The relatively slow speed of Boat #1 would not have allowed significant movement from the anchored position unless the operator of Boat #2 was distracted for quite some time. During that time Boat #2 could as likely have hit any other boat in his area as Boat #1.

No other stressors such as fatigue (heat and sun) or glare are believed to have played a role in the action of either operator.

PROBABLE CAUSES

The probable primary cause of this accident was the inattention of the operator of Boat #2. While it is true that Boat #1 was moving in a slow turn during this period and its position relative to Boat #2 was therefore changing, the relative speeds of both boats minimized this effect. If Boat #2 felt it was safe to continue on his present course after sighting Boat #1 at anchor only a few factors could have caused the accident. Boat #1 could have been making its turn at a high speed, and therefore drastically changed its position in a short period of time. The operator of Boat #2 could have been distracted for a long enough period of time for Boat #1 to slowly cross its path; or the operator of Boat #2 could have unknowingly changed course while he was distracted. It is felt that one of or a combination of the last two possibilities occurred. In either

case it was the inattention of the operator of Boat #2 which most directly caused the accident.

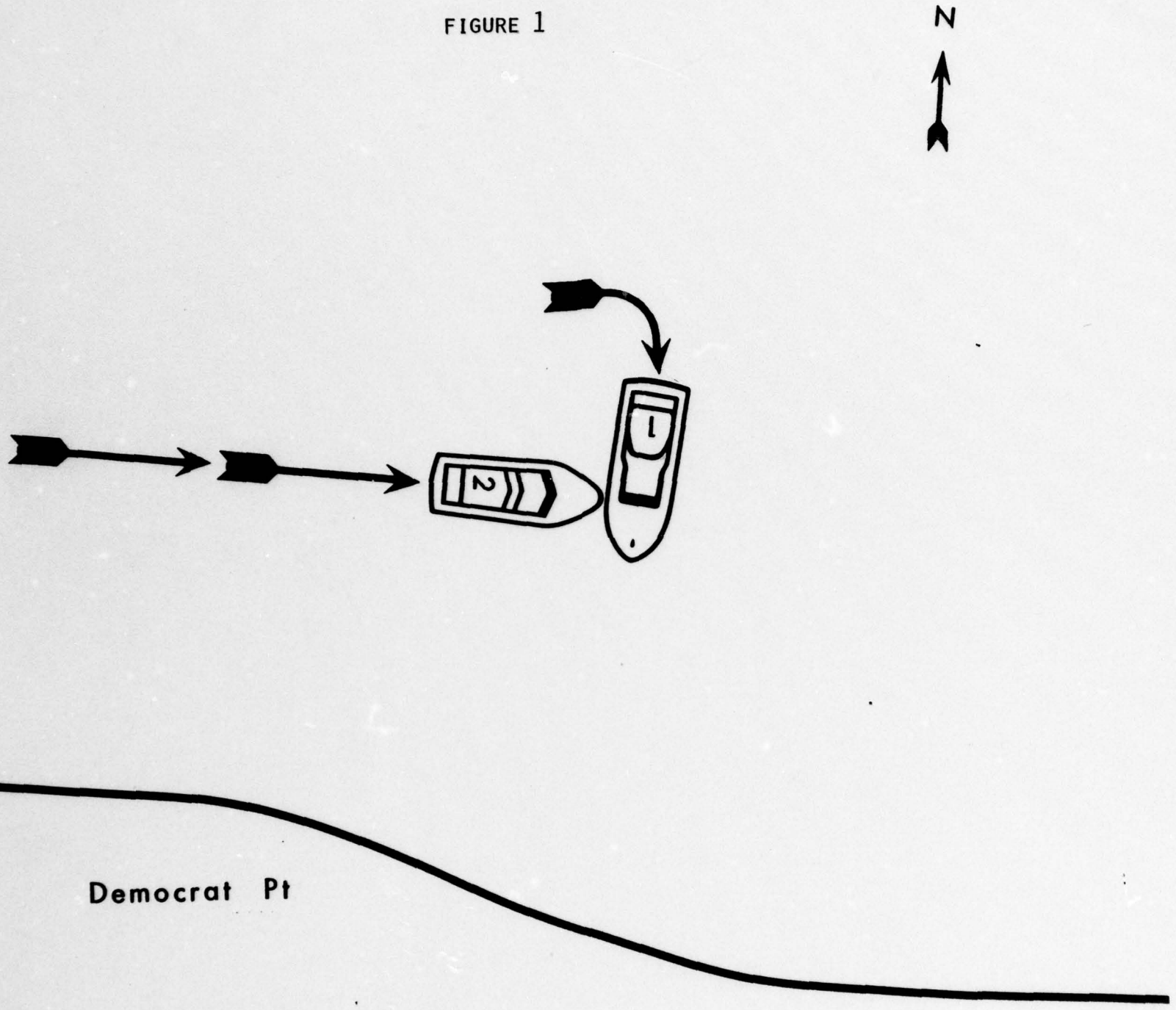
It should be noted that the lack of sufficient caution on the part of the operator and passengers of Boat #1 also contributed to the causation of this accident. Weighing anchor is a maneuver that requires the attention of all passengers. Boat #1 was in the process of getting underway and entering a relatively congested channel. It is the responsibility of such a craft to ascertain the safety of entering any channel before doing so. Had Boat #2 been sighted before commencing the turn back to the inlet, the accident might have been prevented. There is a possibility that, based on the inattention of operator #2, the collision would still have occurred if Boat #1 had still been at anchor. However, more attention by passengers of Boat #1 would have provided more time for evasive action.

RECOMMENDATIONS

It is recommended that this accident investigation be made available for consideration for the next revision of Coast Guard boating education courses. It is felt that a significant number of collisions are due to operators directing their attention to pursuits other than the operation of the vessel, and that the resulting inattention to the helm is most hazardous. It should also be emphasized that the bow high position of most recreational boats while operating just below planning speed can be quite hazardous, and does substantially reduce visibility from the helm. It should be suggested that vessels which display this tendency be operated at speeds low enough to not significantly raise the bow or to be operated at the minimum planing speed. Further emphasis should be placed upon exercising extreme caution when a change in the status of the boat is made, such as raising the anchor and getting under way. This is a critical period, as other operators may have difficulty predicting where the vessel will be and executing the proper actions. The influences of alcohol on operator judgment, attention, and psychomotor coordination should be also emphasized.

No recommendations are made in the fields of enforcement or technical standards development.

FIGURE 1



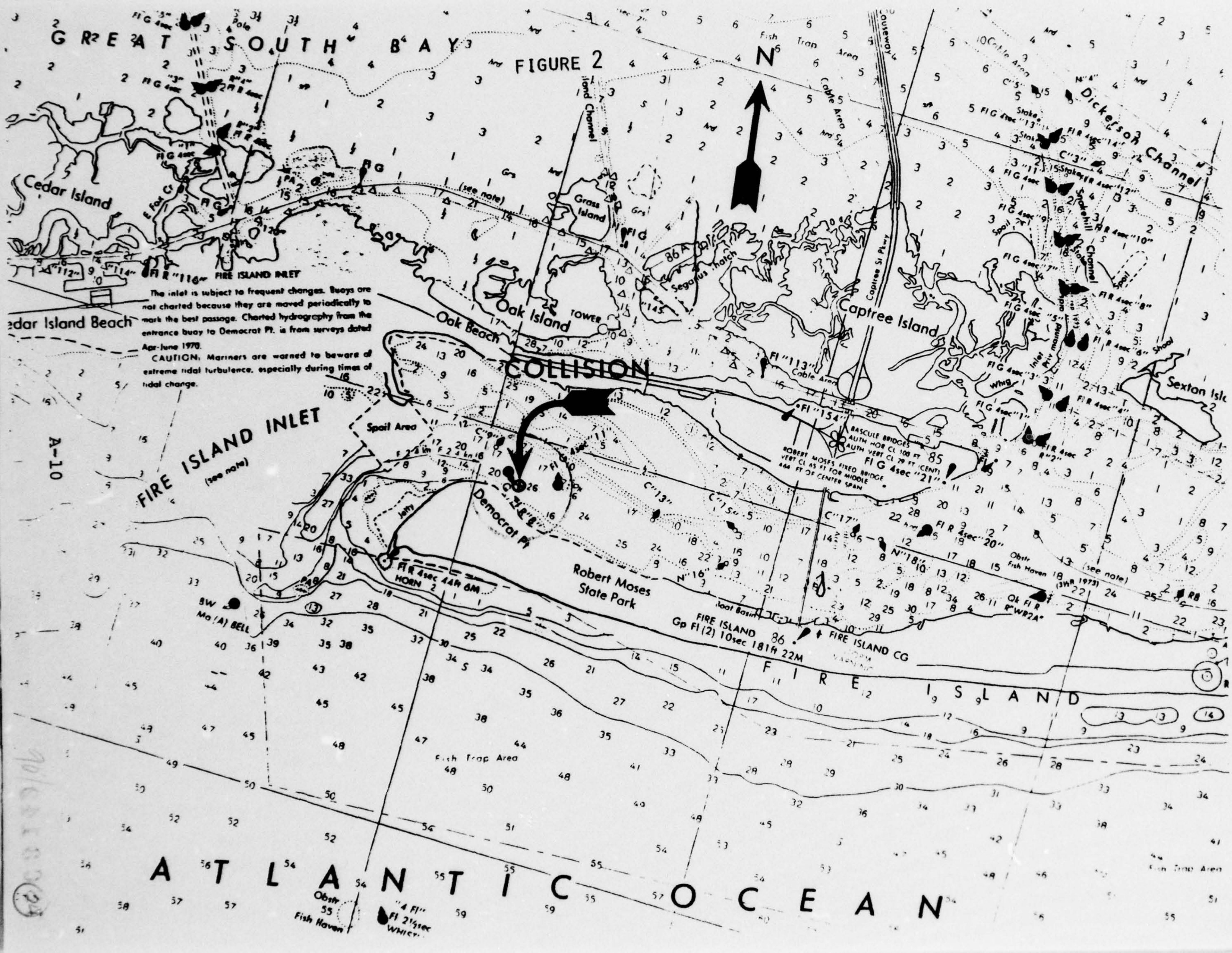
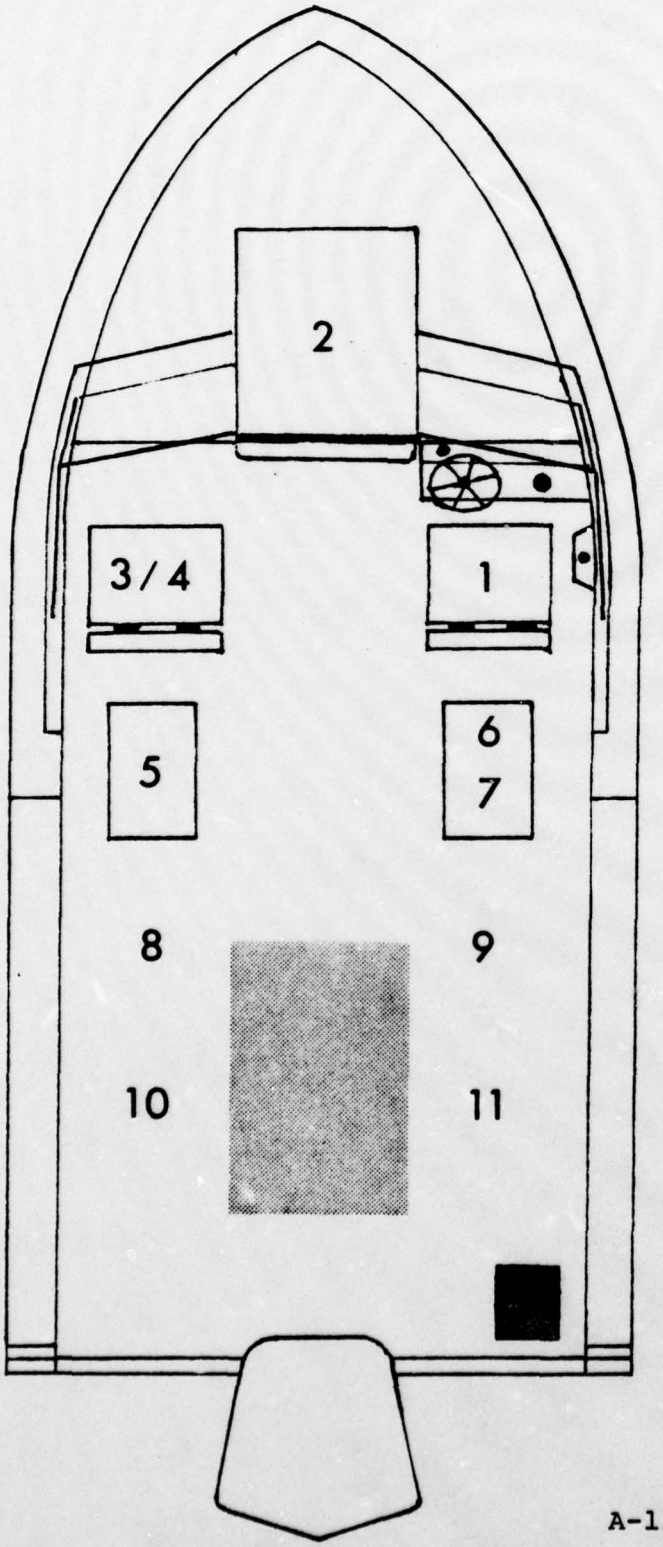

GREAT SOUTH BAY
N
Cedar Island
Cedar Island Beach
FIRE ISLAND INLET
The inlet is subject to frequent changes. Buoys are not charted because they are moved periodically to mark the best passage. Charted hydrography from the entrance buoy to Democrat Pt. is from surveys dated Apr-June 1970.
CAUTION: Mariners are warned to beware of extreme tidal turbulence, especially during times of tidal change.
FIRE ISLAND INLET (see note)
Spoil Area
Grass Island
Oak Island
Oak Beach
TOWER
COLLISION
Democrat Pt
Segarus Thatch
Captree Island
Captree St Pkwy
Cable Area
Fish Trap Area
BASCULE BRIDGES AUTH HOR CL 100 FT AUTH VERT CL 29 FT (CENT)
ROBERT MOSES FIXED BRIDGE VERT CL 65 FT FOR MIDDLE 444 FT OF CENTER SPAN
Fl G 4sec "21"
Dickerson Channel
Snakehill Channel
Sexton Isl
Robert Moses State Park
FIRE ISLAND Gp Fl (2) 10sec 181ft 22M
FIRE ISLAND CG
Fl R 4sec 44ft 6M HORN
FIRE ISLAND
Mo (A) BELL
Obstr Fish Haven
"4 Fl" Fl 2½sec WHIS
ATLANTIC OCEAN

FIGURE 2

FIGURE 3

19' 6" AQUA SPORT - LOAD DIAGRAM (BOAT #1)



BATTERY (45LBS) (20.3KG)

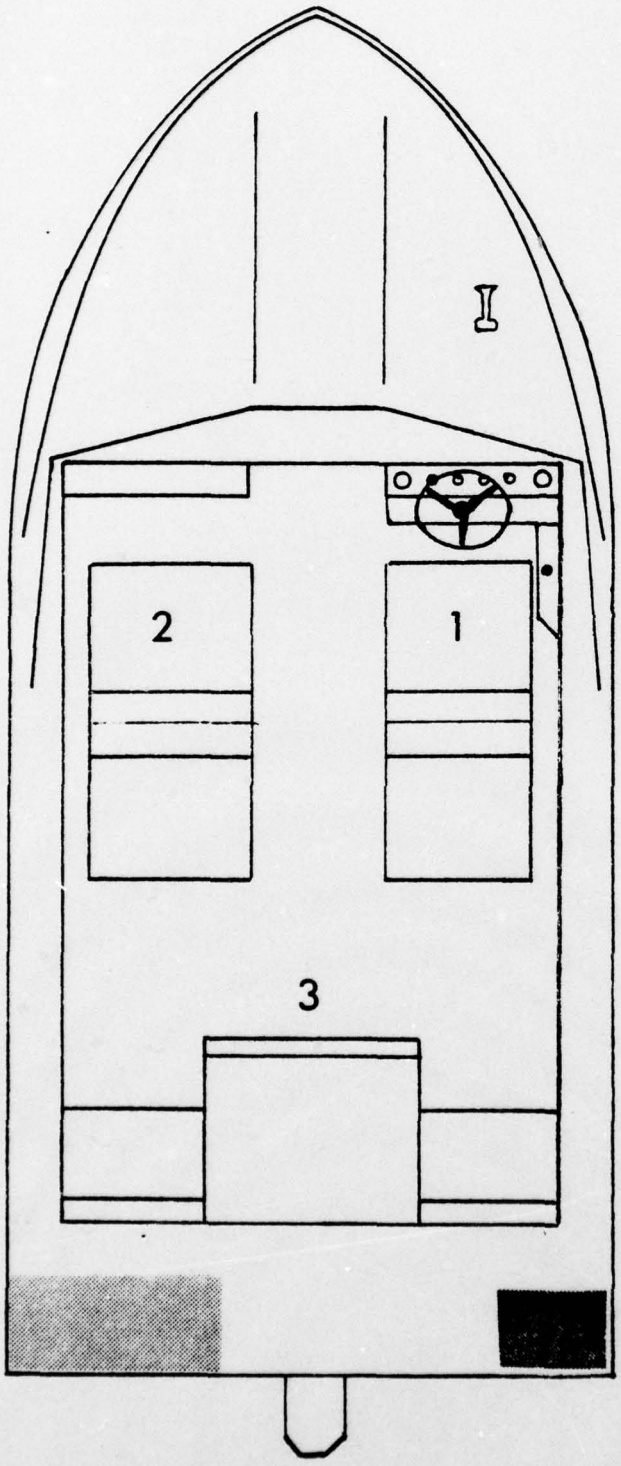
FUEL TANK (120LBS) (54KG)

1 - OPERATOR (195 LB.) (87.8KG)
2 - ADULT MALE (150 LB.) (67.5KG)
3 - ADULT FEMALE (100 LB.) (45KG)
4 - CHILD (30 LB.) (23.5KG)
5 - ADULT FEMALE (115 LB.) (51.8KG)
6 - CHILD (45 LB.) (20.3KG)
7 - CHILD (45 LB.) (20.3KG)
8 - CHILD (70 LB.) (31.5KG)
9 - CHILD (35 LB.) (15.8KG)
10 - CHILD (80 LB.) (36KG)
11 - CHILD (50 LB.) (22.5KG)

(25)

FIGURE 4

19 SEA RAY - LOAD DIAGRAM (BOAT #2)



- BATTERY (45LBS)(20.3KG)
- FUEL TANK (100LBS) (45KG)
1 - OPERATOR (145LBS)(65.3KG)
2 - ADULT MALE (120LBS)(54KG)
3 - ADULT FEMALE (155LBS) (698KG)

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FIGURE 5

AQUA SPORT 19' 6" (BOAT #1)

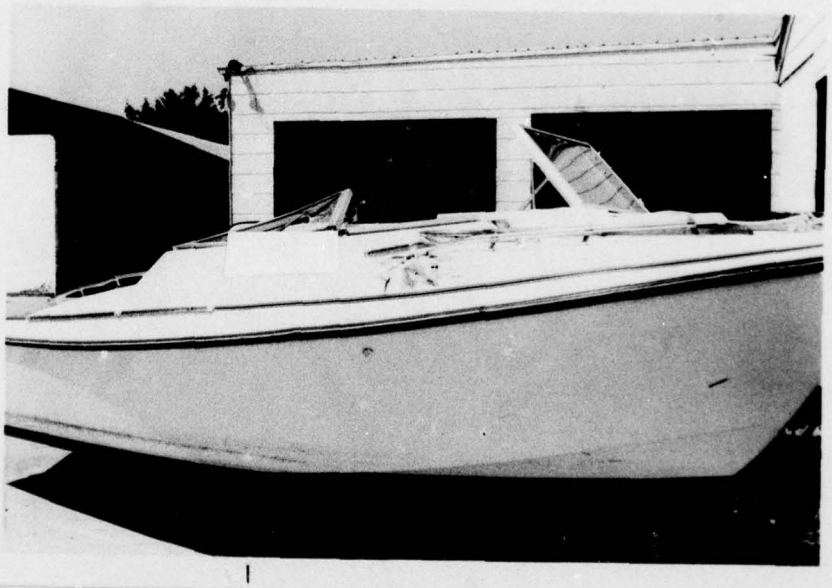
FIGURE 6

SEA RAY 19' (BOAT #2)

FIGURE 7

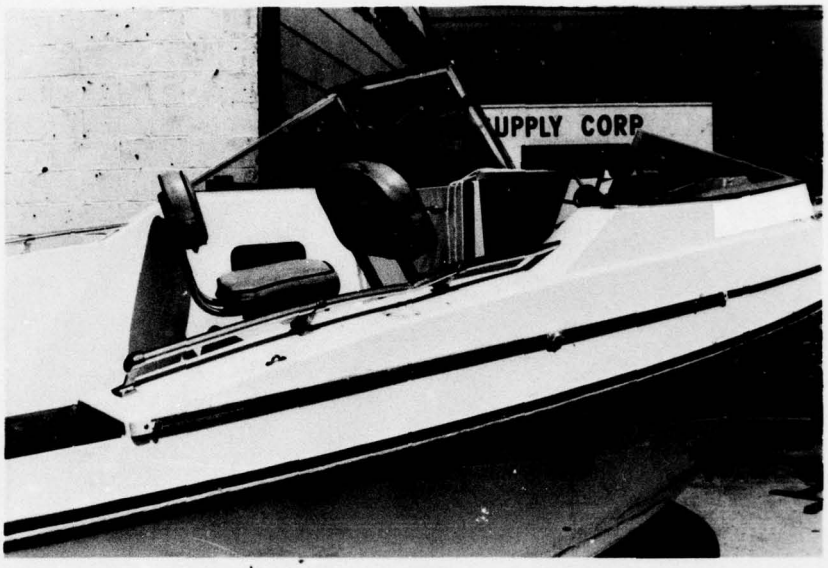
AQUA SPORT INVOLVED IN COLLISION

FIGURE 8



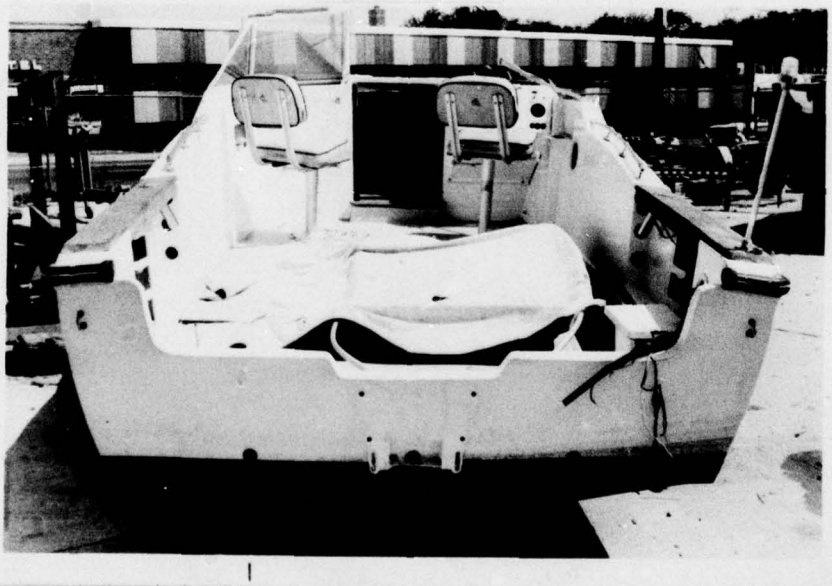
DAMAGE TO DECK, NOTE ANGLE OF IMPACT

FIGURE 9



DAMAGE TO SIDE RAIL CAUSED BY THE KEEL OF THE SEA RAY. A CITIZEN'S BAND RADIO ANTENNA HAD BEEN MOUNTED ADJACENT TO THE CREASE IN THE SIDE RAIL. INJURED 5 YR. OLD CHILD WAS SITTING JUST AFT OF THE HELMSMAN'S SEAT AND NEAR AREA OF THE DAMAGED RAIL.

FIGURE 10



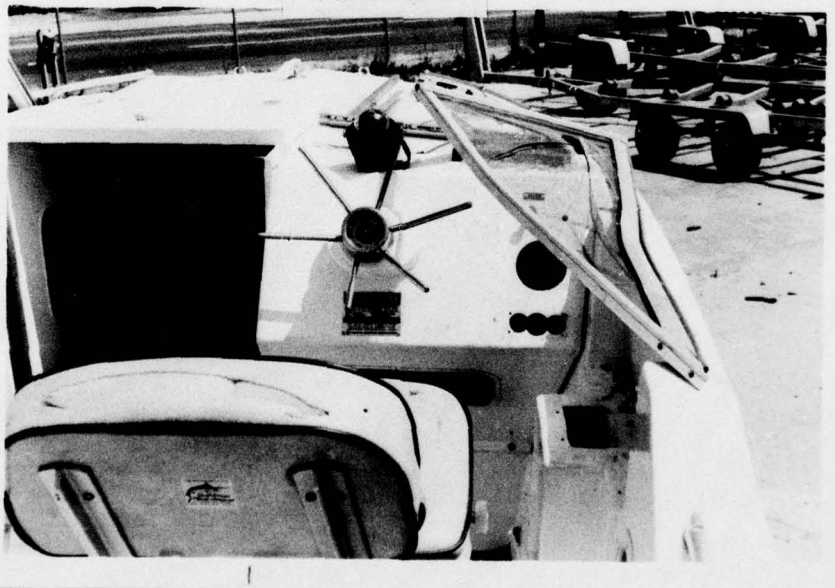
INTERIOR OF THE 19' 6" AQUA SPORT. (ENGINE HAD BEEN INSTALLED ON ANOTHER HULL FOR DELIVERY TO CUSTOMER.)

(34)

FIGURE 11

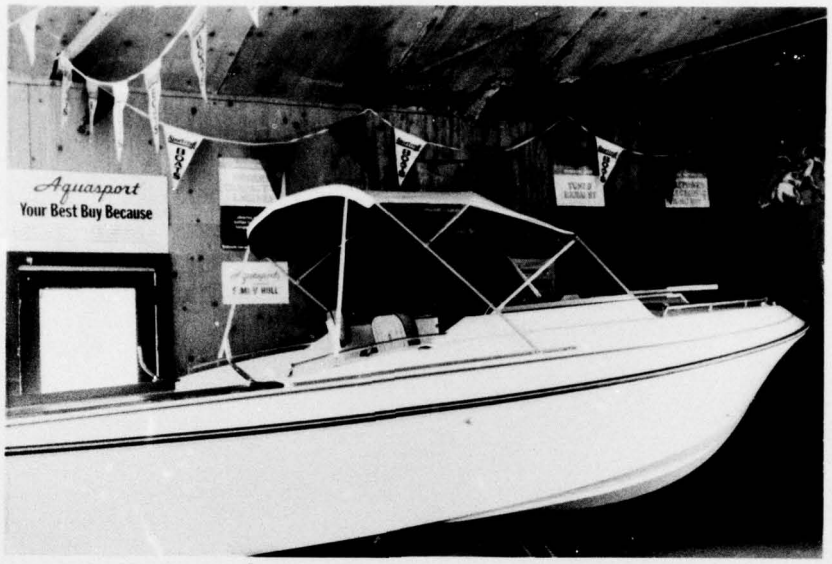
HATCH WHERE PASSENGER WAS STANDING

FIGURE 12



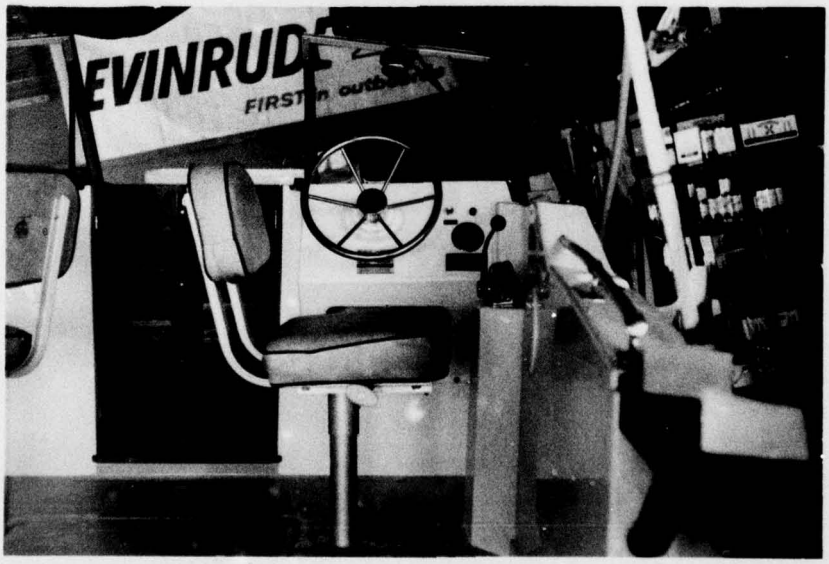
DAMAGE TO HELM AND VIEW OF AREA BELOW DECK. NOTE DAMAGE TO COMPASS WHERE KEEL PASSED OVER THE DECK, AND DAMAGE TO HELMSMANS SEAT CAUSED BY THE SEA RAY KEEL AS IT SLID AFT.

FIGURE 13



NAVY TOP ON 19' 6" AQUA SPORT

FIGURE 14



HELM, 19' 6" AQUA SPORT

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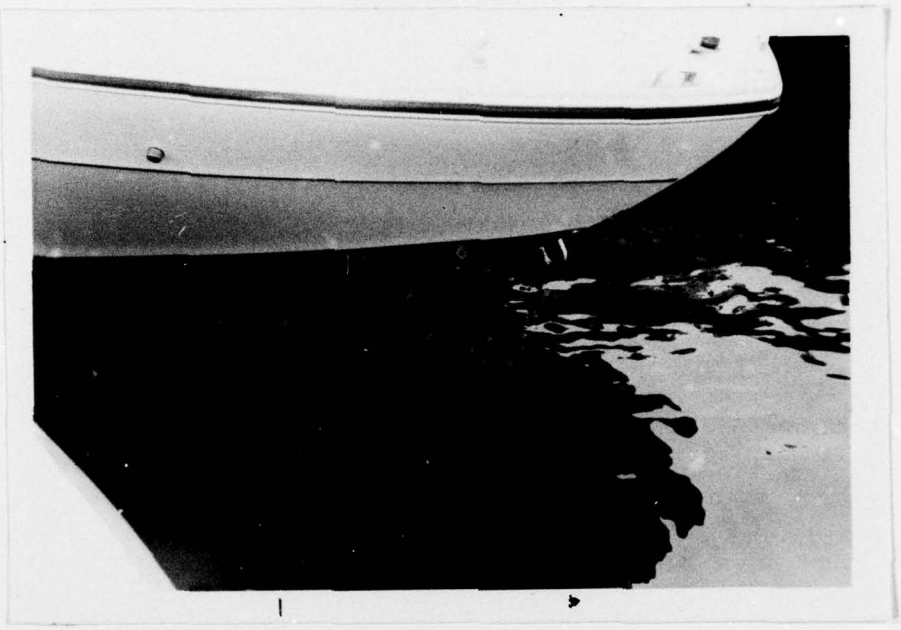
FIGURE 15



19' SEA RAY -- NOTICE SCRATCHES ON KEEL

ACCIDENT DATA SECTION

Case Number 77-1C

J.J.D.A. Number 77 / 35

Date of Accident 7/17/77 (mo/day/year)

Date of Investigation 7/19/77 (mo/day/year)

State (Use postal codes) NY

Jurisdiction (Circle one digit)
1 State
(2) Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
(1) Yes
2 No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 1500

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
(3) Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
5 River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code) COAST GUARD

1 Calm
(2) Choppy
3 Rough
4 Very Rough
5 Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site 20 ft. 5.9 m.
Relative Humidity 60 %
Air Temperature 86 °F 30.2 °C
Water Temperature 71 °F 21.8 °C

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) ____
Cold (60° - 73°F)(34° - 40°C) ____
Very Cold (below 60°F)(34°C) ____

EXPLANATORY NOTES:

DATA SOURCE:

Sky Conditions: (Circle one)

1 Clear
2 Cloudy
(3) Hazy
4 Rain
5 Snow

Wind: (Circle one)

1 None
(2) Light (0-6 mph) (0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the Southwest

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

OPERATORS

1 Yes (2) No 9 Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes 2 No (9) Unknown

Visibility: (Circle the appropriate codes, one on each list):

(1) Day	(1) Good
2 Dusk/Dawn	2 Fair
3 Night	3 Poor

*This boat's distance from shore, pier, etc.
(Fill out one)

_____ miles, or 195 feet

_____ kilometers, or 58.5 meters

This boat's distance from nearest boat.
(Fill out one)

_____ miles, or 300 feet

_____ kilometers, or 270 meters

Was the accident in a congested area?
(Circle one)

(1) Yes 2 No 9 Unknown

Environmental Contributors:

Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters	x		
Unfamiliar waters		x	
Hazardous waters		x	
Undetectable hazard (submerged object)		x	

EXPLANATORY NOTES:

*At the time of the accident both involved vessels were equidistant from the beach.

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)	____	x	____
Traffic, congested area	x	____	____
Abrupt change in weather	____	x	____
Change in water brought about by floods	____	x	____
Improper/Inadequate boat for type of water	____	x	____

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT IDENTIFICATION: Boat #1

Manufacturer Name Aqua Sport

Model Name ---

Year of Manufacture 19 77

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? ----

CAPACITY INFORMATION:

If no capacity information is available, check here ___, otherwise code as follows:

Maximum Horsepower 188 hp

Maximum Person Capacity 855 lb 384.8 kg.
(_____ Persons)

Maximum Weignt Capacity 1,610 lb 724.5 kg.

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

(2) Persons and gear

EXPLANATORY NOTES:

Boat #1 (cont.) DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

Maximum Horsepower 188

Maximum Persons Load 855 lbs.

Maximum Total Load 1,610 lbs.

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
(16) Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

(38)

DATA SOURCE:

Boat #1 (cont.)

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

(1) Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	____lbs.	____kg.
Weight of Hull (without gear and engine) (outboard only)	3400lbs.	1530 kg.
Weight of Engine(s) (outboard only)	280 lbs.	126 kg.

PROPULSION SYSTEM:

Total Horsepower	115
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

DATA SOURCE:

Boat #1 (cont.)

Engine attached by: (Circle one)

(1) Clamp (2) Bolts

Engine attached at: (Circle one)

(1) Transom 2 Other (Specify: _____)

Engine Manufacturer Name Evinrude

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
(2)	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

CONTROLS:

Location of control station: (Circle one code)

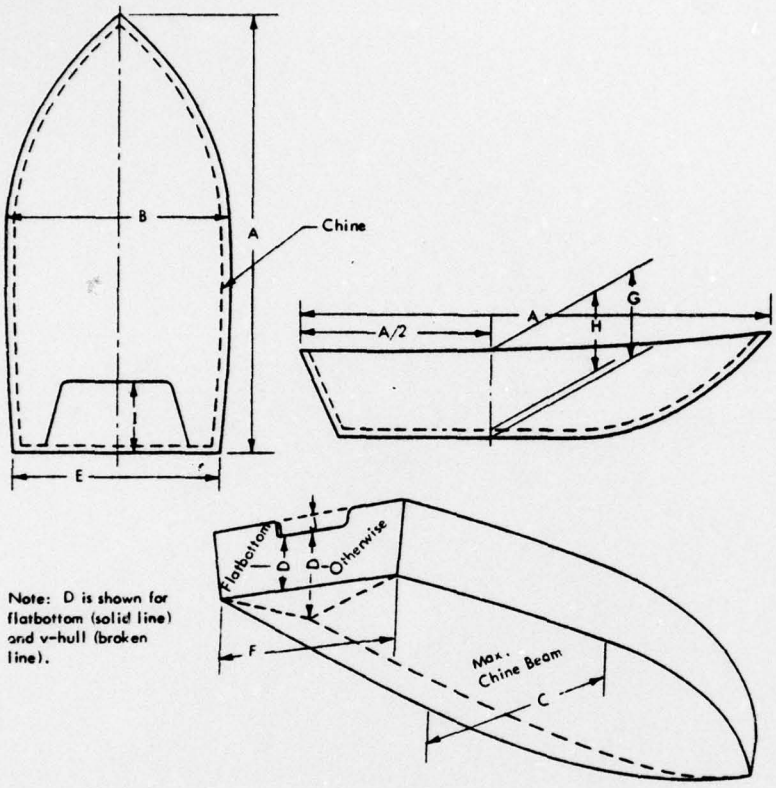
1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

(40)

DATA SOURCE:

Boat #1 (cont.)



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	19	ft.	6	in.	5.9	m.	____ cm.
B	Maximum Beam at Gunwale	-	ft.	____	in.	____	m.	____ cm.
C	Maximum Beam at Chine	-	ft.	____	in.	____	m.	____ cm.
D	Transom Height at Centerline	-	ft.	____	in.	____	m.	____ cm.
E	Transom Width at Gunwale	-	ft.	____	in.	____	m.	____ cm.
F	Transom Width at Chine	-	ft.	____	in.	____	m.	____ cm.
G	Depth Amidships, Keel to Top of Gunwale	-	ft.	____	in.	____	m.	____ cm.
H	Depth Amidships, Gunwale to Cockpit Sole	-	ft.	____	in.	____	m.	____ cm.
I	Length of Motorwell	-	ft.	____	in.	____	m.	____ cm.
J	Height of Motorwell below Transcom	-	ft.	____	in.	____	m.	____ cm.

EXPLANATORY NOTES:

* Other measurements are not considered applicable to the analysis of the collision.

(4)

Boat #1 (cont.) DATA SOURCE:

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller
(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

(1) Manual 3 Hydraulic
2 Electric 4 Other

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes 2 No (9) Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No
9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 VHF radiotelephone
6 SSB radiotelephone
(7) Other - CB Radio

EXPLANATORY NOTES

(#2)

Boat #1 (cont.)

DATA SOURCE:

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

(1) Yes 2 No 9 Unknown

Specify Compass

Navigation lights: (Circle one code)

Meet legal standards-

(1) Inland
2 International
3 Some, but don't meet standards
4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

(1) Yes 2 No 9 Unknown

Specify Grab Rail

Floatation Equipped

1 Air chamber
(2) Poured foam compartments
3 Foam blocks
4 Other

Number of personal flotation devices aboard:
(Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I		
Number of Type II	11	11
Number of Type III		
Number of Type IV		
Number of non-approved PFDs aboard		

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

DATA SOURCE:

Boat #1 (cont.)

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR	PASS. 1	PASS. 2	PASS. 3	PASS. 4
Age	39	*	*	*	*
Weight	190				
Height	6'				
Sex: 1 Male 2 Female	1				
Indicate highest grade completed in school (See instructions)	12				

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	3	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	6	6	6	6
Last two digits of year when the individual's most recent course was completed		__	____	____	____	____

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT: 5/3 _/_ _/_ _/_ _/_

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

*None of the other passengers had any measurable effect upon the operation of this boat. Their positions and weight information are provided on the Loading Diagram for Boat #1.

Boat #1 (cont.)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)

1	Yes	1	1	1	1	1
2	No	(2)	2	2	2	2
9	Unknown	9	9	9	9	9

WEARS PRESCRIPTIVE LENSES

(INCLUDE SUNGLASSES IF PRESCRIPTION):

(Circle one digit for each person)

1	Yes, worn at time of accident	1	1	1	1	1
2	No	(2)	2	2	2	2
3	Yes, but not at time of accident	3	3	3	3	3

SWIMMING ABILITY:
(Circle one digit for each person)

1	Above Average	1	1	1	1	1
2	Average	(2)	2	2	2	2
3	Below Average	3	3	3	3	3
4	Non-Swimmer	4	4	4	4	4

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)

1	0-6 times	2	—	—	—	—
2	0-12 times					
3	12-24 times					
4	More					
9	Unknown					

EXPLANATORY NOTES:

(45)

Boat #1 (cont.) DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Peculiarities in handling characteristics	___	x	___	___
View obstruction attributed to boat design	___	x	___	___
Inefficient control station layout	___	x	___	___
Structural failure	___	x	___	___
Steering failure	___	x	___	___
Other equipment failure	___	x	___	___
Steering or throttle out of adjustment	___	x	___	___
Were this boat's navigation lights adequate?	___	___	x	___
Were this boat's navigation lights on?	___	___	x	___
Loss of stability during high speed maneuver	___	___	x	___
Loss of stability due to wave or wake	___	x	___	___
Loss of stability in strong current, rapids, rough water	___	x	___	___
Ran out of fuel	___	x	___	___
Blower inadequate due to malfunction	___	___	x	___
Bilge pump inadequate due to malfunction	___	___	x	___
Slippery deck	___	___	x	___
Lack of hand or grab rails	___	x	___	___
Failure of anchor; other anchor related factors	___	x	___	___

Other: (Explain)_____

EXPLANATORY NOTES:

DATA SOURCE:

Boat #1 (cont.)

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	Was this type of signal on board?			Was this type of signal used?		
	YES	NO	UNK	YES	NO	UNK
Flares	___	x	___	___	x	___
Flags	___	x	___	___	x	___
Signalling lights (flashlight, etc.)	___	x	___	___	x	___
Electronic	___	x	___	___	x	___

Other:
(Specify)_____

EXPLANATORY NOTES:

Boat #1 (cont.) DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Sunglare				
Bright sun	x			
Sun high	x			
Sun low		x		
Just prior to accident, boat was headed into sun		x		
Visual problems (overcast, misty, foggy)		x		
Changing sun conditions (bright to minimal sun)		x		
Noise, Shock/Vibration				
Just prior to accident, boat achieved speeds of approximately 2 mph. 3.2 kph.				
If outboard motor, running at near full speed		x		
Operator inside cabin	x			
Full windshield in front of operator	x			
No windshield			x	
If inboard, equipped with mufflers			x	
Boat pounding		x		
Ride uncomfortable		x		
Was operator seat padded or cushioned?	x			

EXPLANATORY NOTES:

DATA SOURCE:

Boat #1 (cont.) Fatigue/Discomfort/Time Stress	YES	NO	N/A	UNK
Vigorous activity during or prior to accident	___	x	___	___
Person uncomfortably cold	___	x	___	___
Facing into wind	___	x	___	___
Facing into spray	___	x	___	___
Person physically ill	___	x	___	___
Hurrying to achieve destination by a certain time	___	x	___	___
Time of outing prior to accident	4 hrs.			
Time exposed to elements	4 hrs.			
Time elapsed since person last slept	6 hrs.			

EXPLANATORY NOTES:

(#9)

Boat #1 (cont.) DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	YES	NO	N/A	UNK
Drugs/Narcotics/Alcohol				
Was the operator on medication? (If yes, describe_____)	___	x	___	___
Were narcotics (controlled substances)involved?	___	x	___	___
Was alchohol involved?	___	x	___	___
Was the person(s) drunk?	___	x	___	___
Poor Judgment				
Were any of the following contributors to the accident with respect to this vessel?				
Overloading	___	x	___	___
Exceeding persons capacity	x	___	___	___
Improper load distribution	___	x	___	___
Change in load distribution (not passenger movement)	___	x	___	___
Passenger movement	___	x	___	___
Operator standing on gunwale, bow, transom	___	x	___	___
Passenger standing on gunwale, bow, transom	x	___	___	___
Excessive speed for conditions	___	x	___	___
Operator seated improperly on gunwale, seat back, bow, etc.	___	x	___	___
Passenger seated improperly on gunwale, seat back, bow, etc.	___	x	___	___
Operator unfamiliar with boat	___	x	___	___
Operator unfamiliar with water/ area	___	x	___	___

EXPLANATORY NOTES:

DATA SOURCE:

Boat #1 (cont.)	YES	NO	N/A	UNK
Operator inattention	___	x	___	___
Failure to detect hazard	x	___	___	___
Navigational error	___	x	___	___
Violations of rules of road	___	x	___	___
Started engine in gear	___	x	___	___
Started engine in improper sequence	___	x	___	___
Did not check weather	___	x	___	___
Ignored weather warning	___	___	x	___
Operator away from helm	___	x	___	___
Operating in malicious/ reckless manner	___	x	___	___
Overconfidence in boat capabilities	___	x	___	___
Overconfidence in ability to handle boat	___	x	___	___
Lack of swimming ability	___	x	___	___
Lack of sufficient safety equipment	___	x	___	___
Did not know how to use safety equipment	___	x	___	___
Disregard for safety precautions	___	x	___	___
Lack of parental supervision for young operator	___	x	___	___

EXPLANATORY NOTES:

DATA SOURCE:

Boat #1 (cont.)

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

(1) Maintains contact with boat initially
2 Enters water unconscious
3 Loses contact with boat initially but regains contact
4 Loses contact with boat initially and unsuccessfully attempts to regain contact
5 Loses contact with boat; does not attempt to regain contact
6 Trapped in overturned boat
7 Voluntarily leaves boat

ACTION:

(1) Maintains position in boat
2 Holds onto boat
3 Loses contact with boat
4 Under boat

RESULT OF ACTION:

(1) No injury - For 10 POB
2 Drowns
3 Dies from exposure
(4) Injured - 1 child - laceration (hospitalization not required)
5 Injured (hospitalization required)
6 Reaches safety
7 Reacnes safety through rescue

EXPLANATORY NOTES:

(52)

Boat #1 (cont.)

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	00/00	--/--	--/--	--/--	--/--
Post accident code from above (three digits)	1/1/1	*1/2/1	-/-/-	-/-/-	-/-/-
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

*Adult male passenger on bow jumped onto bow of boat #2 during accident, but was recovered.

(53)

Boat #1 (cont.)

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4	DATA SOURCE: → Pass. 11
PFD aboard for this person's use: (Circle code for each person)						
1 Yes	(1)	(1)	(1)	(1)	(1)	(1)
2 No	2	2	2	2	2	
9 Unknown	9	9	9	9	9	
PFD accessible just before accident: (Circle code for each person)						
1 Yes	(1)	(1)	(1)	(1)	(1)	(1)
2 No	2	2	2	2	2	
PFD accessible just after accident: (Circle code for each person)						
1 Yes	1	1	1	1	1	
2 No	2	2	2	2	2	
3 N/A	(3)	(3)	(3)	(3)	(3)	(3)
9 Unknown	9	9	9	9	9	
Person used PFD: Circle code for each person						
1 Yes	1	(1)	(1)	(1)	(1)	(1)
2 No	(2)	2	2	2	2	
3 N/A	3	3	3	3	3	
9 Unknown	9	9	9	9	9	
If person used PFD, then circle one of the following and the PFD type:						
1 Wore PFD at time of accident and did not remove it	1	(1)	(1)	(1)	(1)	(1)
2 Wore PFD but subsequently took it off	2	2	2	2	2	
3 Wore PFD but it came off	3	3	3	3	3	
4 Donned PFD after accident	4	4	4	4	4	
5 Held onto PFD	5	5	5	5	5	
PFD type: (Circle one for each person who used a PFD)						
1 CG approved I	1	1	1	1	1	
2 CG approved II	2	(2)	(2)	(2)	(2)	(2)
3 CG approved III	3	3	3	3	3	
4 CG approved IV	4	4	4	4	4	
5 Non-approved	5	5	5	5	5	
If non-approved, describe:						

EXPLANATORY NOTES:

Boat #1 (cont.)

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4	DATA SOURCE: → Pass 11
Evidence of PFD failure: (see instructions; circle one) If yes, explain:						
_____ 1 Yes	1	1	1	1	1	
_____ 2 No	(2)	(2)	(2)	(2)	(2)	(2)
_____ 3 N/A	3	3	3	3	3	
_____ 9 Unknown	9	9	9	9	9	
_____						
_____						
Evidence of improper PFD usage:						
If yes, explain:						
_____ 1 Yes	1	1	1	1	1	
_____ 2 No	(2)	(2)	(2)	(2)	(2)	(2)
_____ 3 N/A	3	3	3	3	3	
_____ 9 Unknown	9	9	9	9	9	
_____						
_____						

EXPLANATORY NOTES :

Boat #1 (cont.)

DATA SOURCE:

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

01 Cruising (proceeding normally)

02 Planing

03 Proceeding slowly, but underway

(04) Maneuvering (docking, mooring, emergency operations)

05 Racing (sanctioned)

06 Towing

07 Being towed

08 Adrift

09 At anchor (includes moored to buoy or dragging anchor)

10 Docked

11 Other (Specify_____)

99 Unknown

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing

2 Fishing

3 Skin diving or swimming

4 Fueling

5 Pleasure cruising, departing

6 Pleasure cruising, returning

(7) Pleasure cruising, in middle of outing

8 Other (Specify_____)

9 Unknown

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level

2 Bow High

3 Stern High

4 Listing starboard

5 Listing port

9 Unknown

EXPLANATORY NOTES:

(56)

DATA SOURCE:

ACCIDENT TYPE:

Grounding	1	Primary	5
Capsizing	2	Secondary	
Flooding/Swamping	3		
Sinking	4	Tertiary (third)	
Collision	(5)		
Falls Overboard	6		
Other	7		
Specify			

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

01 Two boats head on
(02) Bow/Side
03 Bow/Transom
04 Side/Side
05 Ran aground
06 Hit fixed object (submerged)
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

DATA SOURCE:

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify: _____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 02

2. _____

3. _____

EXPLANATORY NOTES:

DATA SOURCE:

BOAT IDENTIFICATION: Boat #2

Manufacturer Name - Sea Ray

Model Name ---

COAST GUARD

Year of Manufacture 19 7_

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? - -

CAPACITY INFORMATION:

OPERATOR

If no capacity information is available, check here X, otherwise code as follows:

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

(59)

Boat # 2 (cont.)

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
(16) Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

(10)

DATA SOURCE:

Boat #2 (cont.)

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

(1) Deep-V(ø greater than 18°)
2 Semi-V(ø less than 18°)
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	3200 lbs.	1440 kg.	SEA RAY
Weight of Hull (without gear and engine) (outboard only)	-- lbs.	-- kg.	
Weight of Engine(s) (outboard only)	-- lbs.	-- kg.	

PROPULSION SYSTEM:

Total Horsepower	155
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

(61)

DATA SOURCE:

Boat #2 (cont.)

Engine attached by: (Circle one)

1 Clamp (2) Bolts

OPERATOR

Engine attached at: (Circle one)

(1) Transom 2 Other (Specify:_____)

Engine Manufacturer Name OMC

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
2	Outboard	5	Manual
(3)	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

CONTROLS:

Location of control station: (Circle one code)

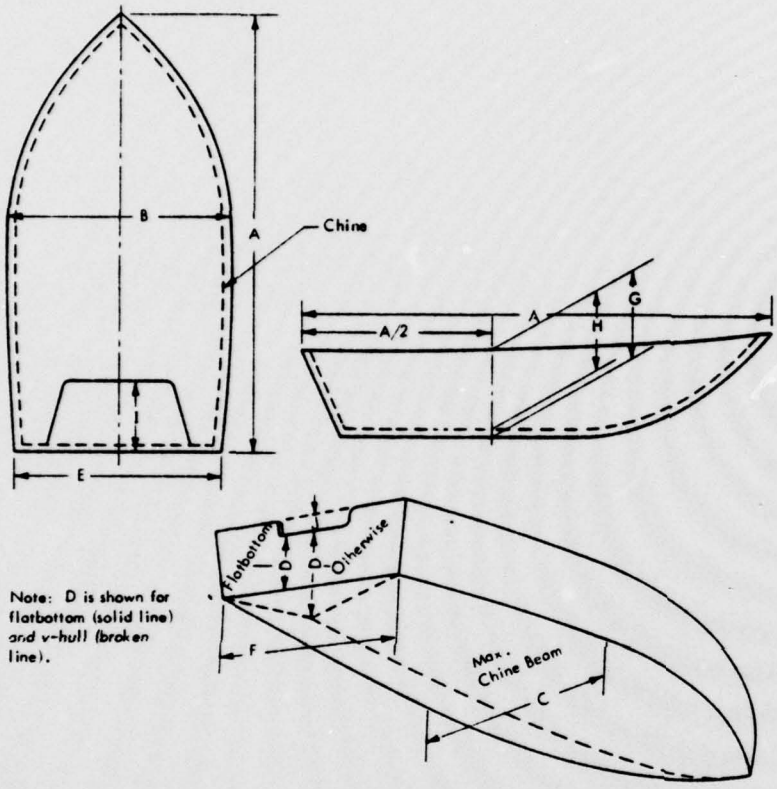
1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

(12)

Boat #2 (cont.)

DATA SOURCE:



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall		19	ft.	____	in.	5.7	m. ____ cm.
B	Maximum Beam at Gunwale	*	--	ft.	____	in.	____	m. ____ cm.
C	Maximum Beam at Chine		--	ft.	____	in.	____	m. ____ cm.
D	Transom Height at Centerline		--	ft.	____	in.	____	m. ____ cm.
E	Transom Width at Gunwale		--	ft.	____	in.	____	m. ____ cm.
F	Transom Width at Chine		--	ft.	____	in.	____	m. ____ cm.
G	Depth Amidships, Keel to Top of Gunwale		--	ft.	____	in.	____	m. ____ cm.
H	Depth Amidships, Gunwale to Cockpit Sole		--	ft.	____	in.	____	m. ____ cm.
I	Length of Motorwell		--	ft.	____	in.	____	m. ____ cm.
J	Height of Motorwell below Transcom		--	ft.	____	in.	____	m. ____ cm.

EXPLANATORY NOTES:

*Other measurements are not considered applicable to the analysis of this collision.

(63)

Boat #2 (cont.) DATA SOURCE:

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller
(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

(1) Manual 3 Hydraulic
2 Electric 4 Other

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes 2 No (9) Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No
9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 VHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

(64)

DATA SOURCE:

Boat #2 (cont.)

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

(1) Inland 3 Some, but don't meet standards

2 International 4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

(1) Yes 2 No 9 Unknown

Specify Grab Rails

Floatation Equipped

1 Air chamber (2) Poured foam compartments

3 Foam blocks 4 Other

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I	_____	_____
Number of Type II	3	3
Number of Type III	_____	_____
Number of Type IV	_____	_____
Number of non-approved PFDs aboard	_____	_____

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

DATA SOURCE:

Boat #2 (cont.)

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR	* PASS. 1	* PASS. 2	PASS. 3	PASS. 4
Age	16				
Weight	135				
Height	5'8"				
Sex: 1 Male 2 Female	1	1	2		
Indicate highest grade completed in school (See instructions)	10				

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	3	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	(6)	(6)	6	6
Last two digits of year when the individual's most recent course was completed						

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT: 4/3 | 2/1 | 1/1 | -/- | -/-

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

* The two passengers were not available for interview and did not by way of their height or weight affect the operation of the boat.

(66)

Boat #2 (cont.)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)

1	Yes	1	1	1	1	1
2	No	(2)	(2)	(2)	2	2
9	Unknown	9	9	9	9	9

WEARS PRESCRIPTIVE LENSES

(INCLUDE SUNGLASSES IF PRESCRIPTION):

(Circle one digit for each person)

1	Yes, worn at time of accident	1	1	1	1	1
2	No	(2)	(2)	(2)	2	2
3	Yes, but not at time of accident	3	3	3	3	3

SWIMMING ABILITY:
(Circle one digit for each person)

1	Above Average	(1)	1	1	1	1
2	Average	2	(2)	(2)	2	2
3	Below Average	3	3	3	3	3
4	Non-Swimmer	4	4	4	4	4

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)

1	0-6 times	2	1	2	—	—
2	0-12 times					
3	12-24 times					
4	More					
9	Unknown					

EXPLANATORY NOTES:

Boat #2 (cont.)

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Peculiarities in handling characteristics	___	X	___	___
View obstruction attributed to boat design	___	X	___	___
Inefficient control station layout	___	X	___	___
Structural failure	___	X	___	___
Steering failure	___	X	___	___
Other equipment failure	___	X	___	___
Steering or throttle out of adjustment	___	X	___	___
Were this boat's navigation lights adequate?	___	___	X	___
Were this boat's navigation lights on?	___	___	X	___
Loss of stability during high speed maneuver	___	X	___	___
Loss of stability due to wave or wake	___	X	___	___
Loss of stability in strong current, rapids, rough water	___	___	X	___
Ran out of fuel	___	___	X	___
Blower inadequate due to malfunction	___	___	X	___
Bilge pump inadequate due to malfunction	___	___	X	___
Slippery deck	___	___	X	___
Lack of hand or grab rails	___	___	X	___
Failure of anchor; other anchor related factors	___	___	X	___

Other: (Explain)_____

EXPLANATORY NOTES:

(65)

DATA SOURCE:

Boat #2 (cont.)

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	Was this type of signal on board?			Was this type of signal used?		
	YES	NO	UNK	YES	NO	UNK
Flares	___	X	___	___	X	___
Flags	___	X	___	___	X	___
Signalling lights (flashlight, etc.)	___	X	___	___	X	___
Electronic	___	X	___	___	X	___

Other:
(Specify) _____

EXPLANATORY NOTES:

(69)

Boat #2 (cont.)

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Sunglare				
Bright sun	X			
Sun high	X			
Sun low		X		
Just prior to accident, boat was headed into sun		X		
Visual problems (overcast, misty, foggy)		X		
Changing sun conditions (bright to minimal sun)		X		
Noise, Shock/Vibration				
Just prior to accident, boat achieved speeds of approximately 15 mph. 24 kph.				
If outboard motor, running at near full speed		X		
Operator inside cabin		X		
Full windshield in front of operator	X			
No windshield		X		
If inboard, equipped with mufflers	X			
Boat pounding		X		
Ride uncomfortable		X		
Was operator seat padded or cushioned?	X			

EXPLANATORY NOTES:

DATA SOURCE:

Boat #2 (cont.)	YES	NO	N/A	UNK
Fatigue/Discomfort/Time Stress				
Vigorous activity during or prior to accident	___	X	___	___
Person uncomfortably cold	___	X	___	___
Facing into wind	X	___	___	___
Facing into spray	___	X	___	___
Person physically ill	___	X	___	___
Hurrying to achieve destination by a certain time	___	X	___	___
Time of outing prior to accident	3 hrs.			
Time exposed to elements	3 hrs.			
Time elapsed since person last slept	6 hrs.			

EXPLANATORY NOTES:

(11)

Boat #2 (cont.)

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	YES	NO	N/A	UNK
Drugs/Narcotics/Alcohol				
Was the operator on medication? (If yes, describe_____)	___	X	___	___
Were narcotics (controlled substances)involved?	___	X	___	___
Was alchohol involved?	X	___	___	___
Was the person(s) drunk?	___	___	___	X
Poor Judgment				
Were any of the following contributors to the accident with respect to this vessel?				
Overloading	___	X	___	___
Exceeding persons capacity	___	X	___	___
Improper load distribution	___	X	___	___
Change in load distribution (not passenger movement)	___	X	___	___
Passenger movement	___	X	___	___
Operator standing on gunwale, bow, transom	___	X	___	___
Passenger standing on gunwale, bow, transom	___	X	___	___
Excessive speed for conditions	___	X	___	___
Operator seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Operator unfamiliar with boat	___	X	___	___
Operator unfamiliar with water/ area	___	X	___	___

EXPLANATORY NOTES:

DATA SOURCE:

Boat #2 (cont.)

	YES	NO	N/A	UNK
Operator inattention	X			
Failure to detect hazard	X			
Navigational error		X		
Violations of rules of road		X		
Started engine in gear			X	
Started engine in improper sequence			X	
Did not check weather			X	
Ignored weather warning			X	
Operator away from helm		X		
Operating in malicious/ reckless manner		X		
Overconfidence in boat capabilities			X	
Overconfidence in ability to handle boat	X			
Lack of swimming ability		X		
Lack of sufficient safety equipment			X	
Did not know how to use safety equipment			X	
Disregard for safety precautions	X			
Lack of parental supervision for young operator	X			

EXPLANATORY NOTES:

Boat #2 (cont.) DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

(1) Maintains contact with boat initially
2 Enters water unconscious
3 Loses contact with boat initially but regains contact
4 Loses contact with boat initially and unsuccessfully attempts to regain contact
5 Loses contact with boat; does not attempt to regain contact
6 Trapped in overturned boat
7 Voluntarily leaves boat

ACTION:

(1) Maintains position in boat
2 Holds onto boat
3 Loses contact with boat
4 Under boat

RESULT OF ACTION:

(1) No injury
2 Drowns
3 Dies from exposure
4 Injured (hospitalization not required)
5 Injured (hospitalization required)
6 Reaches safety
7 Reaches safety through rescue

EXPLANATORY NOTES:

Boat #2 (cont.)

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	00/00	00/00	00/00	--/--	--/--
Post accident code from above (three digits)	1/1/1	1/1/1	1/1/1	-/-/-	-/-/-
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

Boat #2 (cont.)

DATA SOURCE:

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
PFD aboard for this person's use: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	1	1
2 No	2	2	2	2	2
9 Unknown	9	9	9	9	9
PFD accessible just before accident: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	1	1
2 No	2	2	2	2	2
PFD accessible just after accident: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	1	1
2 No	2	2	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
Person used PFD: Circle code for each person					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	(2)	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
If person used PFD, then circle one of the following and the PFD type:					
1 Wore PFD at time of accident and did not remove it	1	1	1	1	1
2 Wore PFD but subsequently took it off	2	2	2	2	2
3 Wore PFD but it came off	3	3	3	3	3
4 Donned PFD after accident	4	4	4	4	4
5 Held onto PFD	5	5	5	5	5
PFD type: (Circle one for each person who used a PFD)					
1 CG approved I	1	1	1	1	1
2 CG approved II	2	2	2	2	2
3 CG approved III	3	3	3	3	3
4 CG approved IV	4	4	4	4	4
5 Non-approved	5	5	5	5	5
If non-approved, describe:					

EXPLANATORY NOTES:

Boat #2 (cont.)

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Evidence of PFD failure: (see instructions; circle one) If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	2	2	2	2	2
_____ 3 N/A	(3)	(3)	(3)	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					
Evidence of improper PFD usage:					
If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	(2)	(2)	(2)	2	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					

EXPLANATORY NOTES :

(77)

Boat #2 (cont.)

DATA SOURCE:

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

(01) Cruising (proceeding normally)
02 Planing
03 Proceeding slowly, but underway
04 Maneuvering (docking, mooring, emergency operations)
05 Racing (sanctioned)
06 Towing
07 Being towed
08 Adrift
09 At anchor (includes moored to buoy or dragging anchor)
10 Docked
11 Other (Specify_____)
99 Unknown

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing
2 Fishing
3 Skin diving or swimming
4 Fueling
5 Pleasure cruising, departing
(6) Pleasure cruising, returning
7 Pleasure cruising, in middle of outing
8 Other (Specify_____)
9 Unknown

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

1 Level
(2) Bow High
3 Stern High
4 Listing starboard
5 Listing port
9 Unknown

EXPLANATORY NOTES:

(78)

APPENDIX B

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-2
Date of Accident: August 20, 1977
Investigation Date: August 23, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-88

SUMMARY

This accident involved a 25 foot (7.5m) Trojan Cabin Cruiser which collided with a partially submerged barge. The barge was clearly marked on charts of the area and the operator of the boat was aware of its location.

The boat was being used for a leisurely cruise at the end of a day of doing maintenance work on the boat's interior. The operator and all passengers routinely cruise at night and were all familiar with the area. The sky was clear and there was a light breeze. The water conditions were calm. Visibility was poor due to darkness but there were many lights on shore. The boat approached the Francis Scott Key Bridge in Baltimore Harbor from the south and started a slow turn to port. During the turn the operator became disoriented and before he could recover his bearings the boat struck an unlighted, partially submerged barge. The passengers quickly determined that the boat would sink and donned PFDs. They radioed the Coast Guard for assistance and climbed on the barge as the boat sank. They were later removed from the barge by Coast Guard personnel.

The primary cause of this accident was the disorientation of the operator which resulted in part from fatigue. Contributing factors were the fact that the barge was unlighted and the over confidence of the operator.

GENERAL INFORMATION

This boat was jointly owned by the operator, passenger #1 (his brother), and passenger #2 (their father). The three bought the boat a number of years ago and have spent considerable time and effort in renovating and maintaining it. They had been working on the boat for most of that day, preparing it for a planned overnight cruise. They routinely take the boat for an evening or night cruise to relax at the end of a day of working on it. All three owners live near or on the river front and spend the majority of their leisure time boating or swimming. They have all been boating most of their adult lives and for more than 500 hours in this particular boat.

Passenger #1 is a state policeman and is extremely safety conscious. He has completed formal boating safety education given by the Coast Guard Auxiliary and the American Red Cross. He has in turn instructed the other owners in the boating safety principles he has learned. During the interview it became apparent that his knowledge of boating safety is extensive and he generally applies this knowledge to his actions.

All three owners can be considered to be in the middle class and intelligent. Passenger #3 is related to the other three but did not play a critical role in this incident. All four persons are in good physical condition and were not impeded during the accident in this respect.

The boat was kept in excellent condition and had been awarded a Courtesy Motor Boat Examination Decal in 1977.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

The operator and passengers #1 and #2 had been working for most of the day performing general maintenance on the boat. They were installing new decking on the after section and generally checking out the boat for a planned overnight cruise. As was their custom, as darkness approached they decided to take the boat out for a short cruise to check its performance. They left their mooring area at approximately 2100 and proceeded to cruise north into Baltimore Harbor. As they approached the Francis Scott Key Bridge the operator swung the boat in a slow gradual arc to port. (See Figure 1.) The operator stated that he was checking to see which ships were in at the docks where he was employed. When they noted no ships of interest in the vicinity, they continued to turn to port at a slow speed of approximately 5 knots. The boat was cruising at approximately 1800 rpm and was definitely below planing speed. The operator had a clear view of the area in all directions and his visibility was not obstructed by either the bow or the cabin superstructure. The operator experienced some difficulty in orienting himself during this turn. He explained that the lights

on shore confused matters somewhat but he then sighted the channel marker and proceeded in that direction.

The water conditions during their entire cruise had been very calm. The only restriction to visibility was due to darkness; visibility was approximately 3 miles (4.8 km). The boat was equipped with a spotlight, but it was not being used at this time.

Accident

At approximately 2230 the boat struck the lower portion of a submerged barge and came to a complete halt. All of the passengers stated that it was like hitting a brick wall. At the time of the accident passenger #1 was in the cabin area lying down on the port berth. He felt the impact and started to rush back toward the control station. At that time the operator told him to check for water under the decks. Passenger #1 turned around and saw water flooding the entire cabin (approximately six inches of water one minute after collision) and relayed that information to the operator. The operator then told everybody to start donning PFDs. There were approximately 18 type II Coast Guard approved PFDs on board the operator told each of the passengers to put on two of them and grab as many as they could holding them under their arms. At this time, passenger #1 grabbed the VHF radio telephone and put in a call for assistance. He also hoisted a distress flag and turned the boat's spotlight on it.

Post-Accident

At approximately 2245, with the vessel taking on more water and no assistance in sight, the boat's personnel decided to abandon the boat. They grabbed the boat's loudhailer and went forward to climb onto the barge. At approximately 2250 all four personnel had abandoned the boat and were on the barge. At this time the transom of the boat slid under the water and the boat began to sink quite rapidly. Also at this time a Coast Guard unit arrived on the scene and offered assistance. At approximately 2300 Coast Guard unit removed the personnel from the barge and radioed for instructions concerning the disposition of the boat. The Coast Guard unit was told to remove personnel but not to attempt salvage operations on the boat. An anchor was put out and the boat was left in that position as the Coast Guard unit transported the accident victims to their home.

During the following day, strong winds entered the area causing the boat to be battered upon the iron frame of the barge. It is believed that extensive damage was done to the hull during this time period. Sometime during the afternoon of August 21, 1977, vandals boarded the boat removing the depth finder and tachometer. Apparently unable to find any other possessions to take, they cut the anchor line salvaging approximately 200 feet of anchor line and the anchor. The boat subsequently drifted away and was reported as a hazard to navigation that evening. Coast Guard units responded to the report and towed the vessel to Coast Guard Station Curtis Bay, Maryland.

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PSYCHO/ SOCIO AND HUMAN FACTORS

A. Relevant Operator Factors

1. The operator was distracted looking for ships in the harbor while executing a turn.

2. The operator had spent a long day working on the boat.

3. The operator had trouble picking out aids to navigation against the lights on shore.

B. Counterbalancing Factors

1. The operator was extremely familiar with both that boat and the area they were operating in.

2. The operator was very familiar with night cruising.

3. The atmosphere on board the boat was very relaxed and the operator was under no pressure.

C. Interaction of A and B Factors

During the interviews it was revealed that no accurate record of the boat's position was being maintained during the turn to port just prior to the accident. The operator and passengers indicated very little concern for their precise location because of their familiarity with that area. They were all surprised by the collision and immediately were able to identify that they had hit the barge and exactly where they were. Fatigue certainly played some role in the disorientation of the operator. The fact that passenger #1, was in the cabin sleeping may be an indication of the level of fatigue of the other passengers. While feeling the effects of fatigue, the operator's visual perception in the dark would have been degraded. His perception of the rate of turn prior to the collision would also have been altered, accounting for his belief that the turn left them much further to the east and clear of the barge.

The relaxed atmosphere aboard the boat and the distraction of the operator in trying to see which ships were in, caused the operator and passengers to lose track of how far toward the west the turn had taken them. The disorientation of the operator at the end of the turn was further complicated by the lights on shore. This made it more difficult for him to pick out the channel buoy. After he had steadied on his new course, he passed very close to the higher portion of the barge. He noticed something but couldn't identify it before the boat struck the other part of the barge.

In this accident the factors of fatigue and operator inattention were reinforced by an overconfidence resulting from their past experiences. They had been boating at night (on

This boat and in these waters) with no prior accidents. There was a very relaxed and pleasant atmosphere aboard the boat which lulled the operator into a false sense of security.

PROBABLE CAUSES

The major cause of this accident was the operator's failure to maintain an accurate realization of his boat's position. The possible effects of fatigue, resulting in loss of visual and spacial perceptions, also contributed to the casue of this accident.

The primary cause of this accident was the disorientation of the operator. This disorientation was largely brought about by fatigue resulting from a long day "working on the boat". The degree of fatigue is demonstrated by the fact that Passenger #1 was asleep in the cabin. Passenger #1 did approximately the same amount of work as the operator that day, had the same amount of sleep the night before, and was in the same physical condition. Therefore, it is likely that the operator was fatigued enough to sleep at the time of the accident (see data section for details). Contributing to the disorientation were the

- o operator's preoccupation with the ships at the dock, and
- o over confidence in the boat and complete familiarity with area shared by the operator and passengers.

The fact that the barge was unlighted (although clearly charted) contributed to the accident. The persons on the boat were aware of the barge's location; and if it had been lighted they might have been able to recover from their disorientation in sufficient time. In one sense the experience level of the operator and passengers also contributed to the accident in that their past experiences caused them to be less cautious. A less experienced boater would have been quite concerned about operating in that area and would have paid more attention to the movement of the boat.

The following factors led to the minimization of personal injury in this case:

1) The formal boating education received by passenger #1 gave him the enabling skills to successfully and quickly broadcast his distress message and display effective distress signals.

2) The extremely evident safety consciousness of all of the passengers enabled them to recover in the post-accident phase of the accident. Their apparent concern for the installation of proper safety equipment aboard the boat, as demonstrated by the presence of 18 PFDs (versus the four required) and a thorough familiarization with the boat's safety equipment location and capabilities allowed the crew to act effectively to minimize their losses.

3) It is evident that the familiarity with boating possessed by the operator and passengers #1 and #2 greatly assisted in the calm evacuation of personnel to the barge. Most likely the employment experience of especially passenger #1, greatly assisted the accident victims. This calm attitude is demonstrated by their decision to forgo salvage of any valuable personal gear aboard the boat so that they could take PFDs and a loudhailer to assist them in rescue operations.

The investigation revealed no evidence of the use of alcohol or other drugs. It should also be noted that the boat received extensive damages which could have been caused by the boat's pounding on the barge the day after the accident. Therefore, estimates of the speed on impact could not be made. However, it is believed that the boat was traveling at the 5 knots reported.

RECOMMENDATIONS

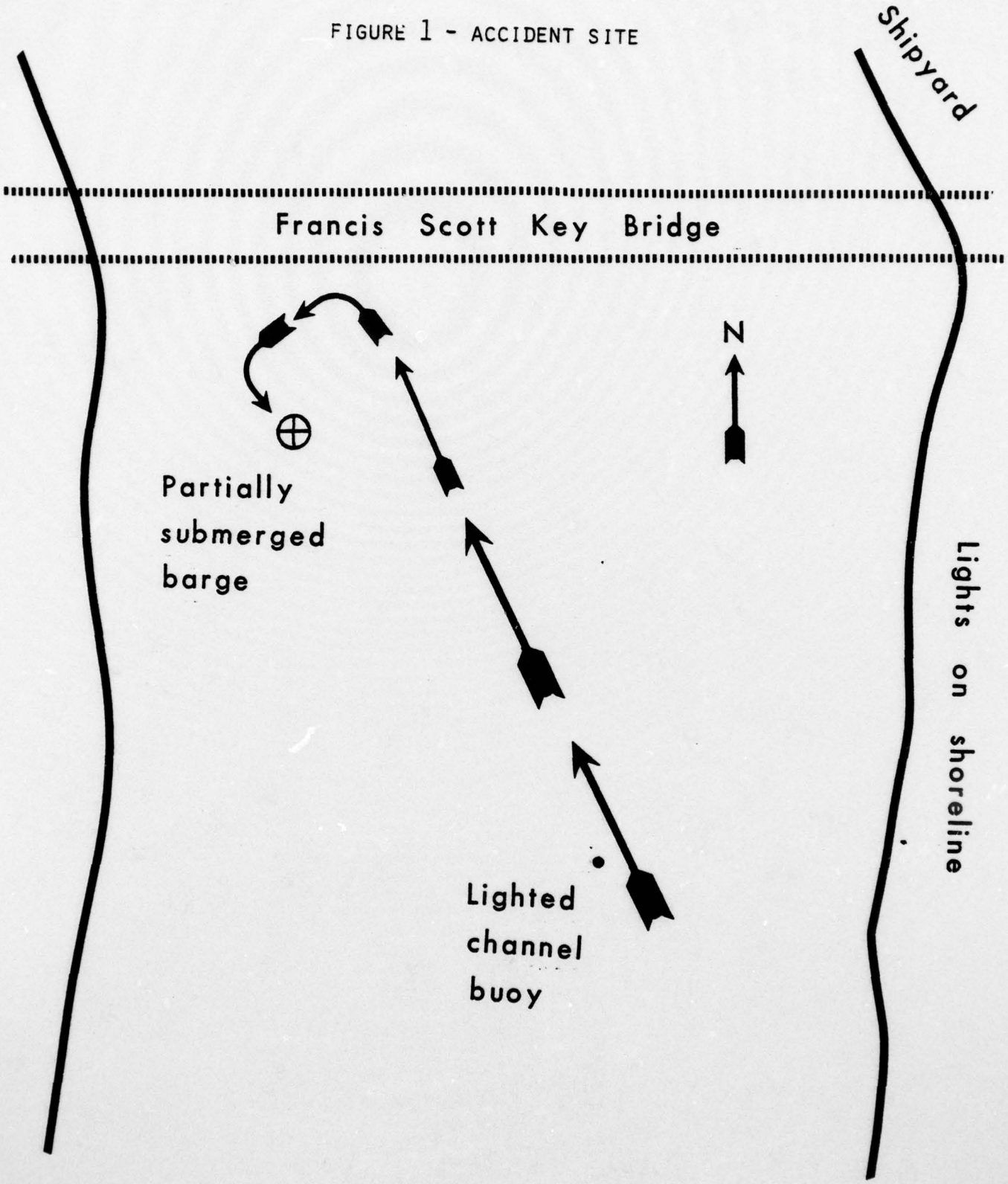
It is recommended that this accident investigation be made available for consideration during the production of formal boating safety educational material for Coast Guard sponsored courses. While it is not felt that a significant number of accidents can be contributed to this specific cause, it is believed that this accident can be used as an example of proper recovery actions. This accident could also prove useful as an example of the possible results of inattention due to over familiarity and overconfidence.

No recommendations are made in the field of technical standards development.

This accident could possibly have been avoided if the partially submerged barge was lighted. It definitely could have been avoided if the barge had been totally removed by salvage operations. A possible alternative would be the application of reflective material to the outline of the barge, thereby allowing somewhat increased visibility during hours of darkness.

(94)

FIGURE 1 - ACCIDENT SITE



(85)

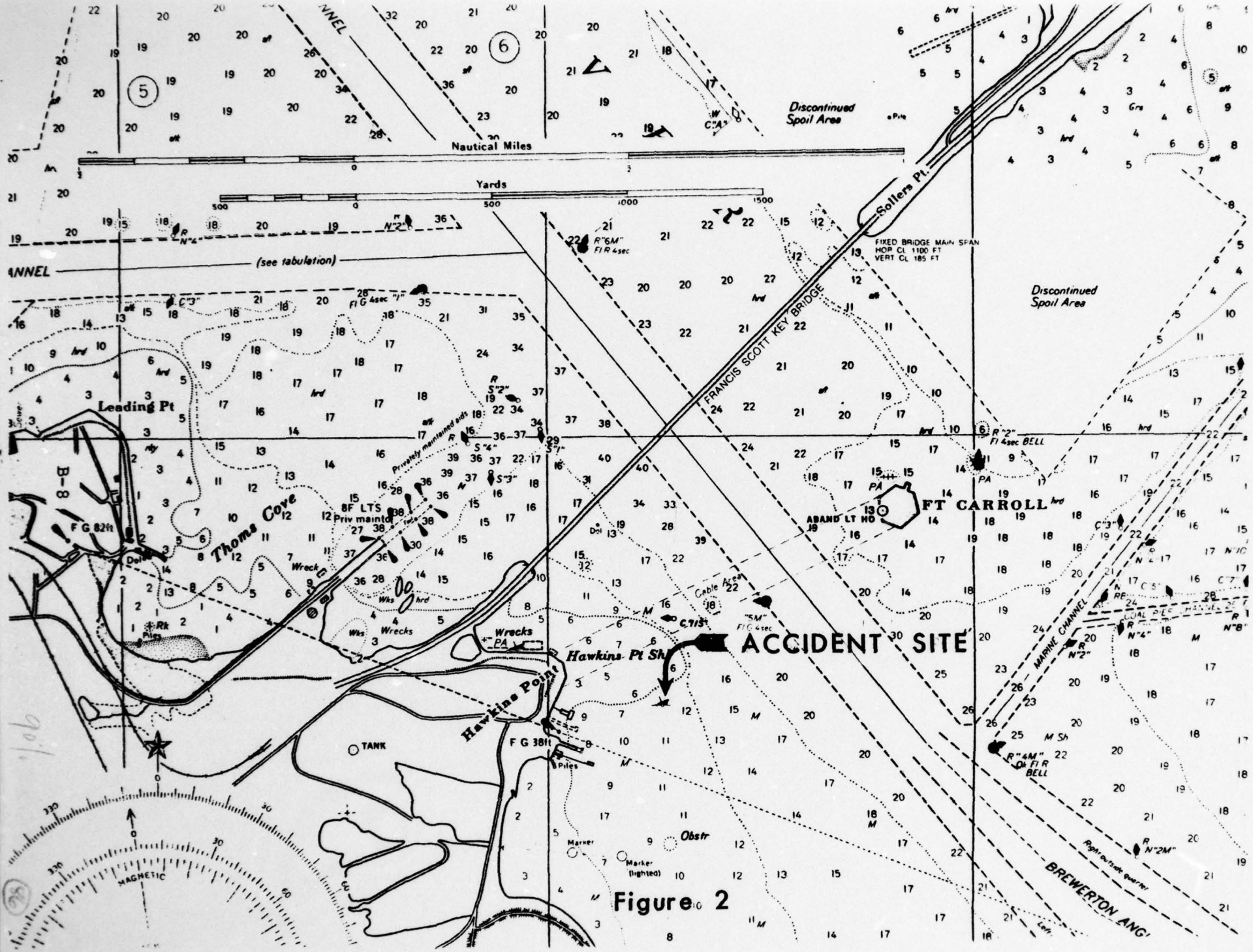

Nautical Miles
Yards
Discontinued Spoil Area
Sollers Pt.
FIXED BRIDGE Main SPAN
HOR CL 1100 FT
VERT CL 185 FT
FRANCIS SCOTT KEY BRIDGE
(see tabulation)
Leading Pt
Thoms Cove
Privately maintained aids
8F LTS
Priv maintd
F G 82ft
Wreck
Wrecks
Wrecks PA
Hawkins Pt Sh
ACCIDENT SITE
FT CARROLL
ABAND LT HO
Cable Area
"5M" Fl G 4sec
Hawkins Point
TANK
F G 38ft
Piles
Marker
Marker (lighted)
Obstr
MAGNETIC
MAPINE CHANNEL
BREWERTON ANG
Right outside quarter
Left

Figure 2

ACCIDENT DATA SECTION

Case Number 77-2 C

J.J.D.A. Number 77 / 88

Date of Accident 8/20/77 (mo/day/year)

Date of Investigation 8/23/77 (mo/day/year)

State (Use postal codes) MD

Jurisdiction (Circle one digit)
1 State
(2) Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 2200 — OPERATOR

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
(3) Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
5 River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code) — COAST GUARD

(1) Calm
2 Choppy
3 Rough
4 Very Rough
5 Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site 12 ft. 3.6 m.

Relative Humidity _____ %

Air Temperature 78 °F 25.8°C

Water Temperature 74 °F 23.5°C

CHART COAST GUARD

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) ____
Cold (60° - 73°F)(34° - 40°C) ____
Very Cold (below 60°F)(34°C) ____

EXPLANATORY NOTES:

DATA SOURCE:

OPERATOR

Sky Conditions: (Circle one)

(1) Clear
2 Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

1 None
(2) Light (0-6 mph) (0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the North

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

1 Yes 2 No (9) Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes 2 No (9) Unknown

Visibility: (Circle the appropriate codes, one on each list):

1 Day	(1) Good
2 Dusk/Dawn	2 Fair
(3) Night	3 Poor

This boat's distance from shore, pier, etc. (Fill out one)

_____ miles, or 1500 feet

_____ kilometers, or 450 meters

This boat's distance from nearest boat. (Fill out one)

N/A miles, or _____ feet

_____ kilometers, or _____ meters

Was the accident in a congested area? (Circle one)

1 Yes (2) No 9 Unknown

Environmental Contributors:

Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters	X		
Unfamiliar waters		X	
Hazardous waters	X		
Undetectable hazard (submerged object)	X		

EXPLANATORY NOTES:

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)	X		
Traffic, congested area		X	
Abrupt change in weather		X	
Change in water brought about by floods		X	
Improper/Inadequate boat for type of water		X	

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT IDENTIFICATION:

Manufacturer Name Trojan

Model Name Sea Raider

Year of Manufacture 19 70

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

(1) Yes 2 No 9 Unknown

If yes, what year? 77

CAPACITY INFORMATION: *

If no capacity information is available, check here X, otherwise code as follows:

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

* Capacity plate requirement is not applicable to this length of boat.

(14)

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
16 Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
(21) Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

DATA SOURCE:

HULL MATERIAL: (Circle the appropriate code)

(1) Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
4 Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
(7) Other (Specify : Plywood Lapstrake)

HULL SHAPE: (Circle the appropriate code)

(1) Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:)

WEIGHTS:

Weight of Boat (inboard only) 6,000 lbs. 2700 kg.

Weight of Hull (without gear and engine) (outboard only) ____ lbs. ____ kg.

Weight of Engine(s) (outboard only) ____ lbs. ____ kg.

PROPULSION SYSTEM:

Total Horsepower 200

If twin engine, port engine horsepower ____

starboard engine horsepower ____

EXPLANATORY NOTES :

DATA SOURCE:

Engine attached by: (Circle one)

1 Clamp (2) Bolts

Engine attached at: (Circle one)

1 Transom (2) Other (Specify: Keel)

Engine Manufacturer Name Chrysler V8

Primary Propulsion System: (Circle one code)

(1)	Inboard	4	Sail
2	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

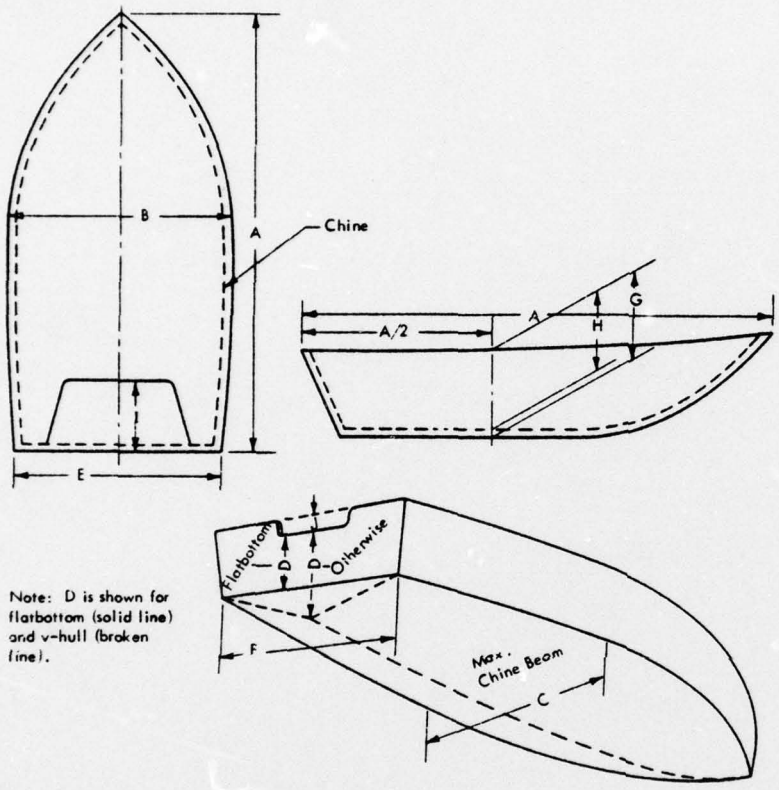
CONTROLS:

Location of control station: (Circle one code)

1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

DATA SOURCE:



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	25	ft.	0	in.	____	m.	____ cm.
B	Maximum Beam at Gunwale	9	ft.	11	in.	____	m.	____ cm.
C	Maximum Beam at Chine	-	ft.	____	in.	____	m.	____ cm.
D	Transom Height at Centerline	-	ft.	____	in.	____	m.	____ cm.
E	Transom Width at Gunwale	-	ft.	____	in.	____	m.	____ cm.
F	Transom Width at Chine	-	ft.	____	in.	____	m.	____ cm.
G	Depth Amidships, Keel to Top of Gunwale	-	ft.	____	in.	____	m.	____ cm.
H	Depth Amidships, Gunwale to Cockpit Sole	-	ft.	____	in.	____	m.	____ cm.
I	Length of Motorwell	-	ft.	____	in.	____	m.	____ cm.
J	Height of Motorwell below Transcom	____	ft.	____	in.	____	m.	____ cm.
H	Draft of Boat	2	ft.	0	in.	____	m.	____ cm.

EXPLANATORY NOTES:

(98)

DATA SOURCE:

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller
(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

1 Manual 3 Hydraulic
2 Electric (4) Mechanical cable

Throttle and shift controlled by same lever: (Circle one)

1 Yes (2) No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

(1) Yes 2 No 9 Unknown

Heavy Duty Rule

Sound amplifying device (loudhailer): (Circle one)

(1) Yes 2 No
9 Unknown (Specify: Loud hailer)

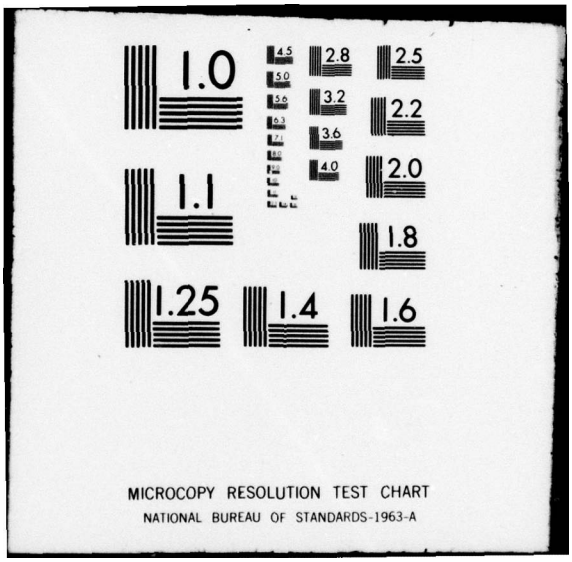
Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
(5) VHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

AD-A060 949 DAVIS (J J) ASSOCIATES INC MCLEAN VA F/G 13/10
COLLISION ACCIDENT INVESTIGATIONS FOR 1977 SEASON.(U)
APR 78 J CLARKE, J ELDREDGE, W MUHLER DOT-CG-70384-A
UNCLASSIFIED USC6-D-61-78 NL

2 OF 3
AD
A060849


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

DATA SOURCE:

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

(1) Yes 2 No 9 Unknown

Specify Charts

Navigation lights: (Circle one code)

Meet legal standards-

1 Inland
3 Some, but don't meet standards
(2) International
4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

200 ft. (m.) of 3/8 inch Nylon Line

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

(1) Yes 2 No 9 Unknown

Specify hand rails.

Level Floatation Equipped - No

1 Air chamber
2 Poured foam compartments
3 Foam blocks
4 Other

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I		
Number of Type II	18	18
Number of Type III		
Number of Type IV		
Number of non-approved PFDs aboard		

Describe non-approved PFDs

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

(1) Yes 2 No 9 Unknown (Describe Life Ring)

EXPLANATORY NOTES:

CG approved Life Ring for use on commercial vessels.

(100)

DATA SOURCE:

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR	PASS. 1	PASS. 2	PASS. 3	PASS. 4
Age	30	27	54	29	
Weight	180	150	165	195	
Height	5'10	5'9	5'6	uk	
Sex: 1 Male 2 Female	1	1	1	1	
Indicate highest grade completed in school (See instructions)	9	12	uk	uk	

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	(1)	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	(3)	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	6	(6)	(6)	6
Last two digits of year when the individual's most recent course was completed		___	72	___	___	___

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT: 5/5 5/5 5/5 u/k _/_

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

(101)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)

1	Yes	1	1	1	1	1
2	No	(2)	(2)	(2)	(2)	2
9	Unknown	9	9	9	9	9

WEARS PRESCRIPTIVE LENSES (INCLUDE SUNGLASSES IF PRESCRIPTION):

(Circle one digit for each person)

1	Yes, worn at time of accident	1	1	(1)	1	1
2	No	(2)	(2)	2	(2)	2
3	Yes, but not at time of accident	3	3	3	3	3

SWIMMING ABILITY:
(Circle one digit for each person)

1	Above Average	(1)	(1)	1	(1)	1
2	Average	2	2	(2)	2	2
3	Below Average	3	3	3	3	3
4	Non-Swimmer	4	4	4	4	4

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)

1	0-6 times	4	4	2	uk	
2	0-12 times					
3	12-24 times					
4	More					
9	Unknown					

EXPLANATORY NOTES:

DATA SOURCE:

ACCIDENT TYPE:

Grounding	1	Primary 5
Capsizing	2	Secondary _____
Flooding/Swamping	3	
Sinking	4	Tertiary (third) _____
Collision	(5)	
Falls Overboard	6	
Other	7	
Specify_____		

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

01 Two boats head on
02 Bow/Side
03 Bow/Transom
04 Side/Side
05 Ran aground
(06) Hit fixed object (submerged)
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

DATA SOURCE:

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify:_____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 06

2. _____

3. _____

EXPLANATORY NOTES:

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Peculiarities in handling characteristics	___	X	___	___
View obstruction attributed to boat design	___	X	___	___
Inefficient control station layout	___	X	___	___
Structural failure	___	X	___	___
Steering failure	___	X	___	___
Other equipment failure	___	X	___	___
Steering or throttle out of adjustment	___	X	___	___
Were this boat's navigation lights adequate?	X	___	___	___
Were this boat's navigation lights on?	X	___	___	___
Loss of stability during high speed maneuver	___	X	___	___
Loss of stability due to wave or wake	___	X	___	___
Loss of stability in strong current, rapids, rough water	___	X	___	___
Ran out of fuel	___	X	___	___
Blower inadequate due to malfunction	___	___	X	___
Bilge pump inadequate due to malfunction	___	X	___	___
Slippery deck	___	___	X	___
Lack of hand or grab rails	___	X	___	___
Failure of anchor; other anchor related factors	___	X	___	___

Other: (Explain)_____

EXPLANATORY NOTES:

DATA SOURCE:

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	Was this type of signal on board?			Was this type of signal used?		
	YES	NO	UNK	YES	NO	UNK
Flares	X				X	
Flags	X			X		
Signalling lights (flashlight, etc.)	X			X		
Electronic	X			X		
Other: (Specify)						

EXPLANATORY NOTES:

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it)

	YES	NO	N/A	UNK
Sunglare				
Bright sun	___	___	X	___
Sun high	___	___	X	___
Sun low	___	___	X	___
Just prior to accident, boat was headed into sun	___	___	X	___
Visual problems (overcast, misty, foggy)	X	___	___	___
Changing sun conditions (bright to minimal sun)	___	___	X	___
Noise, Shock/Vibration				
Just prior to accident, boat achieved speeds of approximately 5 mph. 8 kph.				
If outboard motor, running at near full speed	___	___	X	___
Operator inside cabin	___	X	___	___
Full windshield in front of operator	X	___	___	___
No windshield	___	___	X	___
If inboard, equipped with mufflers	X	___	___	___
Boat pounding	___	X	___	___
Ride uncomfortable	___	X	___	___
Was operator seat padded or cushioned?	X	___	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Fatigue/Discomfort/Time Stress				
Vigorous activity during or prior to accident	___	X	___	___
Person uncomfortably cold	___	___	X	___
Facing into wind	___	___	X	___
Facing into spray	___	___	X	___
Person physically ill	___	___	X	___
Hurrying to achieve destination by a certain time	___	X	___	___
Time of outing prior to accident	1 1/2 hrs.			
Time exposed to elements	1 1/2 hrs.			
Time elapsed since person last slept	12 hrs.			

EXPLANATORY NOTES:

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	YES	NO	N/A	UNK
Drugs/Narcotics/Alcohol				
Was the operator on medication? (If yes, describe_____)	___	X	___	___
Were narcotics (controlled substances)involved?	___	X	___	___
Was alchohol involved?	___	X	___	___
Was the person(s) drunk?	___	X	___	___
Poor Judgment				
Were any of the following contributors to the accident with respect to this vessel?				
Overloading	___	X	___	___
Exceeding persons capacity	___	X	___	___
Improper load distribution	___	X	___	___
Change in load distribution (not passenger movement)	___	X	___	___
Passenger movement	___	X	___	___
Operator standing on gunwale, bow, transom	___	X	___	___
Passenger standing on gunwale, bow, transom	___	X	___	___
Excessive speed for conditions	___	X	___	___
Operator seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Operator unfamiliar with boat	___	X	___	___
Operator unfamiliar with water/ area	___	X	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Operator inattention	___	X	___	___
Failure to detect hazard	X	___	___	___
Navigational error	X	___	___	___
Violations of rules of road	___	X	___	___
Started engine in gear	___	X	___	___
Started engine in improper sequence	___	X	___	___
Did not check weather	___	X	___	___
Ignored weather warning	___	X	___	___
Operator away from helm	___	X	___	___
Operating in malicious/ reckless manner	___	X	___	___
Overconfidence in boat capabilities	___	X	___	___
Overconfidence in ability to handle boat	___	X	___	___
Lack of swimming ability	___	X	___	___
Lack of sufficient safety equipment	___	X	___	___
Did not know how to use safety equipment	___	X	___	___
Disregard for safety precautions	___	X	___	___
Lack of parental supervision for young operator	___	X	___	___

EXPLANATORY NOTES:

DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

(1) Maintains contact with boat initially
2 Enters water unconscious
3 Loses contact with boat initially but regains contact
4 Loses contact with boat initially and unsuccessfully attempts to regain contact
5 Loses contact with boat; does not attempt to regain contact
6 Trapped in overturned boat
7 Voluntarily leaves boat

ACTION:

(1) Maintains position in boat
2 Holds onto boat
3 Loses contact with boat
4 Under boat

RESULT OF ACTION:

(1) No injury
2 Drowns
3 Dies from exposure
4 Injured (hospitalization not required)
5 Injured (hospitalization required)
6 Reaches safety
7 Reaches safety through rescue

EXPLANATORY NOTES:

(111)

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	0-/-0-	-0/-0	-0/-0	-0/-0	--/--
Post accident code from above (three digits)	1/1/1	1/1/1	1/1/1	1/1/1	1/1/1
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

DATA SOURCE:

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
PFD aboard for this person's use: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	(1)	1
2 No	2	2	2	2	2
9 Unknown	9	9	9	9	9
PFD accessible just before accident: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	(1)	1
2 No	2	2	2	2	2
PFD accessible just after accident: (Circle code for each person)					
1 Yes	(1)	(1)	(1)	(1)	1
2 No	2	2	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
Person used PFD: Circle code for each person					
1 Yes	(1)	(1)	(1)	(1)	1
2 No	2	2	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
If person used PFD, then circle one of the following and the PFD type:					
1 Wore PFD at time of accident and did not remove it	1	1	1	1	1
2 Wore PFD but subsequently took it off	2	2	2	2	2
3 Wore PFD but it came off	3	3	3	3	3
4 Donned PFD after accident	(4)	(4)	(4)	(4)	4
5 Held onto PFD	5	5	(5)	5	5
PFD type: (Circle one for each person who used a PFD)					
1 CG approved I	1	1	1	1	1
2 CG approved II	(2)	(2)	(2)	(2)	2
3 CG approved III	3	3	3	3	3
4 CG approved IV	4	4	4	4	4
5 Non-approved	5	5	5	5	5
If non-approved, describe:					

EXPLANATORY NOTES:

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Evidence of PFD failure: (see instructions; circle one) If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	(2)	(2)	(2)	(2)	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					
Evidence of improper PFD usage:					
If yes, explain:					
had trouble 1 Yes	1	1	(1)	1	1
working 2 No	(2)	(2)	2	(2)	2
clasp on 3 N/A	3	3	3	3	3
PFD 9 Unknown	9	9	9	9	9
_____					
_____					

EXPLANATORY NOTES :

DATA SOURCE:

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

(01) Cruising (proceeding normally)
02 Planing
03 Proceeding slowly, but underway
04 Maneuvering (docking, mooring, emergency operations)
05 Racing (sanctioned)
06 Towing
07 Being towed
08 Adrift
09 At anchor (includes moored to buoy or dragging anchor)
10 Docked
11 Other (Specify_____)
99 Unknown

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing
2 Fishing
3 Skin diving or swimming
4 Fueling
5 Pleasure cruising, departing
6 Pleasure cruising, returning
(7) Pleasure cruising, in middle of outing
8 Other (Specify_____)
9 Unknown

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level
2 Bow High
3 Stern High
4 Listing starboard
5 Listing port
9 Unknown

EXPLANATORY NOTES:

DATA SOURCE:

With respect to this boat prior to the accident, describe any other relevant information not previously coded. Note any structural damage, poor condition, repairs, deterioration, and modifications by the owner. Describe any pecularities in the handling characteristics of this boat (inability to turn at high speed, etc.).

See narrative

Describe boat behavior (handling characteristics, movements, etc.) immediately prior to, during, and after the accident.

See narrative

Final attitude of the boat is best described as: (Circle one)

1 Floating, level upright
2 Floating, inverted
3 Partially submerged/flooded bow higher
4 Partially submerged/ flooded, stern higher
5 Sunk
⑥ Aground

EXPLANATORY NOTES:

APPENDIX C

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-3
Date of Accident: October 5, 1977
Investigation Date: October 11, 1977
J. J. DAVIS ASSOCIATES, INC. Number: 77-207

SUMMARY

This collision involved a 19 foot (5.7m) Inboard/Outboard powered runabout striking a bridge abutment while travelling at a speed of about 45 mph (72 kph). The accident occurred at 2315 along the Intracoastal Waterway (ICW) near Fort Lauderdale, Florida.

The weather on scene was clear, seas calm with little or no wind. The operator was a 23 year old male with very little boating experience. He had no formal boating education. The operator and the only passenger, a 19 year old female, had only been boating for about 15 minutes when the accident occurred.

The primary cause of this accident was the operator's inability to handle the boat. This was brought about by his inexperience with boating and with that boat and by the excessive speed with which he was operating. Contributing factors were the operator's inattention caused by the conversation with the passenger and a somewhat confusing display of lights near the bridge. There are restaurants and bars on both sides of the bridge and the lights from these establishments tend to obscure the lights on the bridge.

PFDs were available but not used. Stressors such as fatigue and glare are not considered to be factors in this accident. Alcohol may have played some role but a distinct causal effect cannot be established.

GENERAL INFORMATION

The operator was a 23 year old male who had very little experience boating. He had some prior boating experience on a 17 foot (5.1m) runabout powered by a 50 hp engine. His experience with this boat was also limited to about 1.5 hours on one other outing. The operator has had no formal boating education. He is employed as a mechanic and would be classed as being in the middle income bracket.

He was using the boat for a night time cruise and had just started the trip when the accident occurred. He was taking the passenger on a date and there was a very relaxed social atmosphere on the boat. There may have been alcohol involved in this accident but neither the operator or passenger were intoxicated. The exact role alcohol played in this accident cannot be determined. Immediately after the accident, the operator left his passenger (with a broken arm) and went to a bar to call assistance. While there he had a drink. It is the opinion of the investigator that the operator had been drinking before the accident and decided to have a drink after the accident in the event a blood alcohol test was required. In any event, it is not believed that alcohol played a causal role.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

The boat had left the launching area at approximately 2300 and was heading for the Commercial Bridge. The boat was travelling at about 45 mph (72 kph) and was on plane. As the operator approached the bridge, he felt that he was too far to the right. He looked down to the throttle controls to reduce speed at the same time changing course to port to aim more for the center of the channel. As the boat had been travelling toward the bridge, the operator and passenger had been talking with each other. The atmosphere had been relaxed until the operator realized that his approach to the bridge was wrong.

The weather at the time was clear, seas calm and little or no wind. Visibility was poor due to darkness but the bridge was well lighted. There was no other traffic in the area. The bridge is surrounded by restaurants and bars which are well lighted also. The lights from these establishments tend to wash out the effect of the bridges lights but they do not obscure them completely.

Accident

At about 2315, after the operator had reduced throttle he looked up again just as the boat collided with the left abutment of the bridge. The boat's port bow struck the abutment and the impact threw the operator forward. In doing so the operator's right hand threw the throttle control forward to full speed. The operator had been kneeling in the seat with his right knee on the seat and his right hand on the throttle. The boat bounced off the left abutment and going at full throttle crossed over the channel and smashed into the right abutment. It bounced off the right side and finally came to rest on the left side near the south entrance of the bridge. The starbord stern received some deep scratches some time during the collision.

Post-Accident

After the boat came to rest, the operator checked with the passenger and found out that her arm had been broken. He then went up to one of the bars next to the bridge and called for help. While he was waiting for help to arrive he had a drink.

PSYCHO-SOCIO AND HUMAN FACTORS

A. Relevant Operator Factors

1. The operator's previous experience in boating had been obtained on a much slower boat.

2. The operator mistakenly applied his ability to handle the other boat to this faster and more responsive boat.

3. The relaxed social atmosphere on board the boat distracted the operator from the operation of the boat

B. Counterbalancing Factors

1. The operator had some experience with this boat and one other boat.

2. The operator was somewhat familiar with the area but had not been this way in a boat at night.

C. Interaction of A and B Factors

The operator felt secure in the operation of this boat. He had used a similar boat once before and felt confident with this one. During the 15 minutes before the accident he had been talking with the passenger. This distracted him from realizing how fast he was going. As soon as they came up to the area of the bridge, he started to realize that he would have to make some adjustments. His unfamiliarity with the boat came into play in that he had to look down to find the throttle control. This caused him to divert his attention at the critical moment and resulted in the collision. The adverse factors in Section A were too great to be effectively counterbalanced by his experience with this boat.

PROBABLE CAUSES

The major cause of this accident was the operator's overconfidence in his ability to control that boat. Even if the operator had successfully passed under the bridge it is unlikely (by his own estimate) that he would have safely passed through the other bridges along his route. This overconfidence was brought about by his lack of experience with that boat. His only other experience was with a much slower boat and he failed to realize the difference the increased horsepower that this boat had would substantially increase its speed. This excessive speed made it extremely hazardous to try to pass under that bridge.

Contributing causes of this accident were the operator's inattention until the boat was near the bridge and the confusing aspect of other lights in the area.

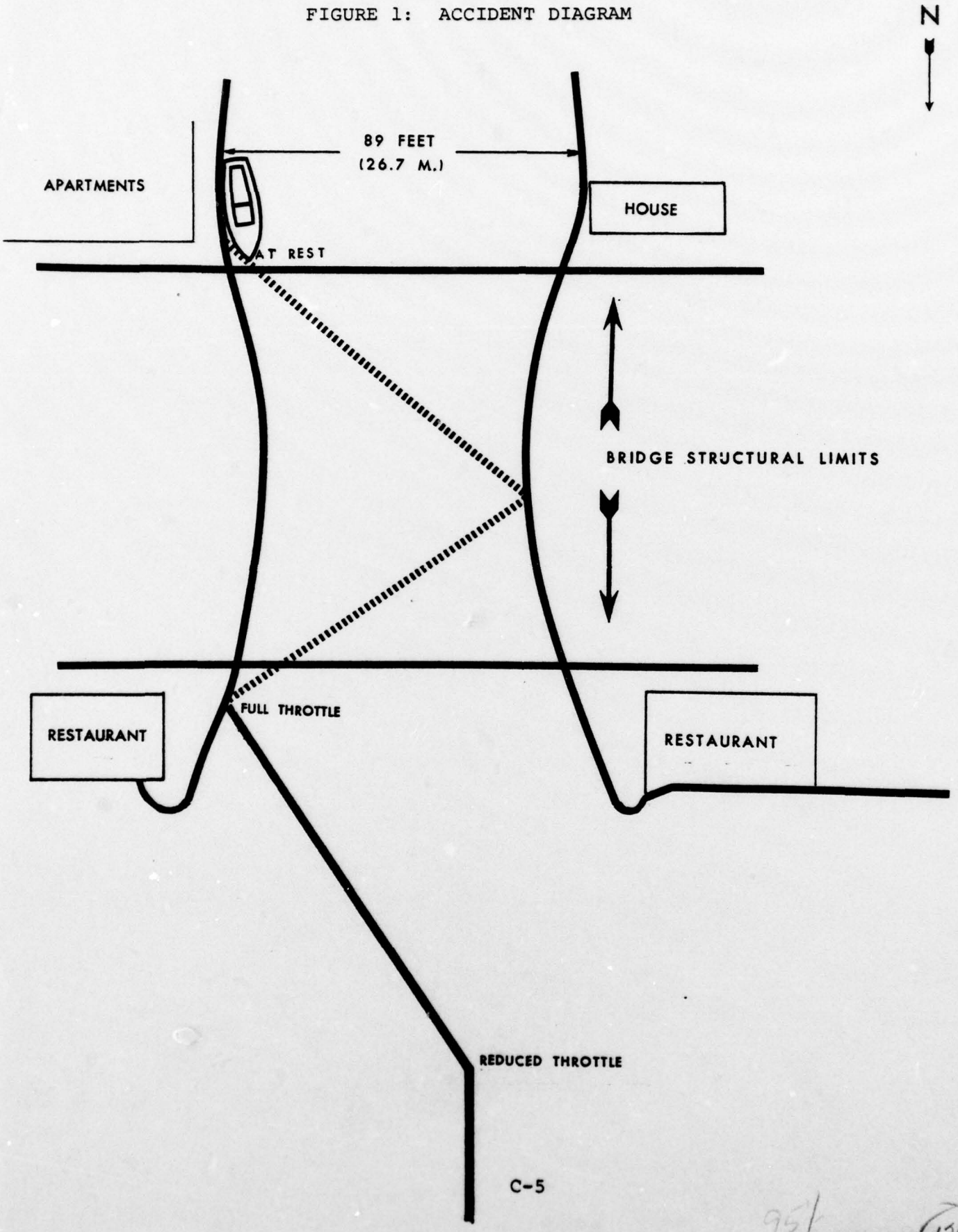
RECOMMENDATIONS

It is recommended that this accident report be made available for possible use in the next revision of Coast Guard sponsored boating education courses. It illustrates the consequences of overconfidence in ability on the part of boat operators.

It is also recommended that Coast Guard personnel review the lighting configuration of the accident location to determine the extent of interference caused by the other lights in the area of the bridge.

In light of the fact that alcohol could possibly have been a factor and that the operator was not paying attention to the operation of the boat, it is not recommended that this accident be considered when revising the safe powering standard.

FIGURE 1: ACCIDENT DIAGRAM



951

(131)

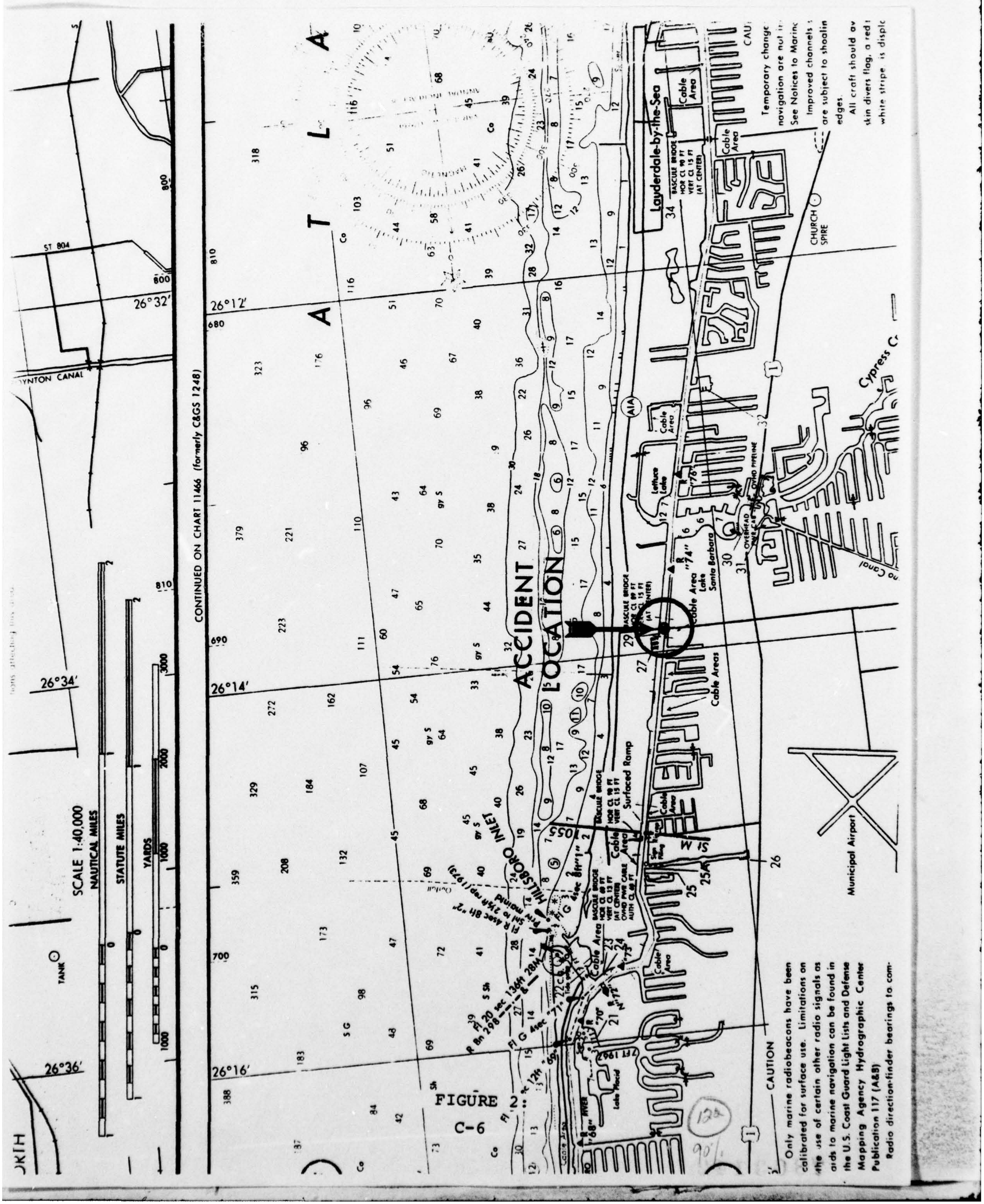
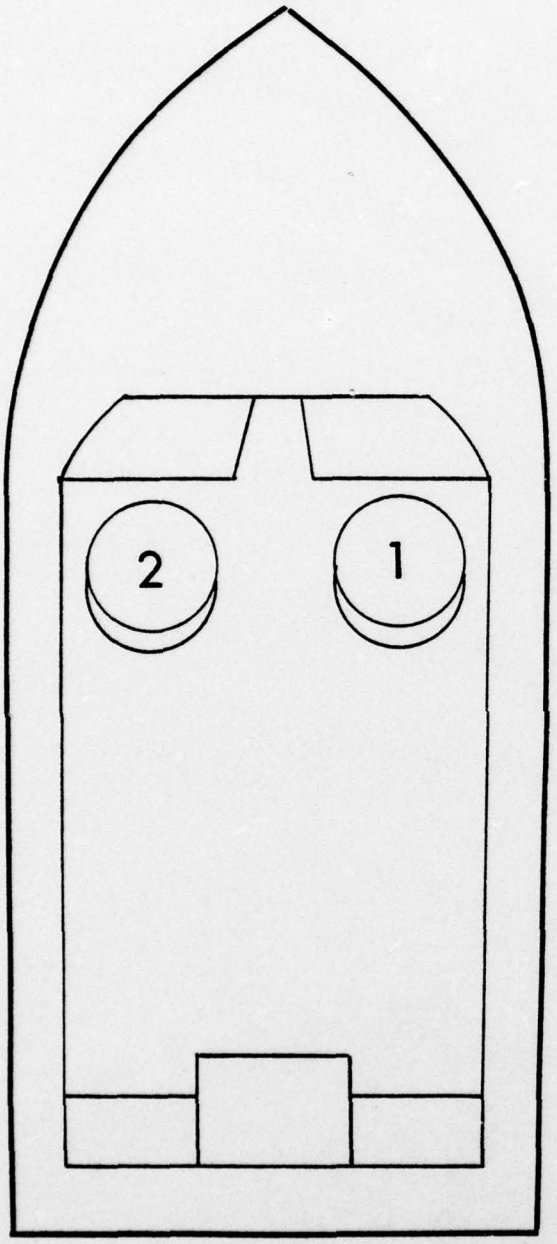

ACCIDENT LOCATION
HILLSBORO INLET
Lauderdale-by-the-Sea
CONTINUED ON CHART 11466 (formerly C&GS 1248)
SCALE 1:40,000
NAUTICAL MILES
STATUTE MILES
YARDS
TANK
Municipal Airport
CHURCH SPIRE
Lettuce Lake
Lake Santa Barbara
Cable Area
Cable Areas
Surfaced Ramp
Cypress C
BASCULE BRIDGE HOR CL 90 FT VERT CL 15 FT (AT CENTER)
26°12′
26°14′
26°16′
26°32′
26°34′
26°36′
CAUTION
Only marine radiobeacons have been calibrated for surface use. Limitations on the use of certain other radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and Defense Mapping Agency Hydrographic Center Publication 117 (A&B)
Radio direction-finder bearings to com-

FIGURE 2

C-6



1:OPERATOR: 182 lbs (82 KG)

2:PASSENGER: 110 lbs (50 KG)

FIGURE 3: LOADING DIAGRAM

ACCIDENT DATA SECTION

Case Number 77-3-C

J.J.D.A. Number 77 / 207

Date of Accident 10 / 5 / 77 (mo/day/year)

Date of Investigation 10/11/77 (mo/day/year)

State (Use postal codes) FL

Jurisdiction (Circle one digit)
1 State
(2) Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 2315

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
(3) Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
5 River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code)

(1) Calm
2 Choppy
3 Rough
4 Very Rough
5 Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site 25 ft. 7.5 m.

Relative Humidity 40 %

Air Temperature 78 °F ____ °C

Water Temperature - °F ____ °C

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) ____
Cold (60° - 73°F)(34° - 40°C) X
Very Cold (below 60°F)(34°C) ____

EXPLANATORY NOTES:

DATA SOURCE:

Sky Conditions: (Circle one)

(1) Clear
2 Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

(1) None
2 Light (0-6 mph) (0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the none

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

1 Yes 2 No (9) Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Sky Conditions: (Circle one)

(1) Clear
2 Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

(1) None
2 Light (0-6 mph) (0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the none

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

1 Yes 2 No (9) Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes 2 No (9) Unknown

Visibility: (Circle the appropriate codes, one on each list):

1 Day	1 Good
2 Dusk/Dawn	2 Fair
(3) Night	(3) Poor

This boat's distance from shore, pier, etc. (Fill out one)

N/A miles, or _____ feet

_____ kilometers, or _____ meters

This boat's distance from nearest boat. (Fill out one)

1 miles, or _____ feet

1.6 kilometers, or _____ meters

Was the accident in a congested area? (Circle one)

1 Yes (2) No 9 Unknown

Environmental Contributors:

Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters		X	
Unfamiliar waters	X		
Hazardous waters		X	
Undetectable hazard (submerged object)		X	

EXPLANATORY NOTES:

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)	_____	X	_____
Traffic, congested area	_____	X	_____
Abrupt change in weather	_____	X	_____
Change in water brought about by floods	_____	X	_____
Improper/Inadequate boat for type of water	_____	X	_____

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT IDENTIFICATION:

Manufacturer Name Cobalt

Model Name _____

Year of Manufacture 1977

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? _____

CAPACITY INFORMATION:

If no capacity information is available, check here X, otherwise code as follows: *

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

After thorough investigation of the boat, the Capacity Plate could not be located.

(130)

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
(16) Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

DATA SOURCE:

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

1 Deep-V(ø greater than 18^{o})
(2) Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	2,700 lbs.	1,215 kg.
Weight of Hull (without gear and engine) (outboard only)	____ lbs.	____ kg.
Weight of Engine(s) (outboard only)	____ lbs.	____ kg.

PROPULSION SYSTEM:

Total Horsepower	225
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

DATA SOURCE:

Engine attached by: (Circle one)
1 Clamp (2) Bolts

Engine attached at: (Circle one)
(1) Transom 2 Other (Specify: _____)

Engine Manufacturer Name MercCruiser

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
2	Outboard	5	Manual
(3)	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)
(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

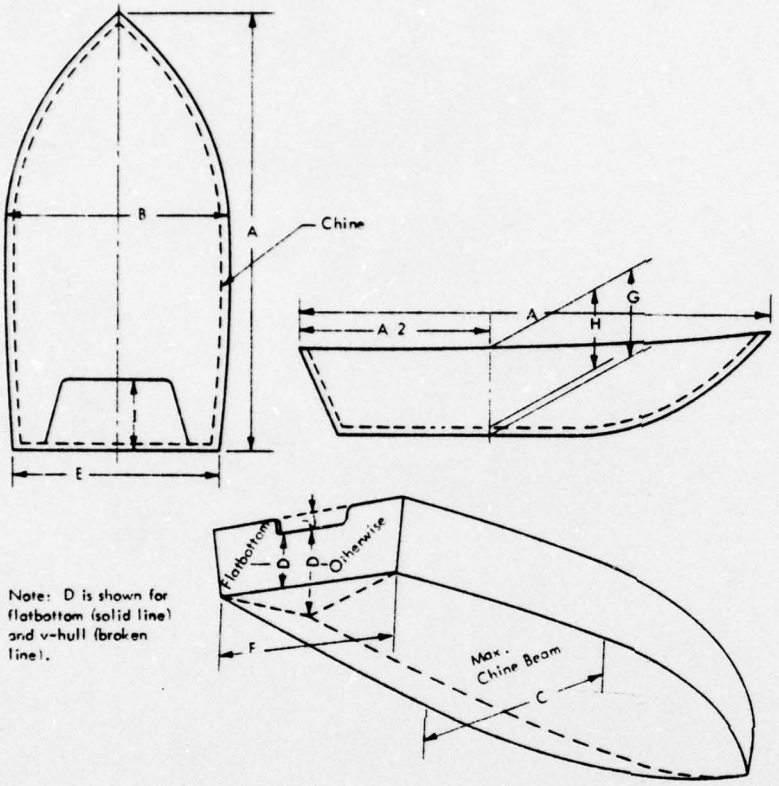
1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

CONTROLS:
Location of control station: (Circle one code)

1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

DATA SOURCE:



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	19	ft.	-	in.	5.7	m.	-	cm.
B	Maximum Beam at Gunwale	-	ft.	86	in.	-	m.	215	cm.
C	Maximum Beam at Chine	-	ft.	80	in.	-	m.	200	cm.
D	Transom Height at Centerline	-	ft.	43	in.	-	m	107.5	cm.
E	Transom Width at Gunwale	-	ft.	86	in.	-	m.	215	cm.
F	Transom Width at Chine	-	ft.	78	in.	-	m.	195	cm.
G	Depth Amidships, Keel to Top of Gunwale	-	ft.	-	in.	-	m.	-	cm.
H	Depth Amidships, Gunwale to Cockpit Sole	-	ft.	-	in.	-	m.	-	cm.
I	Length of Motorwell	N/A	ft.	-	in.	-	m.	-	cm.
J	Height of Motorwell below Transcom	N/A	ft.	-	in.	-	m.	-	cm.

EXPLANATORY NOTES:

DATA SOURCE:

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller
(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

1 Manual (3) Hydraulic
2 Electric 4 Other

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

(1) Yes 2 No 9 Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No
9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 VHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

DATA SOURCE:

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

1 Inland
(2) International
3 Some, but don't meet standards
4 None

Anchor/Anchor line on board: (Circle one)

1 Yes (2) No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Floatation Equipped

1 Air chamber
(2) Poured foam compartments
3 Foam blocks
4 Other

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I	_____	_____
Number of Type II	2	2
Number of Type III	_____	_____
Number of Type IV	_____	_____
Number of non-approved PFDs aboard	_____	_____

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

(136)

DATA SOURCE:

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR	PASS. 1	PASS. 2	PASS. 3	PASS. 4
Age	23	19			
Weight	182	110			
Height	5'10"	5'4"			
Sex: 1 Male 2 Female	1	2			
Indicate highest grade completed in school (See instructions)	9	12			

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	3	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	(6)	6	6	6
Last two digits of year when the individual's most recent course was completed		___	___	___	___	___

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT:	1/1	1/1	_/_	_/_	_/_

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

(137)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)

1	Yes	1	1	1	1	1
2	No	(2)	(2)	2	2	2
9	Unknown	9	9	9	9	9

WEARS PRESCRIPTIVE LENSES

(INCLUDE SUNGLASSES IF PRESCRIPTION):

(Circle one digit for each person)

1	Yes, worn at time of accident	1	1	1	1	1
2	No	(2)	(2)	2	2	2
3	Yes, but not at time of accident	3	3	3	3	3

SWIMMING ABILITY:
(Circle one digit for each person)

1	Above Average	(1)	1	1	1	1
2	Average	2	2	2	2	2
3	Below Average	3	3	3	3	3
4	Non-Swimmer	4	(4)	4	4	4

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)

1	0-6 times	4	1	—	—	—
2	0-12 times					
3	12-24 times					
4	More					
9	Unknown					

EXPLANATORY NOTES:

DATA SOURCE:

ACCIDENT TYPE:

Grounding	1	Primary	5
Capsizing	2	Secondary	-
Flooding/Swamping	3		
Sinking	4	Tertiary (third)	-
Collision	(5)		
Falls Overboard	6		
Other	7		

Specify_____

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

01 Two boats head on
02 Bow/Side
03 Bow/Transom
04 Side/Side
05 Ran aground
(06) Hit fixed object
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

DATA SOURCE:

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify: _____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 06

2. -

3. -

EXPLANATORY NOTES:

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Peculiarities in handling characteristics	___	X	___	___
View obstruction attributed to boat design	___	X	___	___
Inefficient control station layout	___	X	___	___
Structural failure	___	X	___	___
Steering failure	___	X	___	___
Other equipment failure	___	X	___	___
Steering or throttle out of adjustment	___	X	___	___
Were this boat's navigation lights adequate?	X	___	___	___
Were this boat's navigation lights on?	X	___	___	___
Loss of stability during high speed maneuver	X	___	___	___
Loss of stability due to wave or wake	___	X	___	___
Loss of stability in strong current, rapids, rough water	___	X	___	___
Ran out of fuel	___	___	X	___
Blower inadequate due to malfunction	___	___	X	___
Bilge pump inadequate due to malfunction	___	___	X	___
Slippery deck	___	___	X	___
Lack of hand or grab rails	___	___	X	___
Failure of anchor; other anchor related factors	___	___	X	___

Other: (Explain)_____

EXPLANATORY NOTES:

DATA SOURCE:

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	Was this type of signal on board?			Was this type of signal used?		
	YES	NO	UNK	YES	NO	UNK
Flares	___	X	___	___	X	___
Flags	___	X	___	___	X	___
Signalling lights (flashlight, etc.)	___	X	___	___	X	___
Electronic	___	X	___	___	X	___

Other:
(Specify)_____

EXPLANATORY NOTES:

(143)

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Sunglare				
Bright sun	___	___	X	___
Sun high	___	___	X	___
Sun low	___	___	X	___
Just prior to accident, boat was headed into sun	___	___	X	___
Visual problems (overcast, misty, foggy)	___	___	X	___
Changing sun conditions (bright to minimal sun)	___	___	X	___
Noise, Shock/Vibration				
Just prior to accident, boat achieved speeds of approximately 45 mph. 72 kph.				
If outboard motor, running at near full speed	___	___	X	___
Operator inside cabin	___	___	X	___
Full windshield in front of operator	X	___	___	___
No windshield	___	X	___	___
If inboard, equipped with mufflers	X	___	___	___
Boat pounding	___	X	___	___
Ride uncomfortable	___	X	___	___
Was operator seat padded or cushioned?	X	___	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Fatigue/Discomfort/Time Stress				
Vigorous activity during or prior to accident	___	X	___	___
Person uncomfortably cold	___	X	___	___
Facing into wind	___	X	___	___
Facing into spray	___	X	___	___
Person physically ill	___	X	___	___
Hurrying to achieve destination by a certain time	___	X	___	___
Time of outing prior to accident	.25 hrs.			
Time exposed to elements	.25 hrs.			
Time elapsed since person last slept	14 hrs.			

EXPLANATORY NOTES:

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	YES	NO	N/A	UNK
Drugs/Narcotics/Alcohol				
Was the operator on medication? (If yes, describe_____)	___	X	___	___
Were narcotics (controlled substances) involved?	___	X	___	___
Was alchohol involved?	___	X	___	___
Was the person(s) drunk?	___	X	___	___
Poor Judgment				
Were any of the following contributors to the accident with respect to this vessel?				
Overloading	___	___	X	___
Exceeding persons capacity	___	___	X	___
Improper load distribution	___	___	X	___
Change in load distribution (not passenger movement)	___	___	X	___
Passenger movement	___	___	X	___
Operator standing on gunwale, bow, transom	___	X	___	___
Passenger standing on gunwale, bow, transom	___	X	___	___
Excessive speed for conditions	X	___	___	___
Operator seated improperly	X	___	___	___
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Operator unfamiliar with boat	X	___	___	___
Operator unfamiliar with water/ area	X	___	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Operator inattention	___	X	___	___
Failure to detect hazard	X	___	___	___
Navigational error	X	___	___	___
Violations of rules of road	___	X	___	___
Started engine in gear	___	___	X	___
Started engine in improper sequence	___	___	X	___
Did not check weather	___	___	X	___
Ignored weather warning	___	___	X	___
Operator away from helm	___	X	___	___
Operating in malicious/ reckless manner	___	X	___	___
Overconfidence in boat capabilities	___	X	___	___
Overconfidence in ability to handle boat	X	___	___	___
Lack of swimming ability	___	___	X	___
Lack of sufficient safety equipment	X	___	___	___
Did not know how to use safety equipment	___	X	___	___
Disregard for safety precautions	X	___	___	___
Lack of parental supervision for young operator	___	___	X	___

EXPLANATORY NOTES:

DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

(1) Maintains contact with boat initially

2 Enters water unconscious

3 Loses contact with boat initially but regains contact

4 Loses contact with boat initially and unsuccessfully attempts to regain contact

5 Loses contact with boat; does not attempt to regain contact

6 Trapped in overturned boat

7 Voluntarily leaves boat

ACTION:

(1) Maintains position in boat

2 Holds onto boat

3 Loses contact with boat

4 Under boat

RESULT OF ACTION:

1 No injury

2 Drowns

3 Dies from exposure

4 Injured (hospitalization not required)

5 Injured (hospitalization required)

6 Reaches safety

7 Reaches safety through rescue

EXPLANATORY NOTES:

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	00/00	00/00	--/--	--/--	--/--
Post accident code from above (three digits)	1/1/1	1/1/5	-/-/-	-/-/-	-/-/-
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

DATA SOURCE:

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
PFD aboard for this person's use: (Circle code for each person)					
1 Yes	(1)	(1)	1	1	1
2 No	2	2	2	2	2
9 Unknown	9	9	9	9	9
PFD accessible just before accident: (Circle code for each person)					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	2	2	2
PFD accessible just after accident: (Circle code for each person)					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
Person used PFD: Circle code for each person					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
If person used PFD, then circle one of the following and the PFD type:					
1 Wore PFD at time of accident and did not remove it	1	1	1	1	1
2 Wore PFD but subsequently took it off	2	2	2	2	2
3 Wore PFD but it came off	3	3	3	3	3
4 Donned PFD after accident	4	4	4	4	4
5 Held onto PFD	5	5	5	5	5
PFD type: (Circle one for each person who used a PFD)					
1 CG approved I	1	1	1	1	1
2 CG approved II	2	2	2	2	2
3 CG approved III	3	3	3	3	3
4 CG approved IV	4	4	4	4	4
5 Non-approved	5	5	5	5	5
If non-approved, describe:					

EXPLANATORY NOTES:

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Evidence of PFD failure: (see instructions; circle one) If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	2	2	2	2	2
_____ (3) N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					
Evidence of improper PFD usage:					
If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	2	2	2	2	2
_____ (3) N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					

EXPLANATORY NOTES :

DATA SOURCE:

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

01 Cruising (proceeding normally)
(02) Planing
03 Proceeding slowly, but underway
04 Maneuvering (docking, mooring, emergency operations)
05 Racing (sanctioned)
06 Towing
07 Being towed
08 Adrift
09 At anchor (includes moored to buoy or dragging anchor)
10 Docked
11 Other (Specify_____)
99 Unknown

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing
2 Fishing
3 Skin diving or swimming
4 Fueling
(5) Pleasure cruising, departing
6 Pleasure cruising, returning
7 Pleasure cruising, in middle of outing
8 Other (Specify_____)
9 Unknown

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level
2 Bow High
3 Stern High
4 Listing starboard
5 Listing port
9 Unknown

EXPLANATORY NOTES:

(151)

DATA SOURCE:

With respect to this boat prior to the accident, describe any other relevant information not previously coded. Note any structural damage, poor condition, repairs, deterioration, and modifications by the owner. Describe any pecularities in the handling characteristics of this boat (inability to turn at high speed, etc.).

* See Narrative

Describe boat behavior (handling characteristics, movements, etc.) immediately prior to, during, and after the accident.

* See Narrative

Final attitude of the boat is best described as: (Circle one)

(1) Floating, level upright
2 Floating, inverted
3 Partially submerged/flooded bow higher
4 Partially submerged/ flooded, stern higher
5 Sunk
6 Aground

EXPLANATORY NOTES:

APPENDIX D

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-4
Date of Accident: October 14, 1977
Investigation Date: October 18, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-226

SUMMARY

This collision involved a 17 foot (5.1m) runabout striking a 22 foot (6.6m) sailboat on the starboard side, amidship. The sailboat, Boat #2, was emerging from the channel under the MacArthur Causeway in Miami when the accident occured. Boat #1 was traveling at a high speed, parelleling the causeway approximately 80 feet (24m) north of it. Before the operator of Boat #1 realized what was happening the collision occured.

The weather on scene was excellent; the water calm, winds light, and the sky clear. Even though the sun was low and in the face of operator #1, glare was not a factor in this accident. The major factor in this accident was the inattention of operator #1.

PFDs were available but not used. Stressors such as fatigue and alcohol were not causal factors in this accident.

GENERAL INFORMATION

Boat #1

The operator was a 16 year old male who has very little experience boating and even less experience with this boat. He had been spending the week visiting his father. The operator lives with his mother on the west coast of Florida. The operator had some experience riding in this boat during that week but very little experience operating the boat. He was on an errand for his father buying groceries before the accident and under heavy pressure to get home. He had just stopped at a marina on the east side of the MacArthur Causeway to get gas for the boat. The marina owner remembered the occassion and later commented that the operator of Boat #1 was in a tremendous hurry to get home. He said that the youth was very much afraid that his father would be mad at him for being late.

During the interview with the father, he stated that his "son is a screw off;" and that he was not surprised that the accident had happened. The operator is a high school student with no formal boating education. During the interview he portrayed the image of a very immature 16 year old and repeatedly avoided questions, seeking excuses to end the interview as soon as possible.

Boat #2

The operator of Boat #2 was a 42 year old male dental technician. He has many years of boating experience but less than 15 hours of experience on this boat. The boat is new and he has only used it twice before the time of the accident. He had been out in the Bay sailing for about 3 hours, testing the boat out before returning in the evening.

During the interview the operator displayed a thorough knowledge of the Rules of the Road and of boating in general. He seemed a very responsible individual and very safety conscious. This was evidenced by the manner in which he had maintained his boat and by the fact that his decision to buy that particular boat was based on the safety features of that model.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

Boat #1

The operator of Boat #1 was alone. He had just finished refueling the boat and was in a hurry to cross the bay and head home. He left the dock and increased throttle immediately. His boat was

planing within a few seconds. He chose a course that parelleled the causeway approximately 80 feet (24m) to the north of it. Shortly after the boat was on plane, a paper bag from the groceries he was carrying began to blow about. He was in a standing position at the time and looked down to see where the bag was. His attention remained so distracted for several seconds. His speed at the time was estimated at 25mph (40kph).

Boat #2

Boat #2 was preceeding northerly to pass under the MacArthur Causeway Bridge. It was close hauled on a port tack. The operator was still unfamiliar with the boat's operation and was devoting his attention to the boat's passage under the bridge. At this time the boat was making a speed of about 5mph (8kph) and the operator (the only passenger) was at the helm position in the stern. As soon as the boat cleared the bridge the operator looked around for other traffic. At this time he spotted Boat #1 about 400 feet (120m) away. He felt certain that the operator of Boat #1 would see him and change course to avoid him. As he continued to watch Boat #1 he saw that it had not changed course. He began to shout and wave his hands to try to attract the attention of the operator of Boat #1. He noticed as the boat drew closer that the operator was looking down near the controls.

Pre-Accident Weather

The accident occured at about 1716 on a clear,calm day. There was a weak current in the channel but the water was calm. The wind was light (5mph, 8kph) out of the Northwest. The sky was clear, visibility was good. The air temperature was 78°F (20°C). The accident site is 200 yards (180m) off the west coast of Miami Beach just north (80 feet) of the McArthur Causeway bridge. This location is within 200 yards (180m) of Coast Guard Station Group, Miami Beach.

Accident

Boat #1

The first time that the operator of Boat #1 saw Boat #2 was just before impact. He stated that he happened to look up and all he saw was the blue of the hull and the white of the sail. He stated that at that time it was too late to do anything to avoid the accident.

Boat #2

When the operator saw that the operator of Boat #1 was looking down he realized that the collision was unavoidable. He stated that he thought of trying to grab a PFD he had on the starboard seat of the cockpit but felt there wasn't enough time. He then jumped off the stern of his boat just before Boat #1 struck the starboard side of Boat #2.

As Boat #1 hit Boat #2 it rose up and its bow caught on the decking of Boat #2. The force of impact ripped the decking of Boat #2 free from the hull and demasted the sail boat. Boat #1's bow was caved in for about 2 feet (.6m). As Boat #1 cleared the area of impact it started running in a tight circle.

Post-Accident

When the operator of Boat #2 came to the surface, he saw that his boat would still float and he reboarded. He called to the operator of Boat #1 to see if he was injured and told the operator of Boat #1 to shut off his engine and tie Boat #1 up to his boat (Boat #2). He then secured both boats to a pile on the bridge.

Coast Guard personnel at the swimming pool of the station saw the accident just after impact and sounded the alert. One Coast Guardsman swam out to the area of the accident to render aid. Operator #1 was in a state of mild shock but Operator #2 was not in shock although still dazed.

After some confusion as to the location of the accident, Coast Guard units arrived on the scene and rendered first aid to Operator #1. Both boats were then towed back to the station.

PSYCHO-SOCIO AND HUMAN FACTORS

Boat #1

A. Relevant Operator Factors

1. The operator was under pressure to return with the groceries on time. This pressure was generated by his fear of his father's reaction.
2. The operator was totally unfamiliar with the Rules of the Road and proper safe boating practices.
3. The immature attitude of the operator tended to carry over into his boating activities.

B. Counterbalancing Factors

1. The operator did have some experience boating but very little on this boat.

C. Interaction of A and B Factors

The operator was using the boat in a reckless manner. His speed may not have been excessive for the weather conditions but his proximity to the causeway made it impossible for him to avoid any traffic under the bridge. In this circumstance, therefore, his speed was excessive. The pressure he felt to return home on time undoubtedly

lead to his manner of operation. His lack of comprehension of the basic factors of boating allowed his attention to be drawn to the bag flapping in the wind totally disregarding the movement of his boat. In this action he displayed his immature attitude toward his responsibility for safe operation of his boat. The little experience he had boating was insufficient to counterbalance these adverse factors. An obvious lack of parential guidance also contributed indirectly to the operator's actions.

Had the operator been paying attention to his duties, it is possible that the sun would have created a glare problem. The seas were calm and the sun was in the correct position to create a glare problem. However, his attention was directed toward the paper bag during the critical time period thereby negating any affect of glare. Other stressors such as fatigue or alcohol did not play a role in this accident.

Boat #2

A. Relevant Operator Factors

1. The operator may have been suffering from some level of fatigue after 3 hours of boating, but it is doubtful that this was a significant factor.
2. The operator was still unfamiliar with the operation of his boat.
3. The operator was somewhat tense about his boat's passage under the bridge.

B. Counterbalancing Factors

1. The operator was a very experienced boater, familiar with the Rules of the Road and safe boating practices.
2. The operator holds a responsible position in his community and treats his responsibilities seriously.

C. Interaction of A and B Factors

While the operator of Boat #2 may have experienced some distraction due to his boat's passage under the bridge, his immediate reaction after clearing the bridge demonstrated his concern for safety. He immediately checked for other boats in the area. This was impossible to do before passing under the bridge due to the large number of pilings under the causeway. In any event, Boat #1's close passage to the causeway would not have allowed detection. The operator's unfamiliarity with his boat may have actually made him more cautious and gave him a few extra seconds by causing him to notice Boat #1 at first; but after watching its progress it soon became evident that that operator would not avoid the accident. At that point, the operator of Boat #2 reacted in a proper manner in removing himself

from the accident scene as soon as his attempts at warnings failed. Audible warnings, such as an air horn, would most likely not have been effective over the noise of car traffic and the engine on Boat #1.

PROBABLE CAUSE

The cause of this accident was the inattention of Operator #1. This inattention was the result of many social pressures on that operator but is primarily attributable to his immature attitude and lack of boating experience. Based upon the resultant damage to both boats, it is possible that Boat #1 was travelling at the reported speed of 25mph (40kph). At that speed, the boat would be covering 36.67 feet (11m) every second. Therefore, it would have required at least 11 seconds of inattention to cross the distance at which Operator #2 first sighted Boat #1. That period of time is certainly too long a period to allow a boat to "run free" in that situation.

Even though Boat #2 was struck on the starboard beam, Boat #1 was in violation of the Rules of the Road in many ways. Boat #2 was operating under sail, passing through restricted waters with no room for maneuvering. Boat #1 was operated in a manner which violated the Rule of Good Seamanship.

RECOMMENDATIONS

It is recommended that this accident report be made available for use in the next revision of Coast Guard sponsored boating education courses. The consequences of even short spans of inattention are clearly illustrated by the results of this accident. This point should be emphasized to novice boaters.

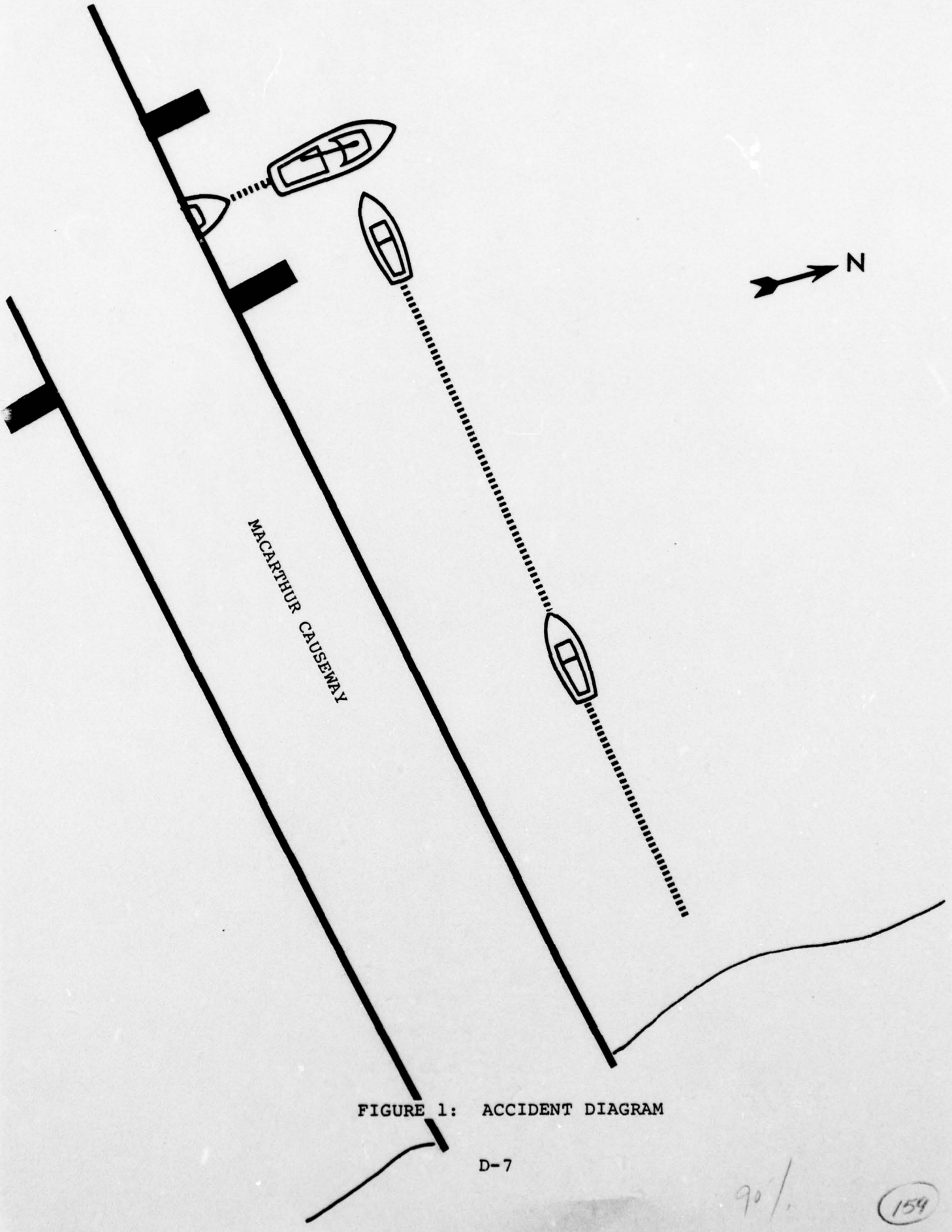


FIGURE 1: ACCIDENT DIAGRAM

90/.

(159)

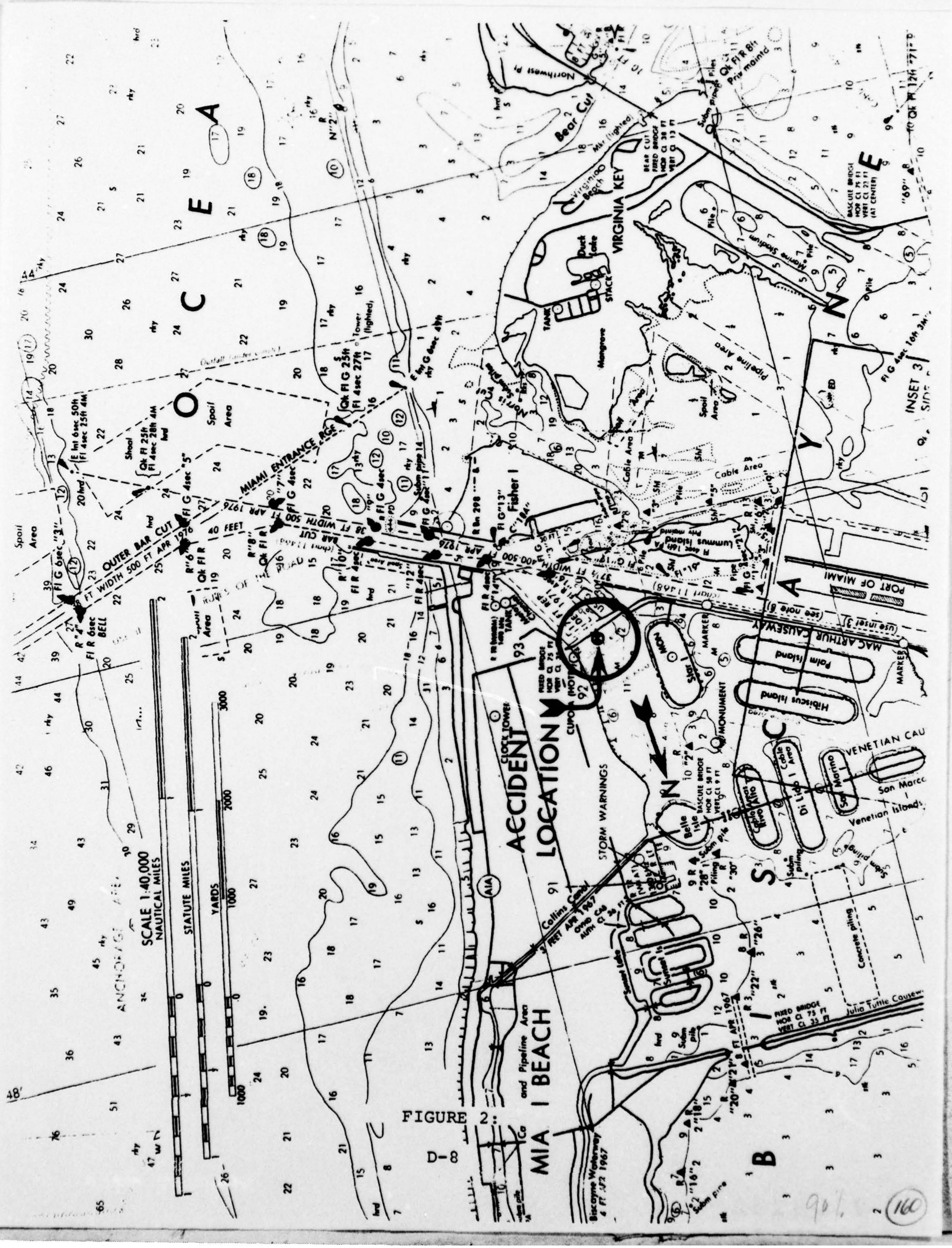

ACCIDENT LOCATION
MIAMI BEACH
VIRGINIA KEY
PORT OF MIAMI
MAC ARTHUR CAUSEWAY
MIAMI ENTRANCE RGE
OUTER BAR CUT
SCALE 1:40,000
NAUTICAL MILES
STATUTE MILES
YARDS
Fisher I
Lummus Island
Palm Island
Hibiscus Island
Star Is
Belle Isle
Bear Cut
Virginia Beach
Duck Lake
Mangrove
STORM WARNINGS
CLOCK TOWER
MONUMENT
Collins Canal
Julia Tuttle Causeway
Venetian Islands
San Marino
Di Lido
Rivo Alto
Biscayne Waterway
Spoil Area
Pipeline Area
Cable Area
INSET 3

FIGURE 2:

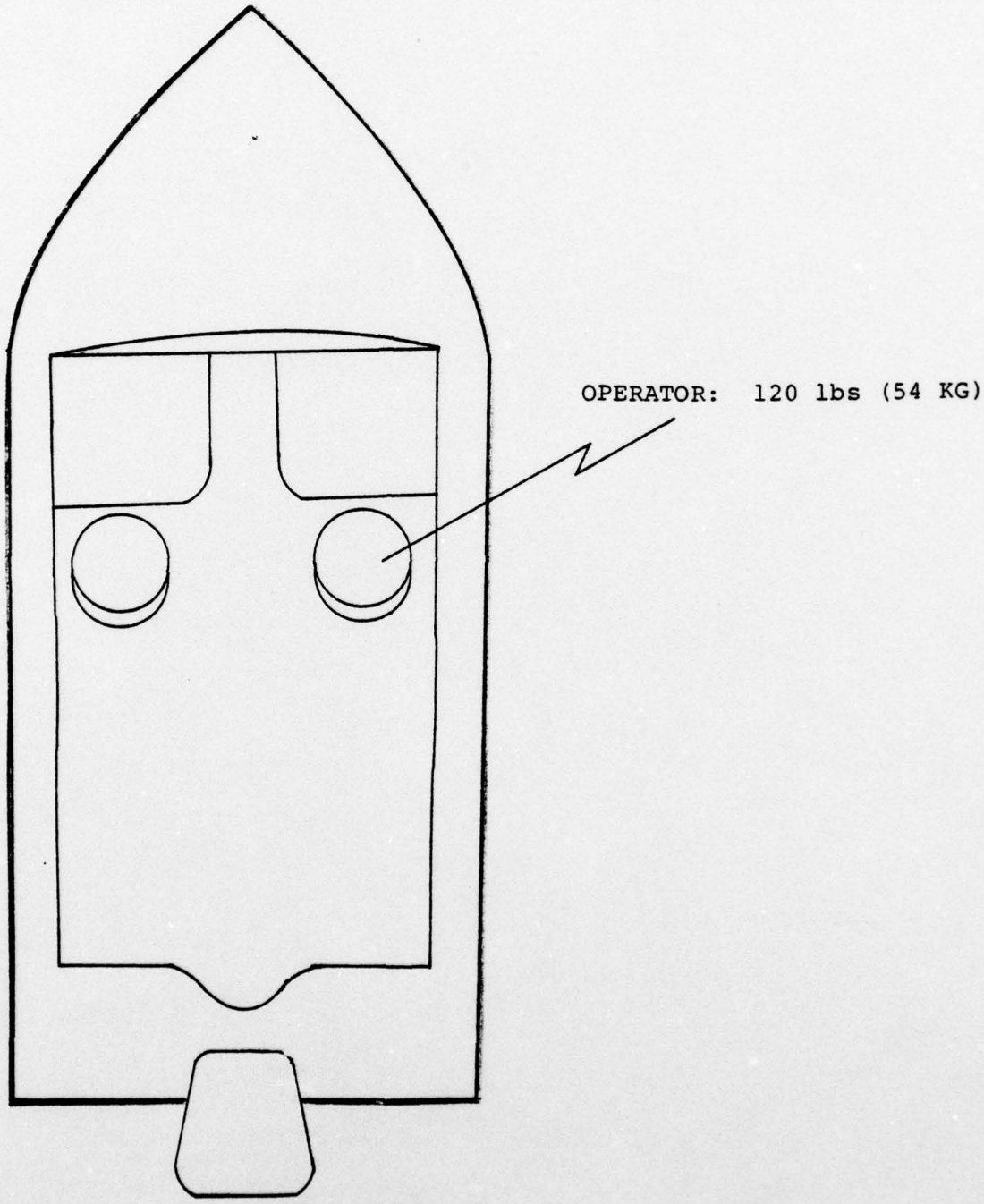
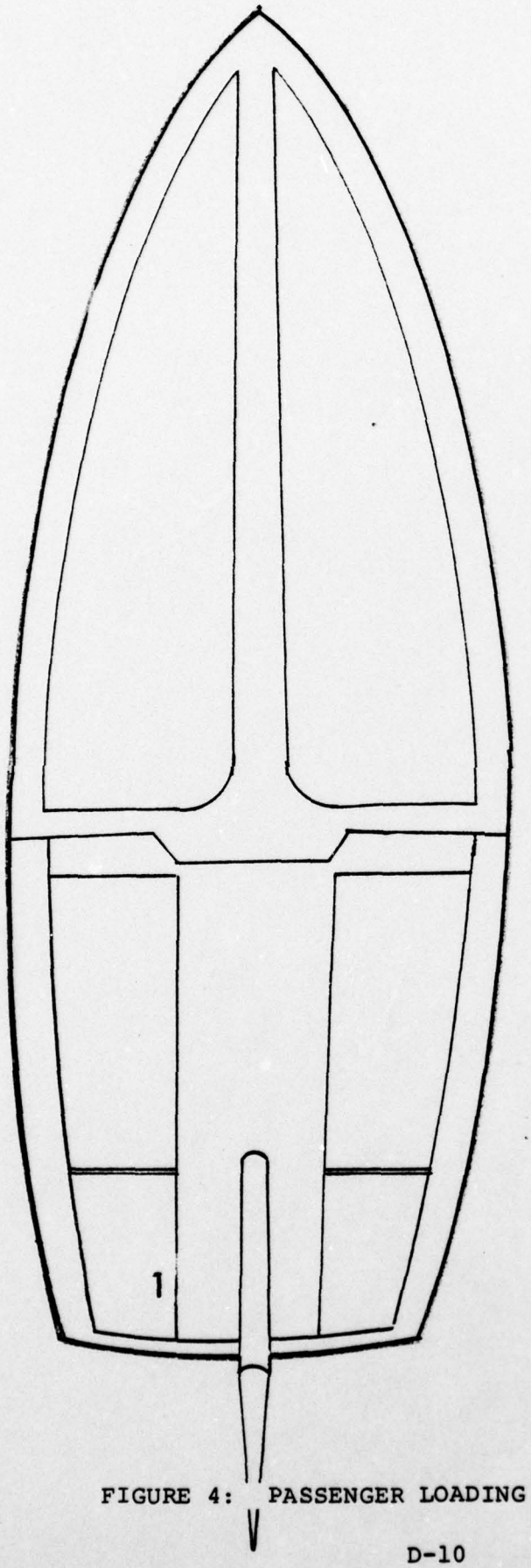


FIGURE 3: PASSENGER LOADING DIAGRAM BOAT #1



OPERATOR: 160 lbs (72 KG)

FIGURE 4: PASSENGER LOADING DIAGRAM BOAT #2

162

ACCIDENT DATA SECTION

Case Number 77-4 C

J.J.D.A. Number 77 / 226

Date of Accident 10/ 14/ 77 (mo/day/year)

Date of Investigation 10 / 18/77 (mo/day/year)

State (Use postal codes) FL

Jurisdiction (Circle one digit)
1 State
(2) Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
(1) Yes
2 No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

ACCIDENT DATA SECTION

Case Number 77-4 C

J.J.D.A. Number 77 / 226

Date of Accident 10/ 14/ 77 (mo/day/year)

Date of Investigation 10 / 18/77 (mo/day/year)

State (Use postal codes) FL

Jurisdiction (Circle one digit)
1 State
(2) Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
(1) Yes
2 No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 1700

COAST GUARD

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
(3) Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
5 River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code)

(1) Calm
2 Choppy
3 Rough
4 Very Rough
5 Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site 11 ft. 3.3 m.

Relative Humidity UNK %

Air Temperature 78 °F 26 °C

Water Temperature 67 °F 20 °C

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) ____
Cold (60° - 73°F)(34° - 40°C) ____
Very Cold (below 60°F)(34°C) ____

EXPLANATORY NOTES:

DATA SOURCE:

Sky Conditions: (Circle one)

(1) Clear
2 Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

1 None
(2) Light (0-6 mph) (0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the Northwest

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

1 Yes 2 No (9) Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes 2 No (9) Unknown — COAST GUARD

Visibility: (Circle the appropriate codes, one on each list):

(1) Day	(1) Good
2 Dusk/Dawn	2 Fair
3 Night	3 Poor

This boat's distance from shore, pier, etc. (Fill out one)

_____ miles, or 60 feet

_____ kilometers, or 18 meters — OPERATORS

This boat's distance from nearest boat. (Fill out one)

_____ miles, or 1000 feet

_____ kilometers, or 300 meters

Was the accident in a congested area? (Circle one)

1 Yes (2) No 9 Unknown

Environmental Contributors:

Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters		X	
Unfamiliar waters		X	
Hazardous waters		X	
Undetectable hazard (submerged object)		X	

EXPLANATORY NOTES:

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)	____	X	____
Traffic, congested area	____	X	____
Abrupt change in weather	____	X	____
Change in water brought about by floods	____	X	____
Improper/Inadequate boat for type of water	____	X	____

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT #1

BOAT IDENTIFICATION:

Manufacturer Name Thunderbird Products Corp. OBSERVED

Model Name Formula 170

Year of Manufacture 19 67

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

(1) Yes 2 No 9 Unknown

If yes, what year? 1977

CAPACITY INFORMATION:

If no capacity information is available, OBSERVED

check here ___, otherwise code as follows:

Maximum Horsepower 120 hp

Maximum Person Capacity ____ lb (___ kg)
(_____ Persons)

Maximum Weight Capacity 1000 lb (450 kg)

Weight Capacity stated as: (Circle one)

(1) Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

BOAT #1 CONT.

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

(1) Yes 2 No 3 Not Applicable 9 Unknown

OBSERVED

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
(16) Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

(177)

BOAT #1 CONT.

DATA SOURCE:

OBSERVED

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

(1) Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only) ____lbs. ____kg.

*Weight of Hull (without gear and engine) (outboard only) N/A lbs. ____kg.

Weight of Engine(s) (outboard only) ____lbs. ____kg.

PROPULSION SYSTEM:

Total Horsepower 115

If twin engine, port engine horsepower ____

starboard engine horsepower ____

EXPLANATORY NOTES :

*Not recorded due to nature of accident.

DATA SOURCE:

OBSERVED

BOAT # 1 CONT.

Engine attached by: (Circle one)

1 Clamp (2) Bolts

Engine attached at: (Circle one)

(1) Transom 2 Other (Specify:_____)

Engine Manufacturer Name Johnson

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
(2)	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

CONTROLS:

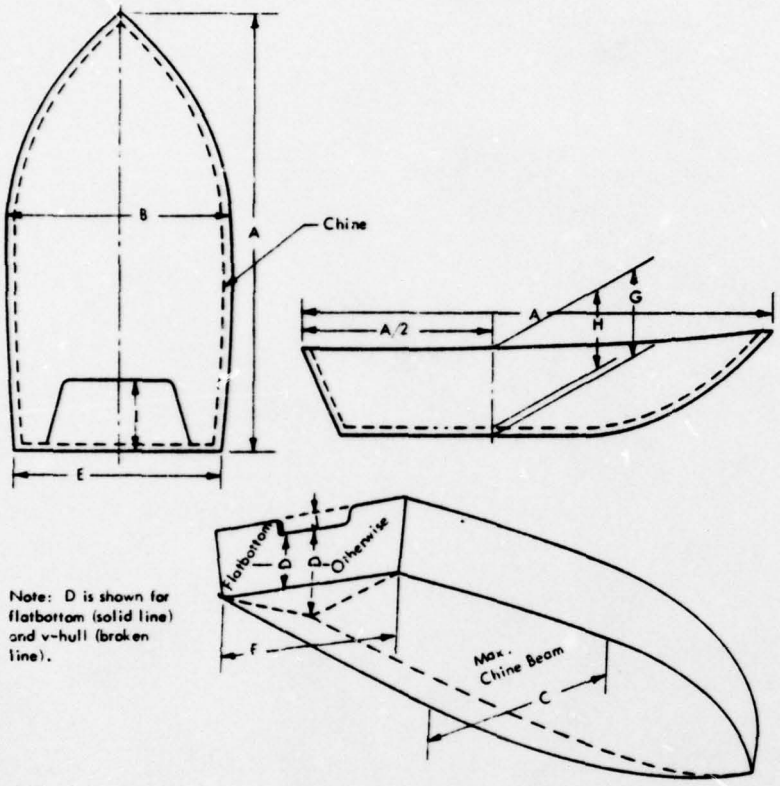
Location of control station: (Circle one code)

1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

DATA SOURCE:

BOAT # 1 CONT.



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT: *

A	Length Overall	16	ft.	7	in.	5	m.	05 cm.
B	Maximum Beam at Gunwale	6	ft.	7	in.	2	m.	01 cm.
C	Maximum Beam at Chine	UK	ft.		in.		m.	cm.
D	Transom Height at Centerline		ft.	22.5	in.		m.	57 cm.
E	Transom Width at Gunwale	UK	ft.		in.		m.	cm.
F	Transom Width at Chine	UK	ft.		in.		m.	cm.
G	Depth Amidships, Keel to Top of Gunwale		ft.	39	in.		m.	99 cm.
H	Depth Amidships, Gunwale to Cockpit Sole		ft.	28	in.		m.	71 cm.
I	Length of Motorwell		ft.	20.5	in.		m.	52 cm.
J	Height of Motorwell below Transcom		ft.	12	in.		m.	30 cm.

EXPLANATORY NOTES:

*Some dimensions not recorded due to nature of accident.

(175)

BOAT # 1 CONT.

DATA SOURCE:

OBSERVED

Steering controls: (Circle one code)

1 Controlled from engine
(2) Remote steering wheel
3 Tiller
4 Not applicable

Shift/Throttle controls: (Circle one code)

(1) Manual
2 Electric
3 Hydraulic
4 Other

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes (2) No 9 Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No
9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 BHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

BOAT # 1 CONT.

DATA SOURCE:

OBSERVED & OPERATOR

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

(1) Inland 3 Some, but don't meet standards

2 International 4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

(1) Yes 2 No 9 Unknown

Specify grab rails

Level Floatation Equipped

1 Air chamber (2) Poured foam compartments

3 Foam blocks 4 Other

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

COAST GUARD

	Number	Number Serviceable
Number of Type I		
Number of Type II	1	1
Number of Type III		
Number of Type IV	1	1
Number of non-approved PFDs aboard		

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

(137)

BOAT IDENTIFICATION: BOAT # 2

Manufacturer Name Catalina Yachts OBSERVED

Model Name Catalina 22

Year of Manufacture 19 77

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? _____

CAPACITY INFORMATION:

If no capacity information is available, check here X, otherwise code as follows:

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

BOAT # 2 CONT.

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

OBSERVED

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
16 Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
(42) Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

BOAT # 2 CONT.

DATA SOURCE:

OBSERVED

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

(1) Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	____lbs.	____kg.
Weight of Hull (without gear and engine) (outboard only)	1850 lbs.	832 kg.
Weight of Engine(s) (outboard only)	____lbs.	____kg.

PROPULSION SYSTEM:

Total Horsepower	N/A
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

(150)

BOAT # 2 CONT.

DATA SOURCE:

OBSERVED

Engine attached by: (Circle one)

1 Clamp 2 Bolts N/A

Engine attached at: (Circle one)

1 Transom 2 Other (Specify: N/A)

Engine Manufacturer Name N/A

Primary Propulsion System: (Circle one code)

1 Inboard
2 Outboard
3 Inboard/Outdrive
(4) Sail
5 Manual
6 Other

Primary Propulsor: (Circle one)

1 Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System N/A

Secondary Means of Propulsion: (Circle one code)

1 Outboard
2 Sail
(3) Manual
4 Other
5 None

CONTROLS:

Location of control station: (Circle one code)

N/A

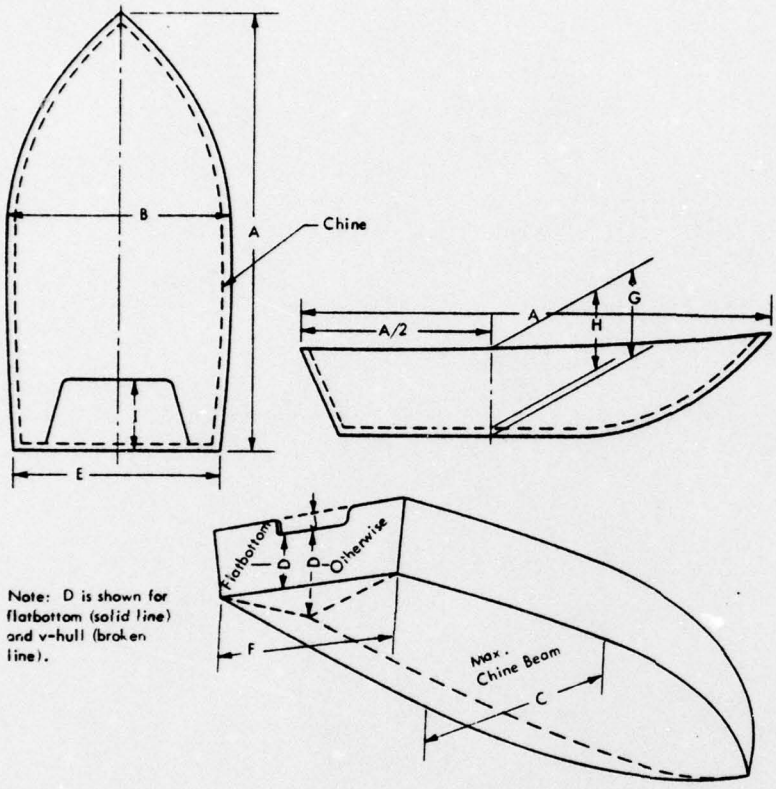
1 Engine Mounted
2 Starboard
3 Port
4 Center Console
5 Other

EXPLANATORY NOTES:

(181)

DATA SOURCE:

BOAT # 2 CONT.



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT: *

A	Length Overall	21	ft.	6	in.	6	m.	55 cm.
B	Maximum Beam at Gunwale	7	ft.	8	in.	2	m.	34 cm.
C	Maximum Beam at Chine		ft.		in.		m.	cm.
D	Transom Height at Centerline		ft.		in.		m.	cm.
E	Transom Width at Gunwale		ft.		in.		m.	cm.
F	Transom Width at Chine		ft.		in.		m.	cm.
G	Depth Amidships, Keel to Top of Gunwale		ft.		in.		m.	cm.
H	Depth Amidships, Gunwale to Cockpit Sole		ft.		in.		m.	cm.
I	Length of Motorwell		ft.		in.		m.	cm.
J	Height of Motorwell below Transcom		ft.		in.		m.	cm.
	Draft Board Down	5	ft.	0	in.	1	m.	52 cm.
	Mast Height	25	ft.	0	in.	7	m.	62 cm.

EXPLANATORY NOTES:

Some dimensions not recorded due to nature of accident.

(182)

BOAT # 2 CONT.

DATA SOURCE:

OBSERVED

Steering controls: (Circle one code)

1 Controlled from engine (3) Tiller

2 Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

1 Manual N/A 3 Hydraulic

2 Electric 4 Other

Throttle and shift controlled by same lever:

(Circle one) N/A

1 Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open

(2) Partially decked

3 Completely decked

4 Tunnel

5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes (2) No 9 Unknown

Sound amplifying device (loudhailer): (Circle one)

(1) Yes 2 No

9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only

2 FM broadcast receiver only

3 FM marine weather receiver

4 CG radiotelephone

5 BHF radiotelephone

6 SSB radiotelephone

7 Other

EXPLANATORY NOTES

BOAT # 2 CONT.

DATA SOURCE:

OBSERVED

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

(1) Yes 2 No 9 Unknown

Specify Charts, Compass

Navigation lights: (Circle one code)

Meet legal standards-

1 Inland
3 Some, but don't meet standards
(2) International
4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

(1) Yes 2 No 9 Unknown

Specify bow pulpit

Floatation Equipped

1 Air chamber
(2) Poured foam compartments
3 Foam blocks
4 Other

OPERATOR

Number of personal flotation devices aboard:
(Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I		
Number of Type II		
Number of Type III	4	4
Number of Type IV	2	2
Number of non-approved PFDs aboard		

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

(184)

DATA SOURCE:

INTERVIEW

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR BOAT # 1	OPERATOR BOAT # 2	PASS. 2	PASS. 3	PASS. 4
Age	16	42			
Weight	120	160			
Height	5-6	5-5			
Sex: 1 Male 2 Female	1	1			
Indicate highest grade completed in school (See instructions)	10	12			

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	3	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	(6)	6	6	6
Last two digits of year when the individual's most recent course was completed		___	___	___	___	___

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT: 3/1 5/2 _/_ _/_ _/_

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

DATA SOURCE:

INTERVIEW

	BOAT # 1	BOAT # 2			
POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	2	2	2
9 Unknown	9	9	9	9	9
WEARS PRESCRIPTIVE LENSES (INCLUDE SUNGLASSES IF PRESCRIPTION): (Circle one digit for each person)					
1 Yes, worn at time of accident	1	(1)	1	1	1
2 No	(2)	2	2	2	2
3 Yes, but not at time of accident	3	3	3	3	3
SWIMMING ABILITY: (Circle one digit for each person)					
1 Above Average	(1)	(1)	1	1	1
2 Average	2	2	2	2	2
3 Below Average	3	3	3	3	3
4 Non-Swimmer	4	4	4	4	4
HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)					
1 0-6 times	4	4	—	—	—
2 0-12 times					
3 12-24 times					
4 More					
5 Unknown					

DATA SOURCE:

ACCIDENT TYPE:

Grounding	1	Primary 5	COAST GUARD
Capsizing	2	Secondary _____	
Flooding/Swamping	3		
Sinking	4	Tertiary (third) _____	
Collision	(5)		
Falls Overboard	6		
Other	7		
Specify _____			

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

01 Two boats head on
(02) Bow/Side
03 Bow/Transom
04 Side/Side
05 Ran aground
06 Hit fixed object (submerged)
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

(157)

DATA SOURCE:

COAST GUARD

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify: _____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 02

2. _____

3. _____

EXPLANATORY NOTES:

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	BOAT # 1 YES	NO	N/A	UNK	BOAT # 2
Peculiarities in handling characteristics	___	X	___	___	NO
View obstruction attributed to boat design	___	X	___	___	NO
Inefficient control station layout	___	X	___	___	NO
Structural failure	___	X	___	___	NO
Steering failure	___	X	___	___	NO
Other equipment failure	___	X	___	___	NO
Steering or throttle out of adjustment	___	X	___	___	NO
Were this boat's navigation lights adequate?	___	___	X	___	N/A
Were this boat's navigation lights on?	___	___	X	___	N/A
Loss of stability during high speed maneuver	___	X	___	___	NO
Loss of stability due to wave or wake	___	X	___	___	NO
Loss of stability in strong current, rapids, rough water	___	X	___	___	NO
Ran out of fuel	___	X	___	___	NO
Blower inadequate due to malfunction	___	___	X	___	N/A
Bilge pump inadequate due to malfunction	___	___	X	___	N/A
Slippery deck	___	___	X	___	N/A
Lack of hand or grab rails	___	___	X	___	N/A
Failure of anchor; other anchor related factors	___	X	___	___	NO

Other: (Explain)_____

EXPLANATORY NOTES:

DATA SOURCE:

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	BOAT # 1 Was this type of signal on board?			Was this type of signal used?			BOAT # 2	
	YES	NO	UNK	YES	NO	UNK	Onboard	Used
Flares	___	X	___	___	X	___	Yes	No
Flags	___	X	___	___	X	___	No	NO
Signalling lights (flashlight, etc.)	___	X	___	___	X	___	Yes	NO
Electronic	___	X	___	___	X	___	NO	NO

Other:
(Specify)_____

EXPLANATORY NOTES:

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it)

	YES	NO BOTH BOATS	N/A	UNK
Sunglare				
Bright sun	___	___	X	___
Sun high	___	___	X	___
Sun low	___	___	X	___
Just prior to accident, boat was headed into sun	___	___	X	___
Visual problems (overcast, misty, foggy)	___	___	X	___
Changing sun conditions (bright to minimal sun)	___	___	X	___

Noise, Shock/Vibration	BOAT # 1				BOAT # 2
Just prior to accident, boat achieved speeds of approximately 25 mph. 40 kph.					5 mph. 8 kph.
If outboard motor, running at near full speed	X	___	___	___	N/A
Operator inside cabin	___	X	___	___	No
Full windshield in front of operator	X	___	___	___	No
No windshield	___	X	___	___	Yes
If inboard, equipped with mufflers	___	___	X	___	N/A
Boat pounding	___	X	___	___	No
Ride uncomfortable	___	X	___	___	No
Was operator seat padded or cushioned?	___	X	___	___	No

EXPLANATORY NOTES:

	BOAT # 1 YES	NO	N/A	UNK	DATA SOURCE: BOAT # 2
Fatigue/Discomfort/Time Stress					
Vigorous activity during or prior to accident	___	X	___	___	No
Person uncomfortably cold	___	X	___	___	No
Facing into wind	X	___	___	___	Yes
Facing into spray	___	X	___	___	No
Person physically ill	___	X	___	___	No
Hurrying to achieve destination by a certain time	X	___	___	___	No
Time of outing prior to accident	5	hrs ~~xxx~~ min.			3 hours
Time exposed to elements	1	hrs.			3 hours
Time elapsed since person last slept	8	hrs.			10 hours

EXPLANATORY NOTES:

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	BOAT # 1				BOAT # 2
	YES	NO	N/A	UNK	
Drugs/Narcotics/Alcohol					
Was the operator on medication? (If yes, describe_____)	___	X	___	___	No
Were narcotics (controlled substances)involved?	___	X	___	___	No
Was alchohol involved?	___	X	___	___	No
Was the person(s) drunk?	___	X	___	___	No
Poor Judgment					
Were any of the following contributors to the accident with respect to this vessel?					
Overloading	___	X	___	___	No
Exceeding persons capacity	___	X	___	___	No
Improper load distribution	___	X	___	___	No
Change in load distribution (not passenger movement)	___	X	___	___	No
Passenger movement	___	X	___	___	No
Operator standing on gunwale, bow, transom	___	X	___	___	No
Passenger standing on gunwale, bow, transom	___	X	___	___	No
Excessive speed for conditions	X	___	___	___	No
Operator seated improperly on gunwale, seat back, bow, etc.	___	X	___	___	No
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___	No
Operator unfamiliar with boat	X	___	___	___	No
Operator unfamiliar with water/ area	X	___	___	___	No

EXPLANATORY NOTES:

DATA SOURCE:

	BOAT # 1 YES	NO	N/A	UNK	BOAT # 2
Operator inattention	X				No
Failure to detect hazard	X				No
Navigational error		X			No
Violations of rules of road	X				No
Started engine in gear		X			No
Started engine in improper sequence		X			No
Did not check weather			X		N/A
Ignored weather warning			X		N/A
Operator away from helm			X		N/A
Operating in malicious/ reckless manner		X			No
Overconfidence in boat capabilities		X			No
Overconfidence in ability to handle boat	X				No
Lack of swimming ability			X		N/A
Lack of sufficient safety equipment			X		N/A
Did not know how to use safety equipment			X		N/A
Disregard for safety precautions	X				No
Lack of parental supervision for young operator	X				No

EXPLANATORY NOTES:

DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

1 Maintains contact with boat initially

2 Enters water unconscious

3 Loses contact with boat initially but regains contact

4 Loses contact with boat initially and unsuccessfully attempts to regain contact

5 Loses contact with boat; does not attempt to regain contact

6 Trapped in overturned boat

7 Voluntarily leaves boat

ACTION:

1 Maintains position in boat

2 Holds onto boat

3 Loses contact with boat

4 Under boat

RESULT OF ACTION:

1 No injury

2 Drowns

3 Dies from exposure

4 Injured (hospitalization not required)

5 Injured (hospitalization required)

6 Reaches safety

7 Reaches safety through rescue

EXPLANATORY NOTES:

DATA SOURCE:

	BOAT # 1 OPERATOR	BOAT # 2 Operator	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	---/---	00/05	--/--	--/--	--/--
Post accident code from above (three digits)	1/1/4	7/2/1	-/-/-	-/-/-	-/-/-
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

(196)

DATA SOURCE:

PFD AVAILABILITY AND USE	Boat #1 OPERATOR	Boat #2 Operator	PASS 2	PASS 3	PASS 4
PFD aboard for this person's use: (Circle code for each person)					
1 Yes	(1)	(1)	1	1	1
2 No	2	2	2	2	2
9 Unknown	9	9	9	9	9
PFD accessible just before accident: (Circle code for each person)					
1 Yes	(1)	(1)	1	1	1
2 No	2	2	2	2	2
PFD accessible just after accident: (Circle code for each person)					
1 Yes	(1)	1	1	1	1
2 No	2	(2)	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
Person used PFD: Circle code for each person					
1 Yes	1	1	1	1	1
2 No	(2)	(2)	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
If person used PFD, then circle one of the following and the PFD type:					
1 Wore PFD at time of accident and did not remove it	1	1	1	1	1
2 Wore PFD but subsequently took it off	2	2	2	2	2
3 Wore PFD but it came off	3	3	3	3	3
4 Donned PFD after accident	4	4	4	4	4
5 Held onto PFD	5	5	5	5	5
PFD type: (Circle one for each person who used a PFD)					
1 CG approved I	1	1	1	1	1
2 CG approved II	2	2	2	2	2
3 CG approved III	3	3	3	3	3
4 CG approved IV	4	4	4	4	4
5 Non-approved	5	5	5	5	5
If non-approved, describe:					

EXPLANATORY NOTES:

75/ (197)

	Boat #1 OPERATOR	Boat #2 Operator	PASS 2	PASS 3	PASS 4
Evidence of PFD failure: (see instructions; circle one) If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	(2)	(2)	2	2	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					
Evidence of improper PFD usage:					
If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	(2)	(2)	2	2	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					

DATA SOURCE:

EXPLANATORY NOTES :

BOAT # 1

DATA SOURCE:

BOAT # 2

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

01 Cruising (proceeding normally)
(02) Planing
03 Proceeding slowly, but underway
04 Maneuvering (docking, mooring, emergency operations)
05 Racing (sanctioned)
06 Towing
07 Being towed
08 Adrift
09 At anchor (includes moored to buoy or dragging anchor)
10 Docked
11 Other (Specify_____)
99 Unknown

01. Cruising (proceeding normally)

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing
2 Fishing
3 Skin diving or swimming
4 Fueling
5 Pleasure cruising, departing
6 Pleasure cruising, returning
7 Pleasure cruising, in middle of outing
(8) Other (Specify hurrying to destination)
9 Unknown

6. Pleasure cruising, returning

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level
2 Bow High
3 Stern High
4 Listing starboard
5 Listing port
9 Unknown

1. Level

EXPLANATORY NOTES:

95/ (199)

AD-A060 949 DAVIS (J J) ASSOCIATES INC MCLEAN VA F/G 13/10
COLLISION ACCIDENT INVESTIGATIONS FOR 1977 SEASON.(U)
APR 78 J CLARKE, J ELDREDGE, W MUHLER DOT-CG-70384-A
UNCLASSIFIED USCG-D-61-78 NL

3 OF 3
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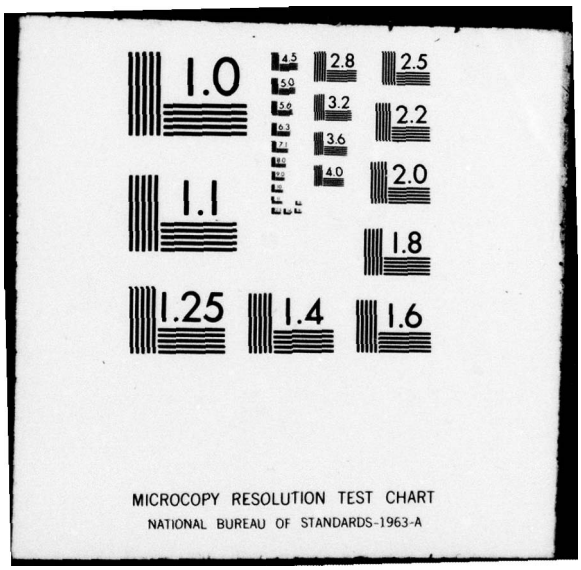

1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
7.1
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

DATA SOURCE:

With respect to this boat prior to the accident, describe any other relevant information not previously coded. Note any structural damage, poor condition, repairs, deterioration, and modifications by the owner. Describe any pecularities in the handling characteristics of this boat (inability to turn at high speed, etc.).

* See narrative

Describe boat behavior (handling characteristics, movements, etc.) immediately prior to, during, and after the accident.

* See narrative

Final attitude of the boat is best described as:
(Circle one) Boat # 1

(1) Floating, level upright
2 Floating, inverted
3 Partially submerged/flooded bow higher
4 Partially submerged/ flooded, stern higher
5 Sunk
6 Aground

Boat #2
1. Floating, level upright

EXPLANATORY NOTES:

(300)

APPENDIX E

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-5
Date of Accident: October 29, 1977
Investigation Date: November 2, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-237

SUMMARY

This mid-morning collision involved two 15 foot (4.5m) boats. Boat #1 was a heavy skiff powered by a 115hp outboard engine. It had 5 people on board, 5 hunting dogs, and 5 shotguns and assorted hunting gear. Boat #2 was an open lightweight motor boat powered by a 85hp outboard engine. The boat was rated for a maximum horsepower of 70. There was one person on board. Both boats were travelling in opposite directions along a narrow river, Bayou Segnette, at high speeds. Boat #1 was estimated to be moving at a speed of 20mph (32kph) and Boat #2 at 30mph (48kph).

The weather on scene was clear, water calm, wind light and visibility good. The bayou is narrow in spots, 120 feet (36m) and winds through numerous turns. The primary cause of this accident was the excessive speeds of both vessels involved. The environmental factors of the turns of the bayou and the tree stumps along the shoreline contributed to the cause of the accident.

Coast Guard approved PFDs were aboard both boats in sufficient quantities but were not used. Stressors such as alcohol, glare, and fatigue were not factors in this accident. All of the occupants of both boats were injured in the accident, three of them fatally.

GENERAL INFORMATION

Boat #1

The operator of Boat #1 was a 34 year old male who was very experienced in boating and had operated this boat for approximately 100 hours. The operator was one of the fatalities and much of the data was supplied by passenger #1. Passengers #3 and 4 were not well known by the other occupants and were along for just this trip. The five people on board had met early that morning for a day of hunting. They had 5 hunting dogs and 5 shotguns along with them as well as other hunting gear. They had left the launching area in Westwego, Louisiana at about 0715 to travel down to Lake Salvador. The hunting had been very bad and they were returning along Bayou Segnette toward the launching ramp.

Boat #1 showed evidence of considerable home modification. There was a wooden platform deck built on to the stern of the boat. There was also a 41 gallon (155.8 liter) gas tank installed in the bow area. These had been installed by the operator who was employed as a welder. The operator and passengers #1 and 2 knew the area very well and had spent most of their lives boating in that area. All three were experienced in the operation of that boat.

The operator was a high school graduate and would have been classed as being in the middle income bracket. Passenger #1 was the only one on board who had received any boating education.

Boat #2

The operator of Boat #2 was a 70 year old male who has been a fisherman all his life. He is in very good physical condition. During the interview, he appeared very perceptive and demonstrated good reflexes. Especially considering that the interview was conducted at his hospital bed, his condition is equivalent to a much younger man. He has been boating all his life and considers it a normal mode of transportation. He had been using the boat of a relative and had used this boat for at least 50 hours before. The boat is equipped with an 85 horsepower engine even though the capacity plate lists the maximum powering as 70 horsepower.

The operator had taken the boat to the launching area in Westwego that morning. He left the launch area about 20 minutes before the accident, heading south. He is extremely familiar with the area and felt confident with that boat.

Observed Information

During the investigation the scene of the accident was reviewed. The area is rich with vegetation and consequently the many turns and channels tend to blend together in the background. There is a considerable number of tree stumps just above the surface on the banks of the bayou near the accident site. The bayou is S shaped in that area and a dead end canal extends off one of the curves. Many boaters in the area avoid the entire bayou during the weekends considering it an unsafe place to boat. This is due to the number of boats using the bayou at high speeds. During the half hour review of the area, 4 motor boats passed the area at excessive speeds calling for evasive maneuvers of our boat. The review was conducted on a weekday morning.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

Boat #1

Being unsuccessful at hunting, all five occupants decided to return to the launching area. They were travelling northerly on the bayou keeping to the right of the center. There were numerous tree trunks along the right side of the bayou and they were trying to avoid them. Although the boat was heavily loaded (but within the estimated capacity) it was on plane moving at approximately 20mph (32kph). Passenger #1 later stated that he could see clearly for "a mile" ahead and there were no other boats. Review of the accident scene showed that the length of the bayou is approximately 150 yards(135m) on that portion of the curve. However, the position of Boat #1 would show a straight-on view of the dead-end canal extending off the far side of the bend in the bayou. This misconception would have accounted for Boat #1 being further toward the center of the line of the bayou than Passenger #1 recalled.

Boat #2

The operator was travelling south along the bayou and was just coming through the S curve. He was travelling at approximately 30 mph (48kph) and saw no traffic ahead of him.

Pre-Accident Conditions

The water on scene was calm and approximately 15 feet (4.5m) deep. The air temperature was 80°F (27°C), water temperature estimated at 73°F (41°C). The winds were light at 5mph (8kph) out of the north-east and the sky was clear. The Bayou is approximately 120 feet (36m) wide at the point of impact. There were no other boats in the vicinity of the accident, but other boats passed the area within 10 minutes.

Accident

Boat #1

As Boat #1 was proceeding up the Bayou, the operator noticed a boat approaching them from the north. Passenger #1 stated that they first saw the boat coming at them from a little to the right of their course. Boat #1 changed course to the left to give that boat more room. It appeared to him that as soon as they changed course to the left the other boat changed course toward them. Passenger #1 claimed that the operator stopped the engine just before impact and that the boat's wake was lifting the stern as the boats collided. As the boats hit, the operator and passengers #1, 2, and 4 were thrown in the water. Passenger #3 was thrown forward into the boat. The PFDs were stored under the bow and were not available. This boat's throttle was later found in the full-ahead position; but this was most likely caused as the operator was thrown over the bow.

Boat #2

The first time that the operator of Boat #2 saw Boat #1 was as he rounded the second curve in the bend of the bayou. He said he was operating toward the center of the bayou to avoid tree stumps on the right-hand side of the bayou. As soon as he sighted the other boat, he changed course to the right. As he did so, he noticed that the other boat had changed course also and that it would now pass in front of him. By this time, the collision was unavoidable. The impact threw the operator forward and he injured his leg and forehead.

Investigative Findings

It is the opinion of this investigator that the operator of Boat #1 mistakenly thought that the dead-end canal was the main course of the bayou. This impression would account for the movement of Boat #1 from the right side of the bayou past the center to the left side of the bayou. At the speeds of both vessels, less than 5 seconds would have elapsed between the operators sighting each other (nearly simultaneously) and the collision. Boat #1 would have travelled 140 feet (42m) in that time and Boat #2, 210 feet (63m). There is about 450 feet (135m) of straight line visibility at that point of the curve. The confusion of course changes noticed by both operators (from their own points of view) used up many of those seconds before impact. At those speeds, the collision was then unavoidable.

Post-Accident

The operator of Boat #2 was dazed after the accident and remained in his boat throughout the post-accident phase. Both boats were propelled by the impact to the bank of the bayou where they beached themselves. The operator of Boat #1

had been thrown over the bow by the impact and his body was recovered at the scene by a passing boat. Passenger #1 was thrown from the boat and ended up on the bank. He had been wearing hip boots and then removed them. He proceeded to assist others. Passenger #2 was also wearing hip boots at the time of the accident and was a non-swimmer. He called for help after being thrown in the water. Passenger #1 helped him to the stern of the boat and went to help others. When he looked again, passenger #2 was gone. His body was recovered later by Parish police. He was found 20 feet (6m) off the bank. Passenger #3 suffered injuries during the impact but remained in the boat. Passenger #4 was found floating submerged by the same boat that recovered the operator's body.

The boats and personnel were transported to the boat dock and then to the hospital. A coronor's report of the three fatalities indicated the cause of death as drowning and that there was no evidence of alcohol.

PSYCHO-SOCIO AND HUMAN FACTORS

Boat #1

A. Relevant Operator Factors

1. The operator had received no formal boating education.
2. The operator was very familiar with the waters and therefore unconcerned about slowing down for turns.
3. The sharpness of the turns restricted the visibility to effectively 5 seconds of visibility at that speed.
4. The rich foilage made the distinction between the real channel and the dead end canal difficult.

B. Counterbalancing Factors

1. The operator was very familiar with the area and with that boat.

C. Interaction of A and B Factors

The factors listed in Section A above combined to make the operator less cautious than the actual situation warrented. Even though the operator was very familiar with the area, the dead end canal looks much like a continuation of the main channel from the point Boat #1 rounded the last curve. At 20 mph (32kph) and with the approach of Boat #2, it is possible that the operator became confused. The fact that the operator was familiar with the area and that most boats in the area routinely speed should have accounted for the speed at which he was traveling. He had no formal boating education to warn him of the danger of such speed and his past accident-free experience did not restrict him.

Boat #2

A. Relevant Operator Factors

1. The operator expected that the other boat would turn to its right as he was spotted. This correct procedure is routinely followed on the bayou.

2. The operator expected that his own turn to the right would have allowed both boats to pass safely.

B. Counterbalancing Factors

1. The operator had spent a life time on the water and was extremely familiar with this area.

C. Interaction of A and B Factors

The operator was using the boat as most people in that area do. It was traveling at approximately 30 mph (48kph) and the operator's many years of experience acted to calm any fears of such operation. The expectation of a port to port passage as prescribed by the Rules of the Road would have displaced any concern on the part of the operator to reduce speed. It also used up precious seconds before the operator realized that a collision would occur.

PROBABLE CAUSES

The direct cause of this accident was the excessive speeds of both boats. The sharpness of the turns of the bayou made those speeds unsafe. The operator of Boat #1 would have had 7.7 seconds to react before his boat reached the mid point of that curve. The operator of Boat #2 had 5.1 seconds to react before his boat had reached the mid-point of the curve. At the combined speed of 50 mph (80kph) they had 4.8 seconds to react between the time Boat #2 rounded the curve and when they hit each other. Clearly this is insufficient, especially when there is confusion due to course changes.

A contributing factor to this accident was the normal mode of operation on that Bayou. Most people either tend to avoid the area completely or operate in a similar manner at high speeds. As this is a "normal" mode of operation for the area, both these boats were encouraged to operate in the same manner.

The overpowering of Boat #2 was a contributing factor to this accident in that the violation of the safe powering criteria allowed that boat to travel faster. However, it is felt that the accident would still have occurred even if Boat #2 had 15 hp less.

The operator of Boat #1 failed to follow the Rules of the Road when he mistakenly moved his boat across the center line of the channel. But both operators committed more serious violations of the Rules of the Road by traveling at those speeds and by failing to slow their boats as soon as they sighted each other. If this prescribed course of action had been taken, they could have determined a proper passing situation and the accident could have been avoided.

RECOMMENDATIONS

It is recommended that the dead end canal located 0.75 miles (1.2km) south of the Westwego boat launch on Bayou Segnette be clearly marked as a dead-end branch and that the true channel be indicated. It is also strongly recommended that Bayou Segnette be routinely patrolled by the local law enforcement agency and that a realistic speed limit be rigidly enforced. This enforcement should be given high priority on on weekends.

This accident investigation report could be used in the next revision of Coast Guard Sponsored boating education courses as a tragic reminder of the consequences of unsafe boating practices. It could be used to illustrate that if either of the operators involved had adhered to the prescribed actions of the Rules of the Road, the fatalities might not have occurred.

Even if both boats had complied with the safe powering criteria, it is believed that there would have been insufficient time to avoid the accident. Therefore, the applicability of the current Safe Powering Standard is questionable (in this accident at least). It is recommended that the data from this accident report be considered in any revision of the safe powering standard, especially as that standard applies to controllable speed.

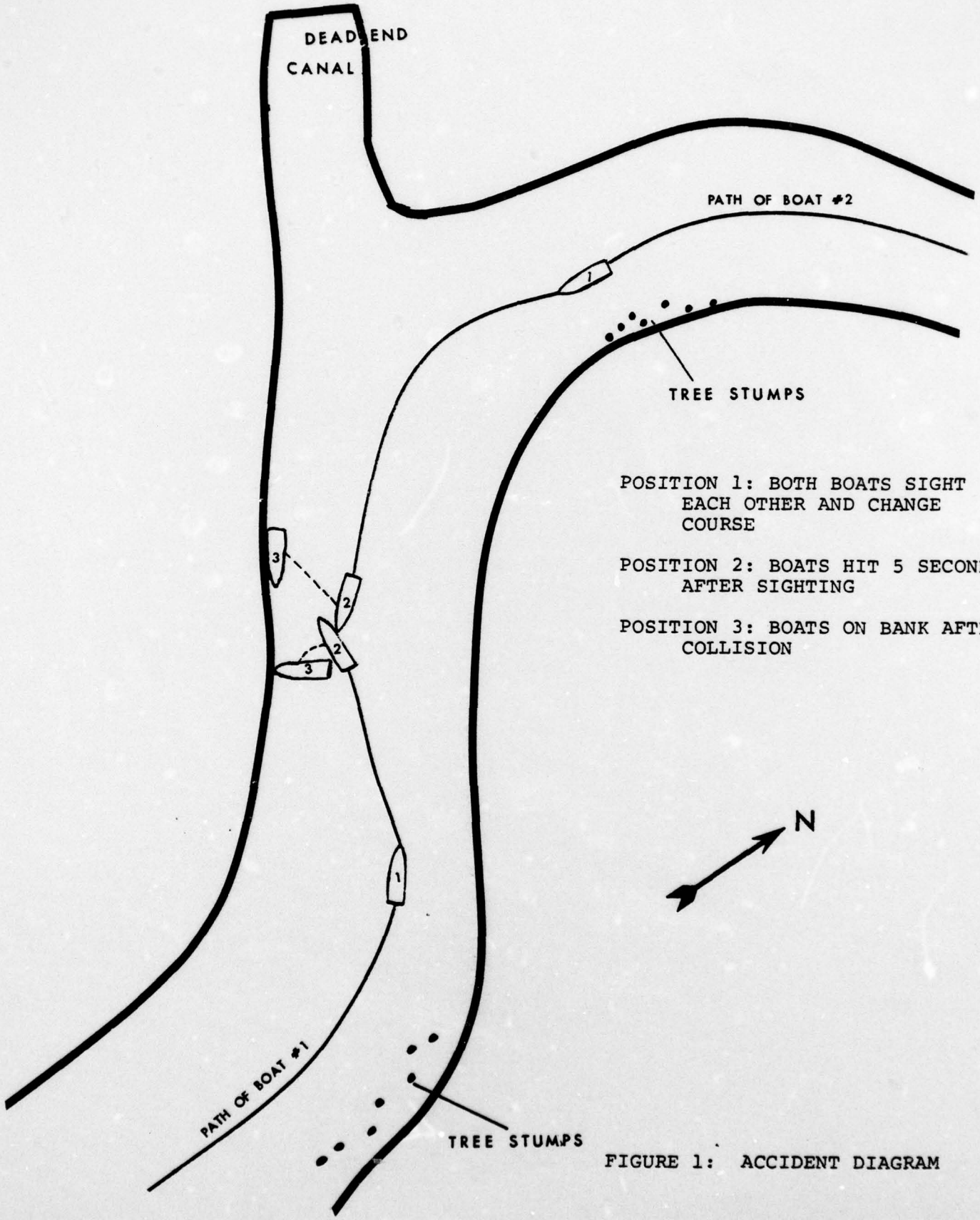
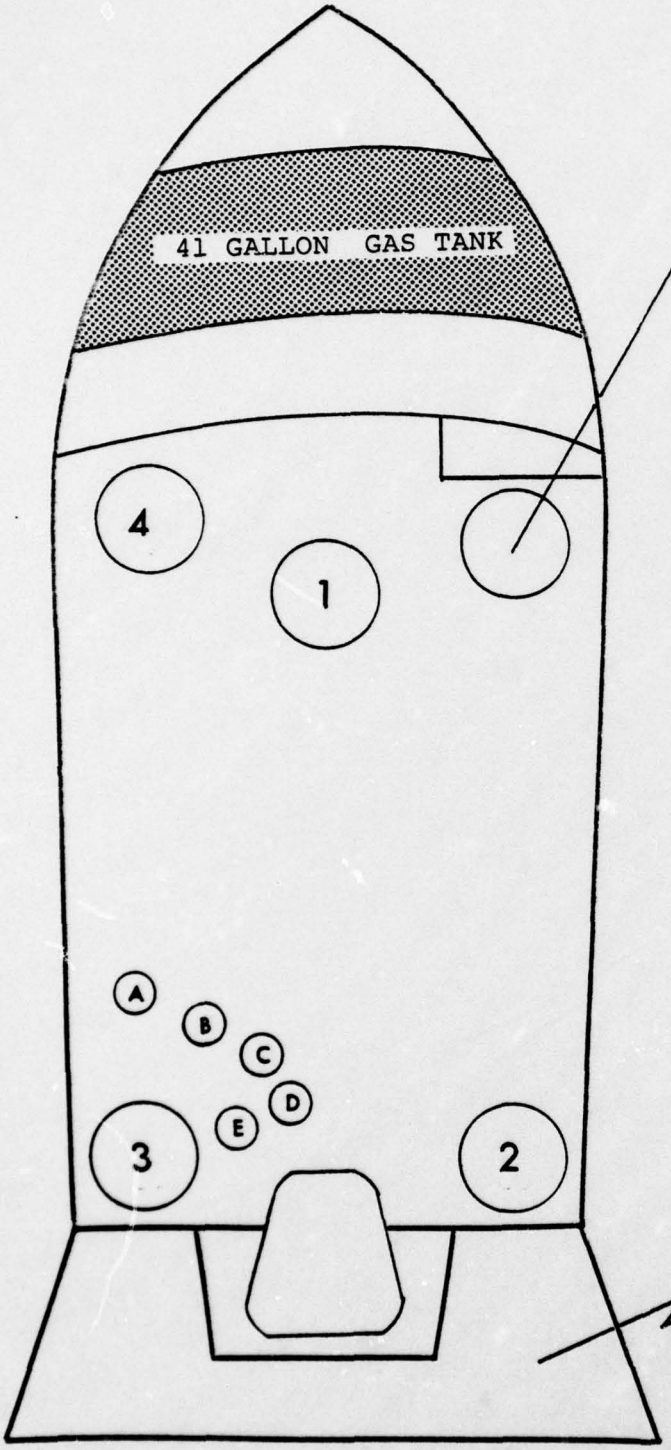


FIGURE 1: ACCIDENT DIAGRAM

95/ (205)


NEW ORLEANS
New Orleans International Airport
Kenner
Metairie
I. C. R. R.
Pipeline Canal
(use chart 11370)
Bridge under constr
Destrehan
St Rose
Luling
Avondale
Ninemile Pt
Westwego
(use chart 11368)
Harvey
Marrero
Algiers
GRETNA
LOCK
Inner Harbor Navigation Canal
N. O. & L. C. R. R.
ACCIDENT SITE
MAGNETIC
Bayou Verret
LAKE CATAOUATCHE
Marsh
Bayou Segnette
3 FEET FEB 1977 TO WESTWEGO
Harvey Canal No 1
Bayou Barataria
COUBA ISLAND
Bayou Couba
Fl 4sec 17ft
3 FEET FEB 1977
Pipeline Canal
Canal
Oakville
Crown Point
Jesuit Bend
LAKE SALVADOR
Priv maintd
"165"
Sign
Marker (lighted)
Signs
BELL (Nov 1 to Apr 30)
Barataria
BARATARIA WATERWAY
Stumps in water 30 ft. from shore.
LAFITTE
Fl 4sec 17ft
Bayou Perot
Grosse Pointe
Temple Bay
Catahoula Bay
Pt. Chico
INTRACOASTAL WATERWAY
(use chart 11355)
E-9
Bayou Perot
Rigolettes
Canal
BARATARIA BAY WATERWAY
The controlling depth was 12 feet acro
bar; thence a depth of 9 feet to a junctic
the Intracoastal Waterway.
90%
209



GAS TANK: 246 lbs (111 kg)
OPERATOR: 170 lbs (76 kg)
PASSENGER #1: 205 lbs (92 kg)
PASSENGER #2: 200 lbs (90 kg)
PASSENGER #3: 130 lbs (58 kg)
PASSENGER #4: 215 lbs (97 kg)

DOGS:
A: 20 lbs (9 kg)
B: 20 lbs (9 kg)
C: 25 lbs (11 kg)
D: 30 lbs (13 kg)
E: 30 lbs (13 kg)

PFDs AND GEAR: 50 lbs (22.5 kg)

WOODEN PLATFORM

FIGURE 3: BOAT #1 LOADING DIAGRAM

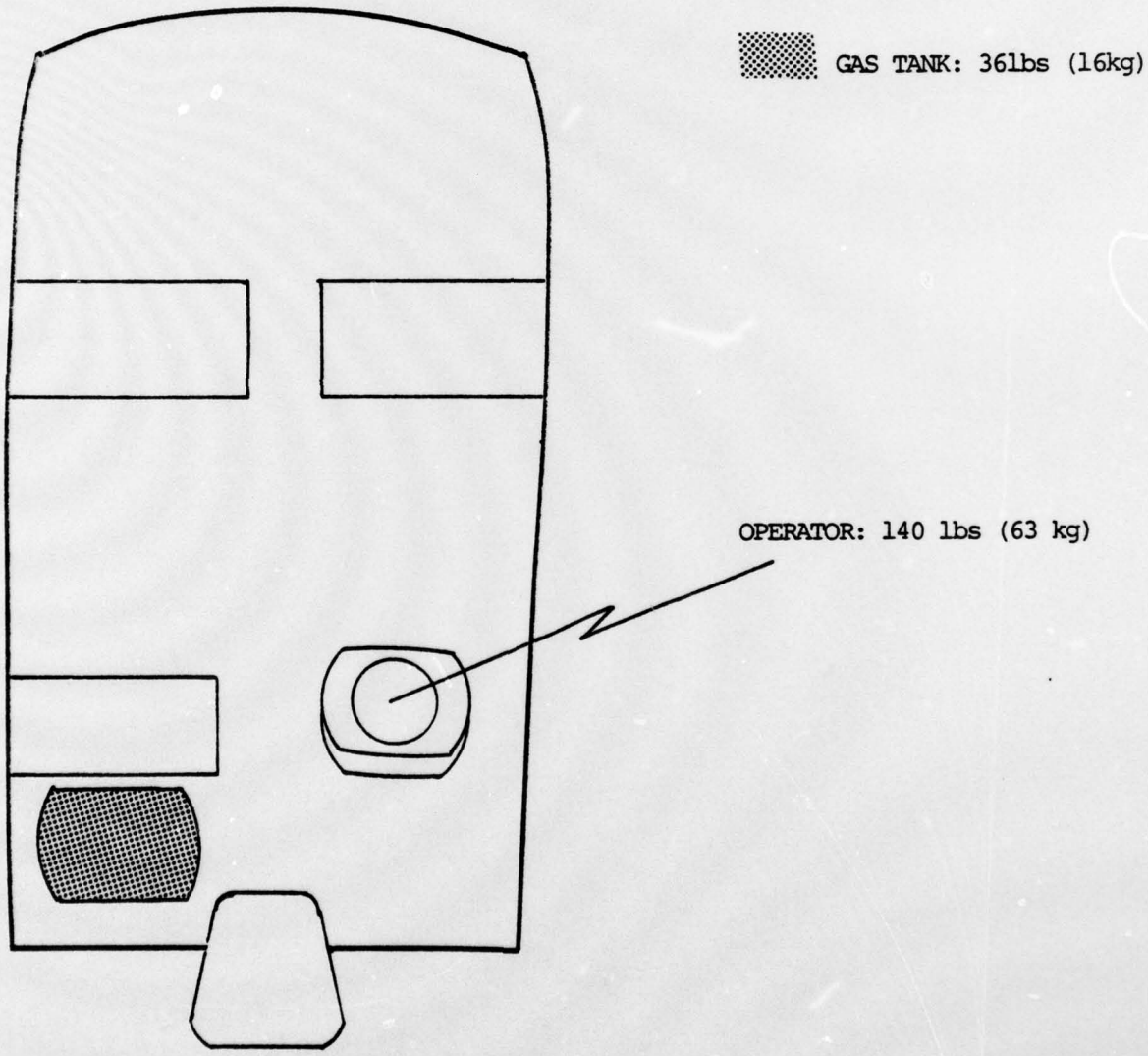


FIGURE 4: BOAT #2 LOADING DIAGRAM

ACCIDENT DATA SECTION

Case Number 77-5C

J.J.D.A. Number 77 / 237

Date of Accident 10/29/77 (mo/day/year)

Date of Investigation 11/ 2/ 77 (mo/day/year)

State (Use postal codes) LA

Jurisdiction (Circle one digit)
(1) State
2 Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
(1) Yes
2 No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
(1) Yes
2 No
9 Unknown

EXPLANATORY NOTES :

(217)

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 1000 — COAST GUARD

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
3 Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
(5) River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code)

(1) Calm
2 Choppy
3 Rough
4 Very Rough
5 Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site	15 ft.	4.5 m.	CHART
Relative Humidity		UNK %	
Air Temperature	80 °F	27 °C	OPERATORS
Water Temperature	___ °F	___ °C	

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) X
Cold (60° - 73°F)(34° - 40°C) ___
Very Cold (below 60°F)(34°C) ___

EXPLANATORY NOTES:

DATA SOURCE:

COAST GUARD

Sky Conditions: (Circle one)

(1) Clear
2 Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

1 None
(2) Light (0-6 mph)(0-10 kph)
3 Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the Northeast

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

1 Yes (2) No 9 Unknown

Was weather forecast obtained *prior* to departure? (Circle one)

1 Yes 2 No (9) Unknown

Was weather as forecast? (Circle one)

(1) Yes 2 No 9 Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes (2) No 9 Unknown

Visibility: (Circle the appropriate codes, one on each list):

COAST GUARD

(1) Day	(1) Good
2 Dusk/Dawn	2 Fair
3 Night	3 Poor

This boat's distance from shore, pier, etc.
(Fill out one)

_____ miles, or 50 feet

_____ kilometers, or 15 meters

This boat's distance from nearest boat.
(Fill out one)

.05 miles, or _____ feet

0.8 kilometers, or _____ meters

Was the accident in a congested area?
(Circle one)

1 Yes (2) No 9 Unknown

Environmental Contributors:
Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters	X		
Unfamiliar waters		X	
Hazardous waters	X		
Undetectable hazard (submerged object)	X		

EXPLANATORY NOTES:

320

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)	_____	X	_____
Traffic, congested area	_____	X	_____
Abrupt change in weather	_____	X	_____
Change in water brought about by floods	_____	X	_____
Improper/Inadequate boat for type of water	_____	X	_____

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT IDENTIFICATION: BOAT # 1

Manufacturer Name Malcom

Model Name Speed Hull

Year of Manufacture 19 UK

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? _____

CAPACITY INFORMATION:

If no capacity information is available, check here X, otherwise code as follows:

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

BOAT # 1 CONT.

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
(12) Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
16 Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

(222)

BOAT # 1 CONT. DATA SOURCE:

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

1 Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
3 Cathedral or Tri-Hull
(4) Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	____lbs.	____kg.
Weight of Hull (without gear and engine) (outboard only)	unk lbs.	____kg.
Weight of Engine(s) (outboard only)	269 lbs.	121 kg.

PROPULSION SYSTEM:

Total Horsepower	____
If twin engine, port engine horsepower	115
starboard engine horsepower	____

EXPLANATORY NOTES :

BOAT # 1 CONT.

DATA SOURCE:

OBSERVATION

Engine attached by: (Circle one)

1 Clamp (2) Bolts

Engine attached at: (Circle one)

(1) Transom 2 Other (Specify:_____)

Engine Manufacturer Name Mercury

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
(2)	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

CONTROLS:

Location of control station: (Circle one code)

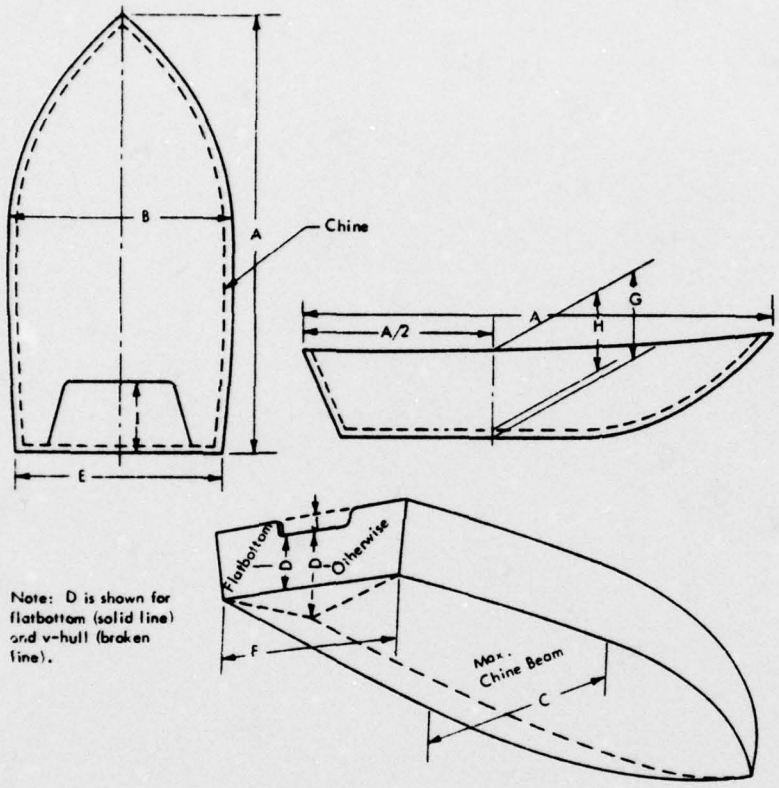
1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

(224)

DATA SOURCE:

BOAT # 1 CONT.



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	15	ft.	0	in.	4	m.	57 cm.
B	Maximum Beam at Gunwale		ft.	82	in.	2	m.	08 cm.
C	Maximum Beam at Chine		ft.	UK	in.		m.	cm.
D	Transom Height at Centerline		ft.	20.5	in.		m.	52 cm.
E	Transom Width at Gunwale		ft.	70	in.	1	m.	78 cm.
F	Transom Width at Chine		ft.	58	in.	1	m.	47 cm.
G	Depth Amidships, Keel to Top of Gunwale		ft.	32	in.		m.	81 cm.
H	Depth Amidships, Gunwale to Cockpit Sole		ft.	27	in.		m.	69 cm.
I	Length of Motorwell		ft.	N/A	in.		m.	cm.
J	Height of Motorwell below Transcom		ft.	5	in.		m.	13 cm.

EXPLANATORY NOTES:

(225)

BOAT # 1 CONT.

DATA SOURCE:

OBSERVED

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller

(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

1 Manual 3 Hydraulic

2 Electric (4) Mechanical

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open

2 Partially decked

(3) Completely decked

4 Tunnel

5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes (2) No 9 Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No

9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only

2 FM broadcast receiver only

3 FM marine weather receiver

4 CG radiotelephone

5 VHF radiotelephone

6 SSB radiotelephone

7 Other

EXPLANATORY NOTES

BOAT # 1 CONT.

DATA SOURCE:

OBSERVED

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

(1) Inland
2 International
3 Some, but don't meet standards
4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Floatation Equipped

1 Air chamber
(2) Poured foam compartments
3 Foam blocks
4 Other

Number of personal flotation devices aboard:
(Enter two numbers for each PFD type)

	Number	Number Serviceable	WITNESS
Number of Type I	_____	_____	
Number of Type II	5	5	
Number of Type III	_____	_____	
Number of Type IV	_____	_____	
Number of non-approved PFDs aboard	_____	_____	

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

DATA SOURCE:

BOAT IDENTIFICATION: BOAT # 2

Manufacturer Name Kingfisher boats, Master Molders, Inc.

Model Name Kingfisher Model 160

Year of Manufacture 19 73

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? _____

CAPACITY INFORMATION:

If no capacity information is available, check here ___, otherwise code as follows:

Maximum Horsepower 70 hp

Maximum Person Capacity 750 lb (338 kg) (_____ Persons)

Maximum Weight Capacity 1389 lb (625 kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

NOT GIVEN

EXPLANATORY NOTES:

(225)

BOAT # 2 CONT.

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes (2) No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

10 Johnboat (flatbottomed)
(11) Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
16 Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

(24)

BOAT #2 CONT.

DATA SOURCE:

OBSERVED

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
2 Aluminum
3 Steel and Steel Alloys
(4) Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

1 Deep-V(ø greater than 18^{o})
2 Semi-V(ø less than 18^{o})
(3) Cathedral or Tri-Hull
4 Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	____lbs.	____kg.
Weight of Hull (without gear and engine) (outboard only)	UK lbs.	____kg.
Weight of Engine(s) (outboard only)	____lbs.	____kg.

PROPULSION SYSTEM:

Total Horsepower	85
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

230

BOAT # 2 CONT.

DATA SOURCE:

OBSERVED

Engine attached by: (Circle one)

1 Clamp (2) Bolts

Engine attached at: (Circle one)

(1) Transom 2 Other (Specify: _____)

Engine Manufacturer Name Mercury

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
(2)	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)

(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	(5)	None
3	Manual		

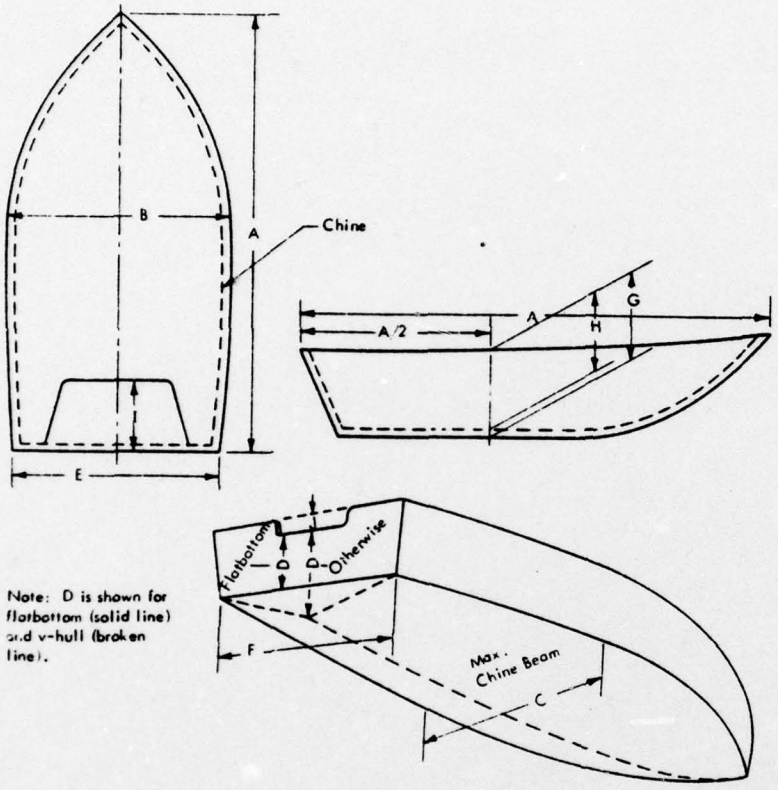
CONTROLS:

Location of control station: (Circle one code)

1	Engine Mounted	4	Center Console
(2)	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

DATA SOURCE:



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	15	ft.	0	in.	4	m.	57 cm.
B	Maximum Beam at Gunwale		ft.	69	in.	1	m.	75 cm.
C	Maximum Beam at Chine		ft.	58	in.	1	m.	47 cm.
D	Transom Height at Centerline		ft.	21	in.		m.	53 cm.
E	Transom Width at Gunwale		ft.	65	in.	1	m.	65 cm.
F	Transom Width at Chine		ft.	55	in.	1	m.	40 cm.
G	Depth Amidships, Keel to Top of Gunwale		ft.	32	in.		m.	81 cm.
H	Depth Amidships, Gunwale to Cockpit Sole		ft.	UK	in.		m.	cm.
I	Length of Motorwell		ft.	N/A	in.		m.	cm.
J	Height of Motorwell below Transcom		ft.	4	in.		m.	10 cm.

EXPLANATORY NOTES:

232

BOAT #2 CONT.

DATA SOURCE:

OBSERVED

Steering controls: (Circle one code)

1 Controlled from engine 3 Tiller
(2) Remote steering wheel 4 Not applicable

Shift/Throttle controls: (Circle one code)

1 Manual 3 Hydraulic
(2) Electric 4 Other

Throttle and shift controlled by same lever: (Circle one)

(1) Yes 2 No 9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

1 Open
2 Partially decked
(3) Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes (2) No 9 Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes (2) No
9 Unknown (Specify:_____)

Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 VHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

BOAT # 2 CONT. DATA SOURCE:

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

(1) Inland
2 International
3 Some, but don't meet standards
4 None

Anchor/Anchor line on board: (Circle one)

(1) Yes 2 No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Floatation Equipped

1 Air chamber
(2) Poured foam compartments
3 Foam blocks
4 Other

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

	Number	Number Serviceable
		OPERATOR
Number of Type I	_____	_____
Number of Type II	1	1
Number of Type III	_____	_____
Number of Type IV	_____	_____
Number of non-approved PFDs aboard	_____	_____

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

(234)

DATA SOURCE:

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	BOAT #1 OPERATOR	PASS. 1	PASS. 2	PASS. 3	PASS. 4	BOAT # 2
Age	34	25	28	28	41	70
Weight	170	205	200	130	215	140
Height	5-8	5-10	5-10	6-0	5-10	5-7
Sex: 1 Male 2 Female	1	1	1	1	1	1
Indicate highest grade completed in school (See instructions)	12	12	12	UK	UK	UK

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1	
2	U. S. Power Squadron	2	2	2	2	2	
3	American Red Cross	3	3	3	3	3	
4	State sponsored boating inst.	4	4	4	4	4	
5	Other (Specify USCG).	5	(5)	5	5	5	
6	None	(6)	6	(6)	(6)	(6)	6
Last two digits of year when the individual's most recent course was completed		___	76	___	___	___	

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT:	5/3	5/4	5/3	-1-	-1-	5/3

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

(235)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)	BOAT # 1					BOAT # 2
1 Yes	1	1	1	1	1	
2 No	(2)	(2)	(2)	(2)	(2)	(2)
9 Unknown	9	9	9	9	9	

WEARS PRESCRIPTIVE LENSES (INCLUDE SUNGLASSES IF PRESCRIPTION): (Circle one digit for each person)						
1 Yes, worn at time of accident	1	1	1	1	1	(2)
2 No	(2)	(2)	(2)	(2)	(2)	
3 Yes, but not at time of accident	3	3	3	3	3	

SWIMMING ABILITY: (Circle one digit for each person)					UNK	
1 Above Average	(1)	(1)	1	1	1	(2)
2 Average	2	2	2	(2)	2	
3 Below Average	3	3	3	3	3	
4 Non-Swimmer	4	4	(4)	4	4	

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)						
1 0-6 times	9	4	9	9	9	4
2 0-12 times						
3 12-24 times						
4 More						
9 Unknown						

EXPLANATORY NOTES:

(236)

DATA SOURCE:

ACCIDENT TYPE:

Grounding	1	Primary	5
Capsizing	2	Secondary	6
Flooding/Swamping	3		
Sinking	4	Tertiary (third)	
Collision	(5)		
Falls Overboard	(6)		
Other	7		
Specify			

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

(01) Two boats head on
02 Bow/Side
03 Bow/Transom
(04) Side/Side
05 Ran aground
06 Hit fixed object (submerged)
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

DATA SOURCE:

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify: _____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 01

2. 04

3. _____

EXPLANATORY NOTES:

(235)

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	BOAT # 1 YES	NO	N/A	UNK	BOAT # 2
Peculiarities in handling characteristics	___	X	___	___	NO
View obstruction attributed to boat design	___	X	___	___	NO
Inefficient control station layout	___	X	___	___	NO
Structural failure	___	X	___	___	NO
Steering failure	___	X	___	___	NO
Other equipment failure	___	X	___	___	NO
Steering or throttle out of adjustment	___	X	___	___	NO
Were this boat's navigation lights adequate?	___	___	X	___	N/A
Were this boat's navigation lights on?	___	___	X	___	N/A
Loss of stability during high speed maneuver	___	X	___	___	NO
Loss of stability due to wave or wake	___	X	___	___	NO
Loss of stability in strong current, rapids, rough water	___	X	___	___	NO
Ran out of fuel	___	X	___	___	NO
Blower inadequate due to malfunction	___	X	___	___	NO
Bilge pump inadequate due to malfunction	___	X	___	___	NO
Slippery deck	___	X	___	___	NO
Lack of hand or grab rails	___	X	___	___	NO
Failure of anchor; other anchor related factors	___	X	___	___	NO

Other: (Explain)_____

EXPLANATORY NOTES:

(234)

DATA SOURCE:

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	BOAT # 1 Was this type of signal on board?			Was this type of signal used?			BOAT #2 Onboard	Used
	YES	NO	UNK	YES	NO	UNK		
Flares	___	X	___	___	X	___	NO	NO
Flags	___	X	___	___	X	___	NO	NO
Signalling lights (flashlight, etc.)	___	X	___	___	X	___	NO	NO
Electronic	___	X	___	___	X	___	NO	NO

Other:
(Specify)_____

EXPLANATORY NOTES:

240

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it.)

	BOAT # 1				BOAT # 2
	YES	NO	N/A	UNK	
Sunglare					
Bright sun	___	___	X	___	N/A
Sun high	___	___	X	___	N/A
Sun low	___	___	X	___	N/A
Just prior to accident, boat was headed into sun	___	___	X	___	N/A
Visual problems (overcast, misty, foggy)	___	___	X	___	N/A
Changing sun conditions (bright to minimal sun)	___	___	X	___	N/A
Noise, Shock/Vibration					
Just prior to accident, boat achieved speeds of approximately 20 mph. 32 kph.					30 mph. 48 kph.
If outboard motor, running at near full speed	___	X	___	___	Yes
Operator inside cabin	___	___	X	___	N/A
Full windshield in front of operator	___	X	___	___	NO
No windshield	X	___	___	___	Yes
If inboard, equipped with mufflers	___	___	X	___	N/A
Boat pounding	___	X	___	___	NO
Ride uncomfortable	___	X	___	___	NO
Was operator seat padded or cushioned?	X	___	___	___	Yes

EXPLANATORY NOTES:

DATA SOURCE:

Fatigue/Discomfort/Time Stress	YES	NO	N/A	UNK	BOAT # 1	BOAT # 2
Vigorous activity during or prior to accident	___	X	___	___		NO
Person uncomfortably cold	___	X	___	___		NO
Facing into wind	X	___	___	___		Yes
Facing into spray	X	___	___	___		Yes
Person physically ill	___	X	___	___		NO
Hurrying to achieve destination by a certain time	___	X	___	___		NO
Time of outing prior to accident	3 hrs.					0.5 hrs.
Time exposed to elements	3 hrs.					0.5 hrs.
Time elapsed since person last slept	4 hrs.					4 hrs.

EXPLANATORY NOTES:

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	BOAT # 1				BOAT # 2
	YES	NO	N/A	UNK	
Drugs/Narcotics/Alcohol					
Was the operator on medication? (If yes, describe_____)	___	X	___	___	NO
Were narcotics (controlled substances)involved?	___	X	___	___	NO
Was alchohol involved?	___	X	___	___	NO
Was the person(s) drunk?	___	X	___	___	NO
Poor Judgment					
Were any of the following contributors to the accident with respect to this vessel?					
Overloading	___	X	___	___	NO
Exceeding persons capacity	___	X	___	___	NO
Improper load distribution	___	X	___	___	NO
Change in load distribution (not passenger movement)	___	X	___	___	NO
Passenger movement	___	X	___	___	NO
Operator standing on gunwale, bow, transom	___	X	___	___	NO
Passenger standing on gunwale, bow, transom	___	X	___	___	NO
Excessive speed for conditions	X	___	___	___	Yes
Operator seated improperly on gunwale, seat back, bow, etc.	___	X	___	___	NO
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___	NO
Operator unfamiliar with boat	___	X	___	___	NO
Operator unfamiliar with water/ area	___	X	___	___	NO

EXPLANATORY NOTES:

	BOAT # 1				DATA SOURCE: BOAT # 2
	YES	NO	N/A	UNK	
Operator inattention	___	X	___	___	NO
Failure to detect hazard	X	___	___	___	Yes
Navigational error	___	X	___	___	NO
Violations of rules of road	X	___	___	___	Yes
Started engine in gear	___	X	___	___	NO
Started engine in improper sequence	___	X	___	___	NO
Did not check weather	___	___	X	___	N/A
Ignored weather warning	___	___	X	___	N/A
Operator away from helm	___	X	___	___	NO
Operating in malicious/ reckless manner	___	X	___	___	NO
Overconfidence in boat capabilities	___	X	___	___	NO
Overconfidence in ability to handle boat	X	___	___	___	Yes
Lack of swimming ability	___	X	___	___	NO
Lack of sufficient safety equipment	___	X	___	___	NO
Did not know how to use safety equipment	___	X	___	___	NO
Disregard for safety precautions	X	___	___	___	Yes
Lack of parental supervision for young operator	___	X	___	___	NO

EXPLANATORY NOTES:

DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

1 Maintains contact with boat initially

2 Enters water unconscious

3 Loses contact with boat initially but regains contact

4 Loses contact with boat initially and unsuccessfully attempts to regain contact

5 Loses contact with boat; does not attempt to regain contact

6 Trapped in overturned boat

7 Voluntarily leaves boat

ACTION:

1 Maintains position in boat

2 Holds onto boat

3 Loses contact with boat

4 Under boat

RESULT OF ACTION:

1 No injury

2 Drowns

3 Dies from exposure

4 Injured (hospitalization not required)

5 Injured (hospitalization required)

6 Reaches safety

7 Reaches safety through rescue

EXPLANATORY NOTES:

DATA SOURCE:

BOAT # 2

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4	
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	---/---	--/--	--/--	--/--	--/--	00/00
Post accident code from above (three digits)	2/3/2	3/3/5	3/3/2	1/1/4	2/3/2	1/1/5
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)						
Completely submerged	(1)	1	1	1	(1)	
Head submerged	2	2	2	2	2	
Floating horizontally	3	3	(3)	3	3	
Floating vertically, face not in water	4	4	4	4	4	
Floating vertically, face in water	5	5	5	5	5	

EXPLANATORY NOTES:

BOAT # 1

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4	DATA SOURCE: BOAT # 2
PFD aboard for this person's use: (Circle code for each person)						
1 Yes	(1)	(1)	(1)	(1)	(1)	(1)
2 No	2	2	2	2	2	
9 Unknown	9	9	9	9	9	
PFD accessible just before accident: (Circle code for each person)						
1 Yes	(1)	(1)	(1)	(1)	(1)	(1)
2 No	2	2	2	2	2	
PFD accessible just after accident: (Circle code for each person)						
1 Yes	1	1	1	1	1	(1)
2 No	(2)	(2)	(2)	(2)	(2)	
3 N/A	3	3	3	3	3	
9 Unknown	9	9	9	9	9	
Person used PFD: Circle code for each person						
1 Yes	1	1	1	1	1	
2 No	(2)	(2)	(2)	(2)	(2)	(2)
3 N/A	3	3	3	3	3	
9 Unknown	9	9	9	9	9	
If person used PFD, then circle one of the following and the PFD type:						
1 Wore PFD at time of accident and did not remove it	1	1	1	1	1	
2 Wore PFD but subsequently took it off	2	2	2	2	2	
3 Wore PFD but it came off	3	3	3	3	3	
4 Donned PFD after accident	4	4	4	4	4	
5 Held onto PFD	5	5	5	5	5	
PFD type: (Circle one for each person who used a PFD)						
1 CG approved I	1	1	1	1	1	
2 CG approved II	2	2	2	2	2	
3 CG approved III	3	3	3	3	3	
4 CG approved IV	4	4	4	4	4	
5 Non-approved	5	5	5	5	5	
If non-approved, describe:						

EXPLANATORY NOTES:

247

BOAT # 1

DATA SOURCE:

BOAT # 2

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4	
Evidence of PFD failure: (see instructions; circle one) If yes, explain:						
_____ 1 Yes	1	1	1	1	1	
_____ 2 No	(2)	(2)	(2)	(2)	(2)	(2)
_____ 3 N/A	3	3	3	3	3	
_____ 9 Unknown	9	9	9	9	9	
_____						
_____						
Evidence of improper PFD usage: If yes, explain:						
_____ 1 Yes	1	1	1	1	1	
_____ 2 No	(2)	(2)	(2)	(2)	(2)	(2)
_____ 3 N/A	3	3	3	3	3	
_____ 9 Unknown	9	9	9	9	9	
_____						
_____						

EXPLANATORY NOTES :

(24)

BOAT # 1

DATA SOURCE:

BOAT # 2

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

01 Cruising (proceeding normally)

(02) Planing

03 Proceeding slowly, but underway

04 Maneuvering (docking, mooring, emergency operations)

05 Racing (sanctioned)

06 Towing

07 Being towed

08 Adrift

09 At anchor (includes moored to buoy or dragging anchor)

10 Docked

11 Other (Specify_____)

99 Unknown

(02) Planing

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing

2 Fishing

3 Skin diving or swimming

4 Fueling

5 Pleasure cruising, departing

(6) Pleasure cruising, returning

7 Pleasure cruising, in middle of outing

8 Other (Specify_____)

9 Unknown

(5) Pleasure cruising, departing

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level

2 Bow High

3 Stern High

4 Listing starboard

5 Listing port

9 Unknown

(1) Level

EXPLANATORY NOTES:

(242)

DATA SOURCE:

With respect to this boat prior to the accident, describe any other relevant information not previously coded. Note any structural damage, poor condition, repairs, deterioration, and modifications by the owner. Describe any pecularities in the handling characteristics of this boat (inability to turn at high speed, etc.).

See narrative

Describe boat behavior (handling characteristics, movements, etc.) immediately prior to, during, and after the accident.

See narrative

Final attitude of the boat is best described as:
(Circle one)

BOATS #1 & 2

(1) Floating, level upright
2 Floating, inverted
3 Partially submerged/flooded bow higher
4 Partially submerged/flooded, stern higher
5 Sunk
6 Aground

EXPLANATORY NOTES:

(252)

APPENDIX F

COLLISION ACCIDENT INVESTIGATION REPORT

Collision Number: 77-6
Date of Accident: November 20, 1977
Investigation Date: November 30, 1977
J. J. DAVIS ASSOCIATES, INC. Accident Number: 77-259

SUMMARY

This collision involved a 14 foot (4.2m) Johnboat powered by a 25hp outboard engine. This boat struck a submerged tree trunk while cruising on a river. The operator and his one passenger were thrown onto the floor of the boat by the impact,injuring the operator. Both occupants were wearing PFDs (type II) but the passenger's came off as he swam to the river bank to seek help.

The accident happened in the early morning as the two occupants were on their way to a hunting area. The river was flooded due to recent rains, and the sky was cloudy and visibility poor. There was a fast current running but the water was flat. The winds were moderate, 10mph (16kph), out of the south. The accident occurred on an isolated portion of the Calcasieu River, northeast of Lake Charles, Louisiana.

The primary cause of this accident was the operator's decision to go boating. The secondary causes were the speed at which the boat was operated (excessive for the amount of debris present) and the flooded condition of the river. The operator's over confidence with the boat and the river was the primary factor in his decision to go boating.

Stressors such as alcohol, fatigue, or glare did not play a role in this accident.

GENERAL INFORMATION

The operator was a 42 year old male who had suffered a stroke over a year before the accident. The stroke did not affect his physical condition other than to leave him with a speech impediment. He has boated all his life and has owned this boat since 1972. The passenger was a 14 year old male with similar boating experiences. The two friends often go hunting together and both have about the same level of experience in this boat in this area. Neither of the two have had any formal education in boating. The operator could be classed as being in the upper end of the low income bracket.

Both occupants had risen early that day to depart on a planned hunting trip. While a weather forecast was not obtained, the operator knew the river would be flooding because of the recent rains. The operator's experience in boating had been obtained on this river and he was very familiar with its characteristics. He knew there is always a swift current and expected it to be stronger that day.

NARRATIVE DESCRIPTION OF ACCIDENT

Pre-Accident

The operator left the launching area at about 0645 and headed upstream against the current. He was proceeding at about ½ throttle at an estimated speed of 10mph (16kph). He was steering from the engine while the passenger was sitting in the bow area with the gear. At this speed, and with the weight forward, the boat was riding level. There were significant amounts of debris in the river (approximately 10% coverage) and the operator was steering around much of it.

The weather at the time was cool, air temperature 60°F (20°C). The sky was cloudy and visibility was poor. While there was a 10mph (16kph) wind out of the south, there was little wind effect at their location because of the protection of the trees. The river is 20 feet (6m) wide at the accident site and they were travelling up the middle of the river in about 8 feet (2.4m) of water. There were no other boats in the area. Both occupants were wearing PFDs as they routinely do while boating.

There was some question as to the speed at which the boat was travelling at the time of impact. The hole caused by the tree is five inches (12.7cm) in diameter. The initial point of impact is just where the bow meets the flat bottom. However, the boat remained on the tree stump for many hours before the local marine police removed it. In the process of removing the boat, the hole was further elongated. Therefore, a determination of the actual boat speed is impossible. However, it is believed that the boat impacted the stationary tree trunk at approximately 10 mph (16 kph).

Accident

The passenger in the bow was warning the operator of large pieces of debris. Without any warning, the boat stopped suddenly throwing both occupants forward. The time was about 0700 and they had been underway for only 15 minutes. As the boat stopped, it was seen that they had struck a submerged tree trunk which was now protruding through the boat's floor. The tree trunk was debris, carried downstream by the floods, which had lodged in the river bottom before the accident. At the time of the accident, it was completely submerged. By this time, the engine had stalled and the current was holding the boat securely to the tree trunk.

Post-Accident

The operator had received some lacerations on the head when the boat hit and it was decided to go seek help. Both occupants left the boat and swam for shore. The passenger's type II PFD had not been buckled when he entered the water and came off as he started to swim. Both occupants made it safely to shore and the passenger then hiked 1.5 miles (2.4km) up river to get help at a friend's cabin. After help arrived, the operator was taken to the hospital for medical treatment.

PSYCHO-SOCIO AND HUMAN FACTORS

A. Relevant Operator Factors

1. The operator wanted to go hunting. This passtime is very enjoyable to him and he goes as often as possible.
2. The reduced visibility and the debris in the area made navigation difficult.
3. The operator's past accident-free experience with this boat and this area downplayed the potential danger.

B. Counterbalancing Factors

1. The operator was very familiar with this area and had been boating on this river for years.

C. Interaction of A and B Factors

In this case, the operator's desire to go hunting outweighed any concern about operating on the flooded river. Any concern about dangers due to the river's condition were mitigated by the operator's past experience on that river. He had run it when it was flooded before and had not encountered any difficulties. Therefore, he saw no reason to expect different results this time. While he was experiencing difficulties navigating the river that day (as evidenced by the passenger acting as a lookout) this was considered a normal procedure for these water conditions. Since these boating habits had always worked before, he saw no reason to be concerned for their safety.

No other factors were found to have played a role in the operator's decision to go boating or in his actions up to the accident.

PROBABLE CAUSES

The primary cause of this accident was the operator's decision to go boating in those conditions. Secondary causes of the accident were the speed at which the boat was operated and the flooded condition of the river. The operator's experience with that body of water should have warned him of the potential hazards during flooded conditions. The amount of debris floating on the surface of the river should have indicated the possibility of submerged debris. The operator's over confidence in his abilities (forstered by previous accident free experiences and the lookout in the bow) over rode any concern for these potential dangers. The operation of his boat at approximately 10 mph (16 kph) seriously increased the probability of hull damage in the event of a collision.

The boat was properly loaded at the time of impact and overloading is not considered a factor in this accident.

RECOMMENDATIONS

In this case, the boat was loaded in the proper manner, but the environmental factors made the operation of that boat unsafe. There are very few boats that could have been operated safely under those circumstances. If the boat had been operated at a lower speed, it could possibly have avoided the hull damage of this accident. The most practical way that this accident could have been avoided would have been to cancel the hunting trip. It is recommended that this message be directed to the audience of hunters and fishermen. In that this audience is not normally attracted to formal boating education courses, it is recommended that this message be distributed to magazines that are read by this audience.

No recommendations are made in the areas of enforcement or technical standards.

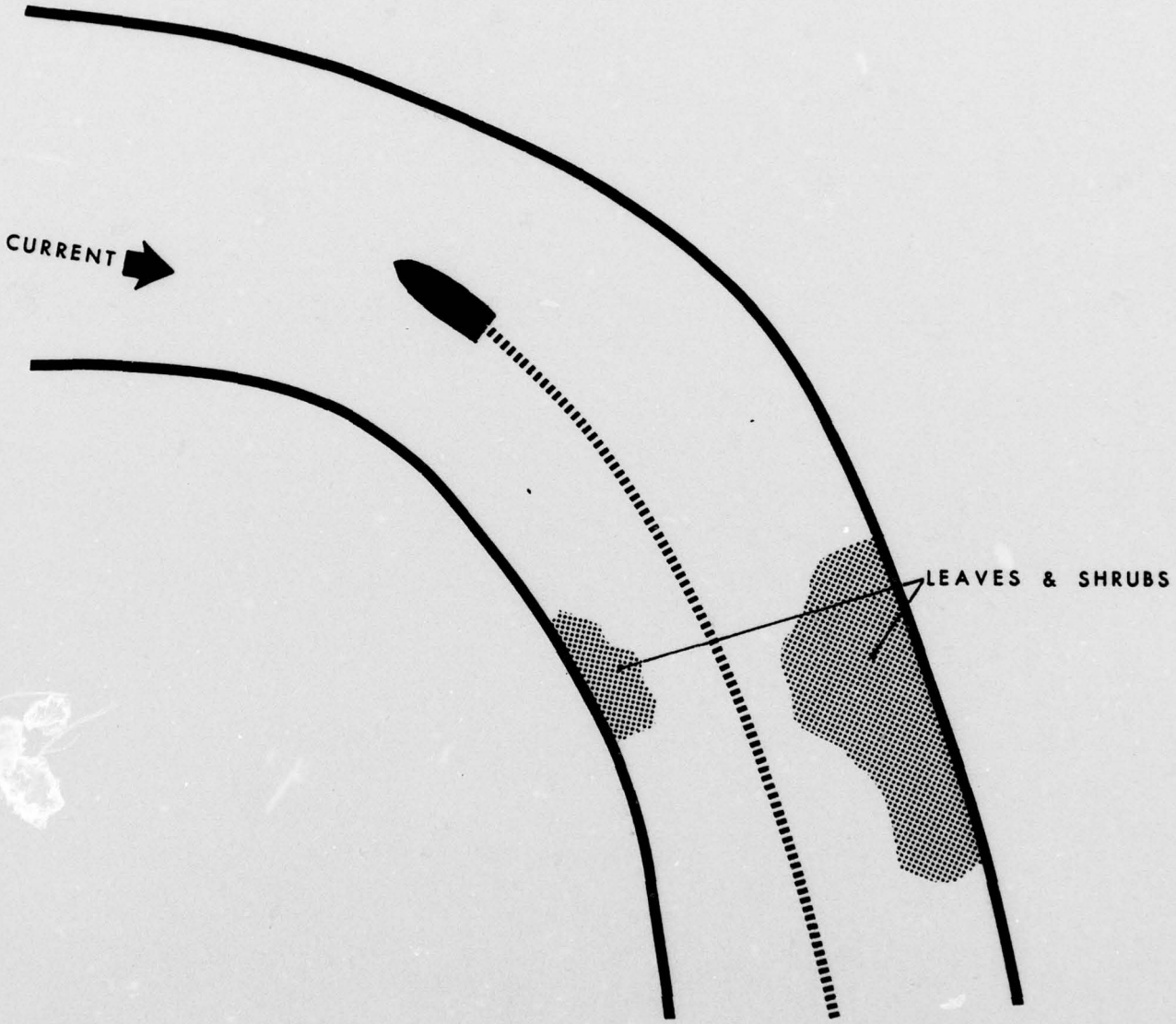


FIGURE I: ACCIDENT DIAGRAM

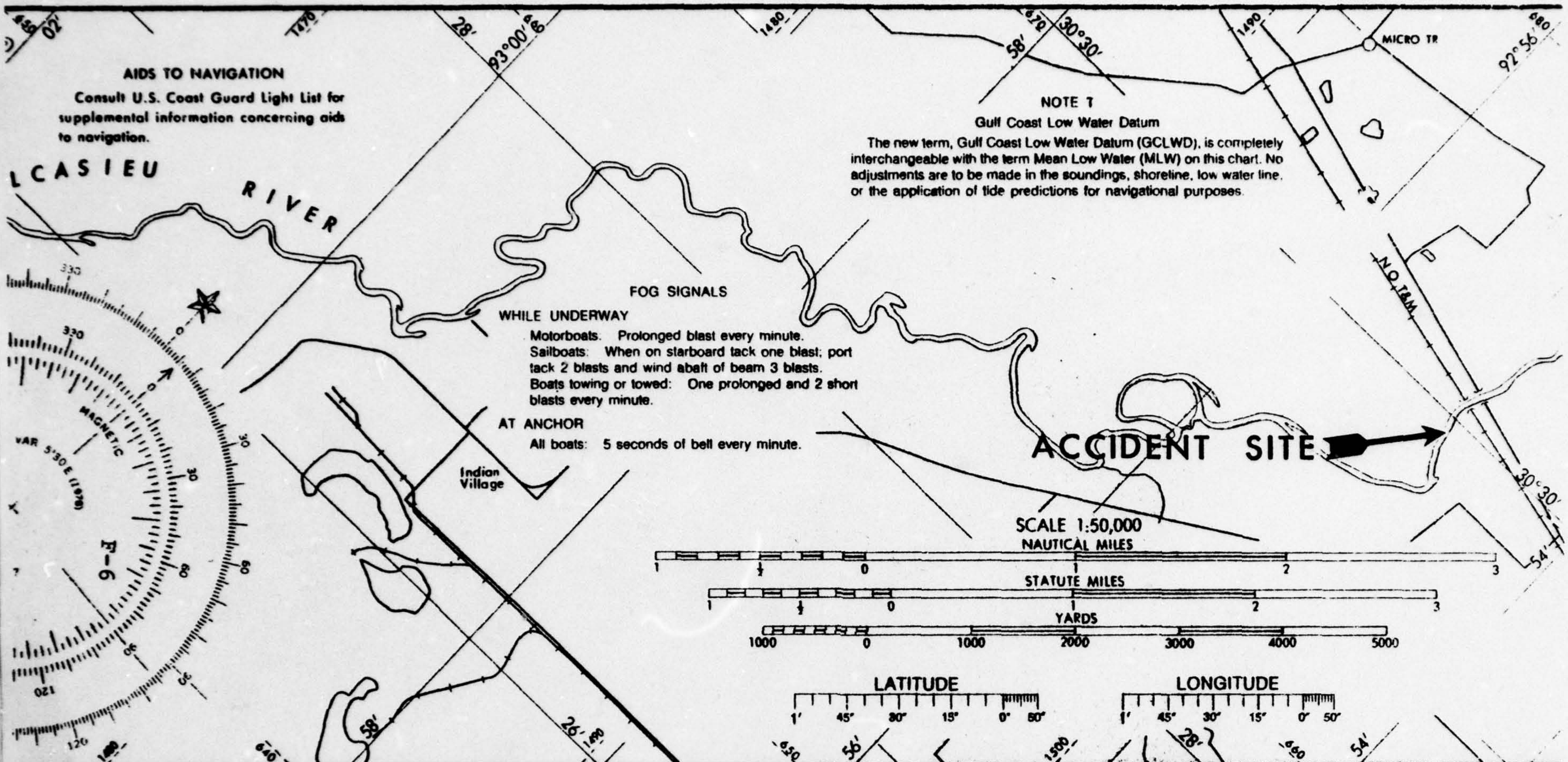
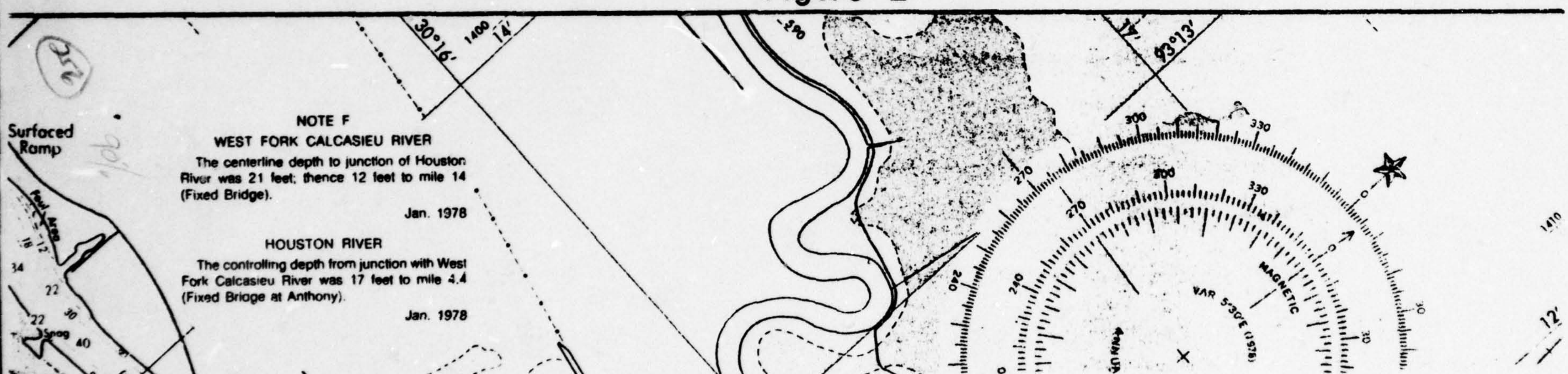

Nautical Chart Catalog
AIDS TO NAVIGATION
Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.
LCASIEU
RIVER
NOTE T
Gulf Coast Low Water Datum
The new term, Gulf Coast Low Water Datum (GCLWD), is completely interchangeable with the term Mean Low Water (MLW) on this chart. No adjustments are to be made in the soundings, shoreline, low water line, or the application of tide predictions for navigational purposes.
FOG SIGNALS
WHILE UNDERWAY
Motorboats: Prolonged blast every minute.
Sailboats: When on starboard tack one blast; port tack 2 blasts and wind abaft of beam 3 blasts.
Boats towing or towed: One prolonged and 2 short blasts every minute.
AT ANCHOR
All boats: 5 seconds of bell every minute.
Indian Village
ACCIDENT SITE
MICRO TR
N O T&M
SCALE 1:50,000
NAUTICAL MILES
STATUTE MILES
YARDS
LATITUDE
LONGITUDE
MAGNETIC
VAR 5°30'E (1978)
F-6
93°00'
30°30'
92°56'

Figure 2


NOTE F
WEST FORK CALCASIEU RIVER
The centerline depth to junction of Houston River was 21 feet; thence 12 feet to mile 14 (Fixed Bridge).
Jan. 1978
HOUSTON RIVER
The controlling depth from junction with West Fork Calcasieu River was 17 feet to mile 4.4 (Fixed Bridge at Anthony).
Jan. 1978
Surfaced Ramp
Foul Area
30°16'
93°13'
MAGNETIC
VAR 5°30'E (1978)

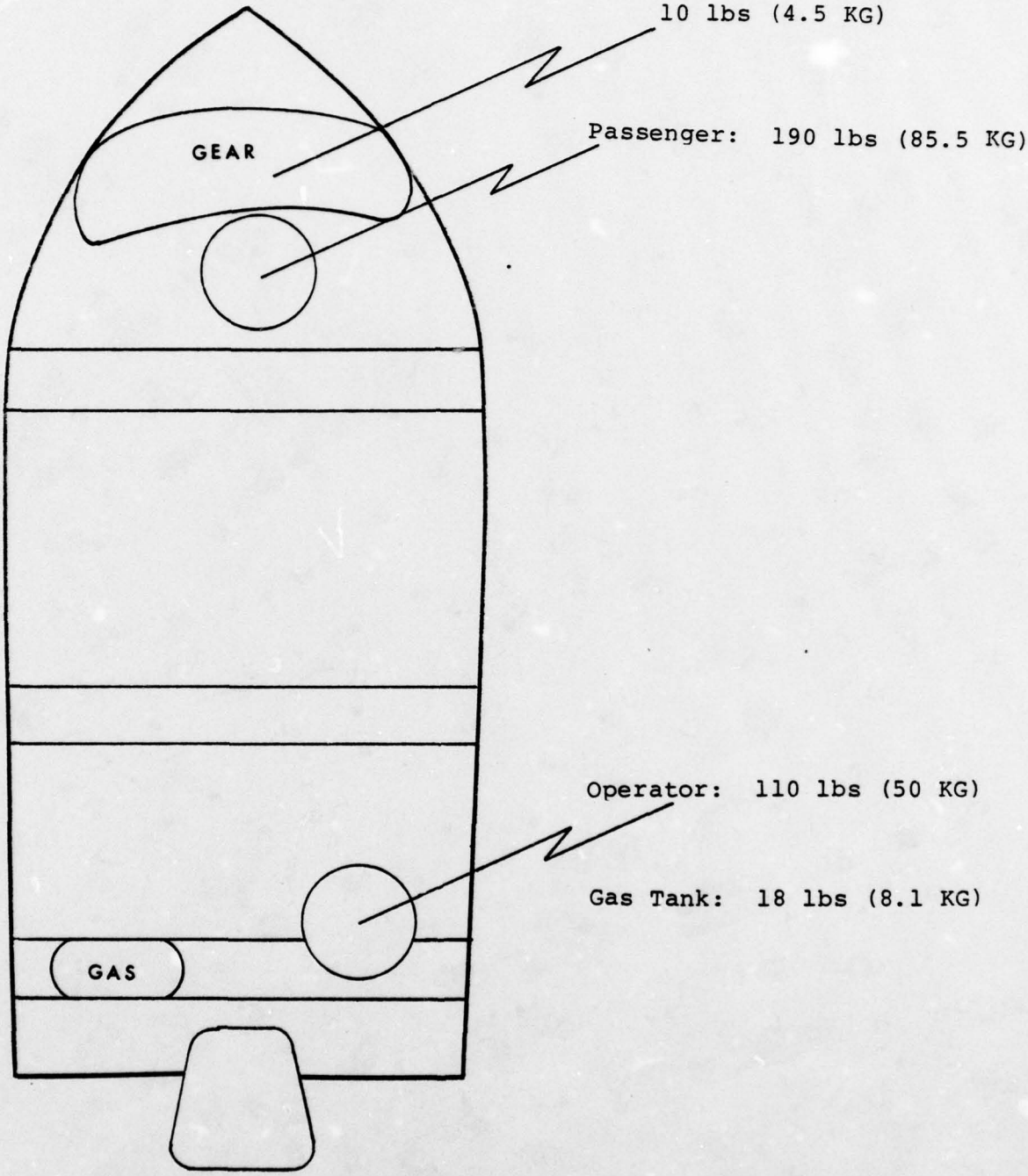


FIGURE 3: LOADING DIAGRAM

257

ACCIDENT DATA SECTION

Case Number 77-6C

J.J.D.A. Number 77 / 259

Date of Accident 11 / 20 / 77 (mo/day/year)

Date of Investigation 11 / 30 / 77 (mo/day/year)

State (Use postal codes) LA

Jurisdiction (Circle one digit)
(1) State
2 Joint/Federal
3 High Seas

More than one vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

NOTE: If more than one vessel was involved, complete a separate booklet for each vessel.

Commercial vessel involved? (Circle one)
1 Yes
(2) No
9 Unknown

Was there at least one fatality? (Circle one)
1 Yes
(2) No
9 Unknown

EXPLANATORY NOTES :

(260)

DATA SOURCE:

ENVIRONMENT:

Time of day of accident (when accident occurred, began, to the nearest hour on a 24 hr. clock; i.e., 2 p.m. = 1400): 0700

Body of Water: (Circle appropriate code)

1 Ocean or Gulf of Mexico
2 Great Lakes
3 Tidal Waters (Rivers)
4 Lake, Pond, Dam, Reservoir
(5) River, Stream, Creek
6 Harbor, Marina

Condition of Water: (Circle appropriate code) OPERATOR

1 Calm
2 Choppy
3 Rough
4 Very Rough
(5) Fast Water, but flat (such as flooded river)
6 White Water, down river

Depth of water at accident site 8 ft. 2.4 m.

Relative Humidity 60 %

Air Temperature 60 °F 15.7 °C

Water Temperature 67 °F 19.6 °C

If precise temperature is unknown, then check one:

Warm (greater than 73°F)(41°C) ____
Cold (60° - 73°F)(34° - 40°C) ____
Very Cold (below 60°F)(34°C) ____

EXPLANATORY NOTES:

(261)

DATA SOURCE:

Sky Conditions: (Circle one)

1 Clear
(2) Cloudy
3 Hazy
4 Rain
5 Snow

Wind: (Circle one)

1 None
2 Light (0-6 mph) (0-10 kph)
(3) Moderate (7-14 mph) (11-22 kph)
4 Strong (15-25 mph) (23-40 kph)
5 Storm (over 25 mph) (41 kph)

Wind Direction:

From the South

Was weather a factor (i.e., did it contribute to causing the accident or did it hamper recovery efforts)? (Circle one)

(1) Yes 2 No 9 Unknown

Was weather forecast obtained prior to departure? (Circle one)

1 Yes (2) No 9 Unknown

Was weather as forecast? (Circle one)

1 Yes 2 No (9) Unknown

If not, describe change _____

_____

EXPLANATORY NOTES:

262

DATA SOURCE:

Was weather warning issued at point of departure? (Circle one)

1 Yes (2) No 9 Unknown

Visibility: (Circle the appropriate codes, one on each list):

(1) Day	1 Good
2 Dusk/Dawn	2 Fair
3 Night	(3) Poor

This boat's distance from shore, pier, etc.
(Fill out one)

_____ miles, or 10 feet

_____ kilometers, or 2.9 meters

This boat's distance from nearest boat.
(Fill out one)

N/A miles, or _____ feet

_____ kilometers, or _____ meters

Was the accident in a congested area?
(Circle one)

1 Yes (2) No 9 Unknown

Environmental Contributors:

Were any of the following contributors to the accident? (Check one column for each row)

	Yes	No	Unknown
Familiar waters	____	X	____
Unfamiliar waters	____	X	____
Hazardous waters	X	____	____
Undetectable hazard (submerged object)	X	____	____

EXPLANATORY NOTES:

DATA SOURCE:

Environmental Contributors (cont.):

	Yes	No	Unknown
Undetectable hazard (not visible in this type of light)		X	
Traffic, congested area		X	
Abrupt change in weather		X	
Change in water brought about by floods	X		
Improper/Inadequate boat for type of water		X	

NOTE: If any of the environmental contributors are checked "Yes", be sure to include these in the narrative.

BOAT IDENTIFICATION:

Manufacturer Name Duracraft

Model Name ____

Year of Manufacture 19 72

Does the boat have a Courtesy Motorboat Examination (CME) decal affixed? (Circle one)

1 Yes (2) No 9 Unknown

If yes, what year? _____

CAPACITY INFORMATION:

If no capacity information is available, check here X, otherwise code as follows:

Maximum Horsepower ____hp

Maximum Person Capacity ____lb (___kg) (_____ Persons)

Maximum Weight Capacity ____lb (___kg)

Weight Capacity stated as: (Circle one)

1 Persons, motor, and gear

2 Persons and gear

EXPLANATORY NOTES:

DATA SOURCE:

Does the boat have a BIA plate? (Circle one)

1 Yes 2 No 3 Not Applicable 9 Unknown

If not a BIA plate, sketch the general layout of the capacity plate in this space:

BOAT TYPE: (Circle the appropriate code)

(10) Johnboat (flatbottomed)
11 Open lightweight motorboat - not johnboat
12 Skiff (heavy open motorboat)
13 Dinghy (under 10 ft.)
14 Rowboat (manually propelled)
15 Bowrider runabout
16 Runabout (decked forward)
17 Bass boat
20 Cuddy cabin boat (limited accommodations under raised forward deck)
21 Cabin motorboat (cabin constructed forward, bulkhead with doors or hatches enclose cabin)
22 Houseboat
23 Pontoon boat
30 Canoe
31 Kayak
32 Inflatable boat
33 Inflatable raft
34 Non-inflatable raft
40 Sail only
41 Auxiliary sail (inboard engine)
42 Sail with outboard kicker
50 Other (hydroplane, airboat, any category not listed above. Specify:_____)

EXPLANATORY NOTES:

365

DATA SOURCE:

HULL MATERIAL: (Circle the appropriate code)

1 Wood (includes wooden construction sheathed by fiberglass or metal)
(2) Aluminum
3 Steel and Steel Alloys
4 Fiberglass, Reinforced Plastic(rigid construction)
5 Non-Reinforced Plastic(rigid construction)
6 "Rubber" (plastic inflatable)
7 Other (Specify :_____)

HULL SHAPE: (Circle the appropriate code)

1 Deep-V(ø greater than 18°)
2 Semi-V(ø less than 18°)
3 Cathedral or Tri-Hull
(4) Flatbottom
5 Roundbottom
6 Other (Specify:_____)

WEIGHTS:

Weight of Boat (inboard only)	____lbs.	____kg.
Weight of Hull (without gear and engine) (outboard only)	200 lbs.	90 kg.
Weight of Engine(s) (outboard only)	110 lbs.	49.5 kg.

PROPULSION SYSTEM:

Total Horsepower	25
If twin engine, port engine horsepower	____
starboard engine horsepower	____

EXPLANATORY NOTES :

DATA SOURCE:

Engine attached by: (Circle one)
(1) Clamp 2 Bolts

Engine attached at: (Circle one)
(1) Transom 2 Other (Specify:_____)

Engine Manufacturer Name Evinrude

Primary Propulsion System: (Circle one code)

1	Inboard	4	Sail
(2)	Outboard	5	Manual
3	Inboard/Outdrive	6	Other

Primary Propulsor: (Circle one)
(1) Propeller 2 Water Jet 3 Other

Number of Propulsors in Primary System 1

Secondary Means of Propulsion: (Circle one code)

1	Outboard	4	Other
2	Sail	5	None
(3)	Manual		

CONTROLS:
Location of control station: (Circle one code)

(1)	Engine Mounted	4	Center Console
2	Starboard	5	Other
3	Port		

EXPLANATORY NOTES:

DATA SOURCE:

Steering controls: (Circle one code)

(1) Controlled from engine
2 Remote steering wheel
3 Tiller
4 Not applicable

Shift/Throttle controls: (Circle one code)

(1) Manual
2 Electric
3 Hydraulic
4 Other

Throttle and shift controlled by same lever: (Circle one)

1 Yes
(2) No
9 Unknown

BILGE/COMMUNICATIONS:

Bilge: (Circle one code)

(1) Open
2 Partially decked
3 Completely decked
4 Tunnel
5 Other (Specify:_____)

Bilge pump installed: (Circle one)

1 Yes
(2) No
9 Unknown

Sound amplifying device (loudhailer): (Circle one)

1 Yes
(2) No
9 Unknown (Specify:_____)

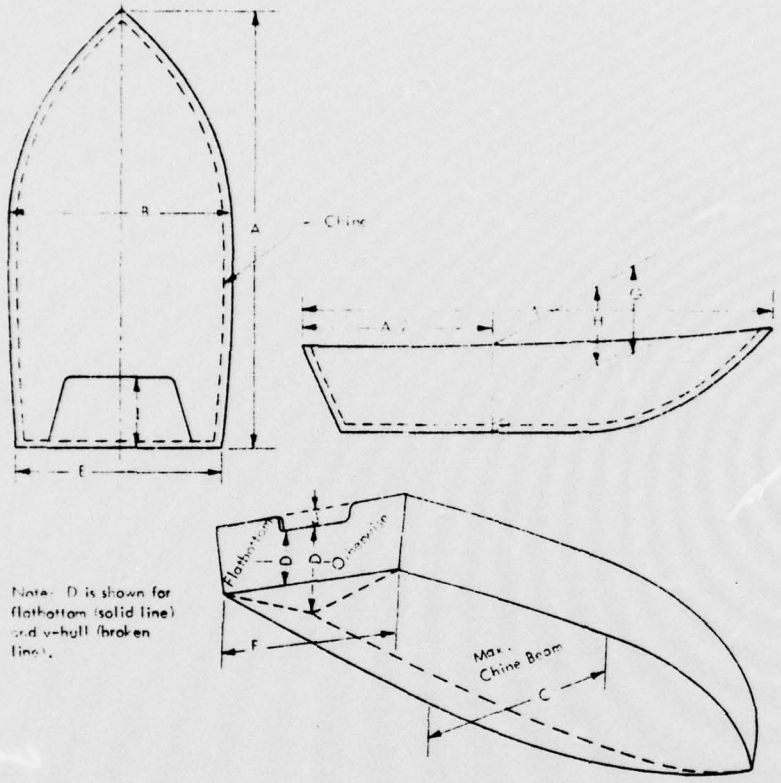
Electronic communication device: (Circle one code)

1 AM broadcast receiver only
2 FM broadcast receiver only
3 FM marine weather receiver
4 CG radiotelephone
5 VHF radiotelephone
6 SSB radiotelephone
7 Other

EXPLANATORY NOTES

(265)

DATA SOURCE:



Note: D is shown for flatbottom (solid line) and v-hull (broken line).

MEASUREMENT:

A	Length Overall	14	ft.	____	in.	4.19	m.	____	cm.
B	Maximum Beam at Gunwale	4	ft.	5	in.	1.32	m.	____	cm.
C	Maximum Beam at Chine	____	ft.	____	in.	____	m.	____	cm.
D	Transom Height at Centerline	____	ft.	20.5	in.	____	m.	5.13	cm.
E	Transom Width at Gunwale	____	ft.	48	in.	____	m.	120	cm.
F	Transom Width at Chine	____	ft.	36	in.	____	m.	90	cm.
G	Depth Amidships, Keel to Top of Gunwale	____	ft.	____	in.	____	m.	____	cm.
H	Depth Amidships, Gunwale to Cockpit Sole	____	ft.	____	in.	____	m.	____	cm.
I	Length of Motorwell	____	ft.	____	in.	____	m.	____	cm.
J	Height of Motorwell below Transcom	____	ft.	4	in.	____	m.	10	cm.

EXPLANATORY NOTES:

DATA SOURCE:

ADDITIONAL SAFETY EQUIPMENT:

Navigational aids aboard (charts, compasses, etc.) (Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Navigation lights: (Circle one code)

Meet legal standards-

1 Inland
2 International
3 Some, but don't meet standards
(4) None

Anchor/Anchor line on board: (Circle one)

1 Yes (2) No 9 Unknown

LIFE SAVING AIDS:

Deck hardware (grab rails, life lines):

(Circle one)

1 Yes (2) No 9 Unknown

Specify_____

Level Floatation Equipped

1 Air chamber
2 Poured foam compartments
3 Foam blocks
4 Other
(5) None

Number of personal flotation devices aboard: (Enter two numbers for each PFD type)

	Number	Number Serviceable
Number of Type I	_____	_____
Number of Type II	2	2
Number of Type III	_____	_____
Number of Type IV	_____	_____
Number of non-approved PFDs aboard	_____	_____

Describe non-approved PFDs _____

Additional life preservation aids (dinghies, rafts, etc.):

(Circle one)

1 Yes (2) No 9 Unknown (Describe_____)

EXPLANATORY NOTES:

DATA SOURCE:

DESCRIPTION OF ACCIDENT PARTICIPANTS (complete every row for each person)	OPERATOR	PASS. 1	PASS. 2	PASS. 3	PASS. 4
Age	42	14			
Weight	190	110			
Height	5'9"	5'4"			
Sex: 1 Male 2 Female	1	1			
Indicate highest grade completed in school (See instructions)	11	8			

FORMAL BOATING SAFETY INSTRUCTION:

(Circle one digit for each person)

1	USCG Auxiliary	1	1	1	1	1
2	U. S. Power Squadron	2	2	2	2	2
3	American Red Cross	3	3	3	3	3
4	State sponsored boating inst.	4	4	4	4	4
5	Other (Specify _____).	5	5	5	5	5
6	None	(6)	(6)	6	6	6
Last two digits of year when the individual's most recent course was completed		___	___	___	___	___

TOTAL EXPERIENCE/EXPERIENCE ON THIS BOAT:	5/5	5/5	_/_	_/_	_/_

1 Less than 5 hrs
2 5 - 20 hrs
3 20 - 100 hrs
4 100 - 500 hrs
5 Greater than 500 hrs

(Enter 2 digits for each person)

EXPLANATORY NOTES:

(271)

DATA SOURCE:

POOR PHYSICAL CONDITION WAS A FACTOR IN THIS ACCIDENT: (See Instruction)

1	Yes	1	1	1	1	1
2	No	(2)	(2)	2	2	2
9	Unknown	9	9	9	9	9

WEARS PRESCRIPTIVE LENSES

(INCLUDE SUNGLASSES IF PRESCRIPTION):

(Circle one digit for each person)

1	Yes, worn at time of accident	1	1	1	1	1
2	No	(2)	(2)	2	2	2
3	Yes, but not at time of accident	3	3	3	3	3

SWIMMING ABILITY:
(Circle one digit for each person)

1	Above Average	1	(1)	1	1	1
2	Average	2	2	2	2	2
3	Below Average	(3)	3	3	3	3
4	Non-Swimmer	4	4	4	4	4

HOW OFTEN DID THIS PERSON SWIM DURING THE PAST YEAR? (Enter one digit per person)

1	0-6 times	1	4	—	—	—
2	0-12 times					
3	12-24 times					
4	More					
9	Unknown					

EXPLANATORY NOTES:

272

DATA SOURCE:

ACCIDENT TYPE:

Grounding	(1)	Primary	1
Capsizing	2	Secondary	6
Flooding/Swamping	3		
Sinking	4	Tertiary (third)	
Collision	5		
Falls Overboard	(6)		
Other	7		
Specify			

ACCIDENT DESCRIPTORS:
(Circle the codes of all that are relevant)

Collisions, Groundings

01 Two boats head on
02 Bow/Side
03 Bow/Transom
04 Side/Side
05 Ran aground
(06) Hit fixed object (submerged)
07 Hit floating object other than boat

Capsizing, Flooding, Sinking

09 Wave over bow
10 Wave over stern
11 Wave over gunwale
- Another boat's wake
12 Over bow
13 Over stern
14 Over gunwale
- Boats's own wake

EXPLANATORY NOTES:

(273)

DATA SOURCE:

15 Over bow

16 Over stern

17 Over gunwale

18 Passenger movement

19 Load shift (other than passenger)

- Water through hull via drains, vents, holes

20 Control cables

21 Water through damaged hull

Others

22 Falls overboard

23 Falls within boat

24 Material failure

25 Other (Specify: _____)

Using the codings as shown, list the three major descriptors of this accident; i.e., the three major causes, by number:

1. 06

2. -

3. -

EXPLANATORY NOTES:

274

DATA SOURCE:

NOTE: N/A stands for Not Applicable; UNK stands for Unknown

Were any of the following accident contributors related to this boat? (Every row should have a check-mark in it.)

	YES	NO	N/A	UNK
Peculiarities in handling characteristics	___	X	___	___
View obstruction attributed to boat design	___	X	___	___
Inefficient control station layout	___	X	___	___
Structural failure	___	X	___	___
Steering failure	___	X	___	___
Other equipment failure	___	X	___	___
Steering or throttle out of adjustment	___	X	___	___
Were this boat's navigation lights adequate?	___	__	X	___
Were this boat's navigation lights on?	___	__	X	___
Loss of stability during high speed maneuver	___	X	___	___
Loss of stability due to wave or wake	___	X	___	___
Loss of stability in strong current, rapids, rough water	___	X	___	___
Ran out of fuel	___	__	X	___
Blower inadequate due to malfunction	___	__	X	___
Bilge pump inadequate due to malfunction	___	__	X	___
Slippery deck	___	__	X	___
Lack of hand or grab rails	___	__	X	___
Failure of anchor; other anchor related factors	___	__	X	___

Other: (Explain)_____

EXPLANATORY NOTES:

DATA SOURCE:

SIGNALLING:

Every row should have two check-marks, one for each question for each row. N/A stands for Not Applicable; UNK stands for Unknown. If a type of signal was not on board, use N/A for "Was it used?"

	Was this type of signal on board?			Was this type of signal used?		
	YES	NO	UNK	YES	NO	UNK
Flares	___	X	___	___	X	___
Flags	___	X	___	___	X	___
Signalling lights (flashlight, etc.)	___	X	___	___	X	___
Electronic	___	X	___	___	X	___

Other:
(Specify)_____

EXPLANATORY NOTES:

276

DATA SOURCE:

NOTE: N/A stands for Not Applicable and UNK stands for Unknown.

Were any of the following contributors to the accident with respect to this vessel? (Every row should have a check-mark in it)

	YES	NO	N/A	UNK
Sunglare				
Bright sun	___	___	X	___
Sun high	___	___	X	___
Sun low	___	___	X	___
Just prior to accident, boat was headed into sun	___	___	X	___
Visual problems (overcast, misty, foggy)	___	___	X	___
Changing sun conditions (bright to minimal sun)	___	___	X	___
Noise, Shock/Vibration				
Just prior to accident, boat achieved speeds of approximately 10 mph. 16 kph.				
If outboard motor, running at near full speed	___	X	___	___
Operator inside cabin	___	X	___	___
Full windshield in front of operator	___	X	___	___
No windshield	X	___	___	___
If inboard, equipped with mufflers	___	___	X	___
Boat pounding	___	X	___	___
Ride uncomfortable	___	X	___	___
Was operator seat padded or cushioned?	___	X	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Fatigue/Discomfort/Time Stress				
Vigorous activity during or prior to accident	___	X	___	___
Person uncomfortably cold	___	X	___	___
Facing into wind	___	X	___	___
Facing into spray	___	X	___	___
Person physically ill	___	X	___	___
Hurrying to achieve destination by a certain time	___	X	___	___
Time of outing prior to accident	1/4 hrs.			
Time exposed to elements	1/4 hrs.			
Time elapsed since person last slept	2 hrs.			

EXPLANATORY NOTES:

(278)

DATA SOURCE:

OTHER HUMAN FACTORS/STRESSORS CONTRIBUTORS:

NOTES: N/A stands for Not Applicable and UNK stands for Unknown. (Every row should have a check mark in it.)

	YES	NO	N/A	UNK
Drugs/Narcotics/Alcohol				
Was the operator on medication? (If yes, describe_____)	___	X	___	___
Were narcotics (controlled substances) involved?	___	X	___	___
Was alchohol involved?	___	X	___	___
Was the person(s) drunk?	___	X	___	___
Poor Judgment				
Were any of the following contributors to the accident with respect to this vessel?				
Overloading	___	X	___	___
Exceeding persons capacity	___	X	___	___
Improper load distribution	___	X	___	___
Change in load distribution (not passenger movement)	___	X	___	___
Passenger movement	___	X	___	___
Operator standing on gunwale, bow, transom	___	X	___	___
Passenger standing on gunwale, bow, transom	___	X	___	___
Excessive speed for conditions	___	X	___	___
Operator seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Passenger seated improperly on gunwale, seat back, bow, etc.	___	X	___	___
Operator unfamiliar with boat	___	X	___	___
Operator unfamiliar with water/ area	___	X	___	___

EXPLANATORY NOTES:

DATA SOURCE:

	YES	NO	N/A	UNK
Operator inattention	___	X	___	___
Failure to detect hazard	X	___	___	___
Navigational error	___	X	___	___
Violations of rules of road	___	X	___	___
Started engine in gear	___	X	___	___
Started engine in improper sequence	___	X	___	___
Did not check weather	X	___	___	___
Ignored weather warning	___	X	___	___
Operator away from helm	___	X	___	___
Operating in malicious/ reckless manner	___	X	___	___
Overconfidence in boat capabilities	___	X	___	___
Overconfidence in ability to handle boat	___	X	___	___
Lack of swimming ability	___	X	___	___
Lack of sufficient safety equipment	___	X	___	___
Did not know how to use safety equipment	___	X	___	___
Disregard for safety precautions	___	X	___	___
Lack of parental supervision for young operator	___	X	___	___

EXPLANATORY NOTES:

(310)

DATA SOURCE:

PERSON'S POST ACCIDENT BEHAVIOR WITH RESPECT TO BOAT:

(Enter at bottom of page)

RELATION TO BOAT IMMEDIATELY AFTER ACCIDENT:

* 1 Maintains contact with boat initially

2 Enters water unconscious

3 Loses contact with boat initially but regains contact

4 Loses contact with boat initially and unsuccessfully attempts to regain contact

5 Loses contact with boat; does not attempt to regain contact

6 Trapped in overturned boat

7 Voluntarily leaves boat

ACTION:

* 1 Maintains position in boat

2 Holds onto boat

3 Loses contact with boat

4 Under boat

RESULT OF ACTION:

* 1 No injury

2 Drowns

3 Dies from exposure

4 Injured (hospitalization not required)

5 Injured (hospitalization required)

6 Reaches safety

7 Reaches safety through rescue

EXPLANATORY NOTES:

* Different Sequence for each occupant.

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Length of time person was in water; enter two codes, first hours, then min. (Enter 00/00 if never in water)	00/10	00/10	--/--	--/--	--/--
Post accident code from above (three digits)	7/3/5	5/3/1	-/-/-	-/-/-	-/-/-
If the person died and was taken from the water, the attitude of the body is best described as: (Circle one digit for each person who died)					
Completely submerged	1	1	1	1	1
Head submerged	2	2	2	2	2
Floating horizontally	3	3	3	3	3
Floating vertically, face not in water	4	4	4	4	4
Floating vertically, face in water	5	5	5	5	5

EXPLANATORY NOTES:

DATA SOURCE:

PFD AVAILABILITY AND USE	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
PFD aboard for this person's use: (Circle code for each person)					
1 Yes	(1)	(1)	1	1	1
2 No	2	2	2	2	2
9 Unknown	9	9	9	9	9
PFD accessible just before accident: (Circle code for each person)					
1 Yes	(1)	(1)	1	1	1
2 No	2	2	2	2	2
PFD accessible just after accident: (Circle code for each person)					
1 Yes	(1)	1	1	1	1
2 No	2	(2)	2	2	2
3 N/A	3	3	3	3	3
9 Unknown	9	9	9	9	9
Person used PFD: Circle code for each person					
1 Yes	(1)	1	1	1	1
2 No	2	2	2	2	2
3 N/A	3	(3)	3	3	3
9 Unknown	9	9	9	9	9
If person used PFD, then circle one of the following and the PFD type:					
1 Wore PFD at time of accident and did not remove it	(1)	1	1	1	1
2 Wore PFD but subsequently took it off	2	2	2	2	2
3 Wore PFD but it came off	3	(3)	3	3	3
4 Donned PFD after accident	4	4	4	4	4
5 Held onto PFD	5	5	5	5	5
PFD type: (Circle one for each person who used a PFD)					
1 CG approved I	1	1	1	1	1
2 CG approved II	(2)	(2)	2	2	2
3 CG approved III	3	3	3	3	3
4 CG approved IV	4	4	4	4	4
5 Non-approved	5	5	5	5	5
If non-approved, describe:					

EXPLANATORY NOTES:

DATA SOURCE:

	OPERATOR	PASS 1	PASS 2	PASS 3	PASS 4
Evidence of PFD failure: (see instructions; circle one) If yes, explain:					
_____ 1 Yes	1	1	1	1	1
_____ 2 No	(2)	(2)	2	2	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					
Evidence of improper PFD usage:					
If yes, explain:					
unhooked 1 Yes	1	(1)	1	1	1
_____ 2 No	(2)	2	2	2	2
_____ 3 N/A	3	3	3	3	3
_____ 9 Unknown	9	9	9	9	9
_____					
_____					

EXPLANATORY NOTES :

(254)

DATA SOURCE:

OPERATION OF BOAT AT TIME OF ACCIDENT:
(Circle the appropriate code)

(01) Cruising (proceeding normally)
02 Planing
03 Proceeding slowly, but underway
04 Maneuvering (docking, mooring, emergency operations)
05 Racing (sanctioned)
06 Towing
07 Being towed
08 Adrift
09 At anchor (includes moored to buoy or dragging anchor)
10 Docked
11 Other (Specify_____)
99 Unknown

PRINCIPAL ACTIVITY OF PEOPLE AT THE TIME OF THE ACCIDENT: (Circle the appropriate code)

1 Waterskiing
2 Fishing
3 Skin diving or swimming
4 Fueling
5 Pleasure cruising, departing
6 Pleasure cruising, returning
7 Pleasure cruising, in middle of outing
(8) Other (Specify hunting_____)
9 Unknown

ATTITUDE OF BOAT PRIOR TO ACCIDENT: (Circle the appropriate code)

(1) Level
2 Bow High
3 Stern High
4 Listing starboard
5 Listing port
9 Unknown

EXPLANATORY NOTES:

(285)

DATA SOURCE:

With respect to this boat prior to the accident, describe any other relevant information not previously coded. Note any structural damage, poor condition, repairs, deterioration, and modifications by the owner. Describe any pecularities in the handling characteristics of this boat (inability to turn at high speed, etc.).

* See narrative

Describe boat behavior (handling characteristics, movements, etc.) immediately prior to, during, and after the accident.

* See narrative

Final attitude of the boat is best described as: (Circle one)

1 Floating, level upright
2 Floating, inverted
3 Partially submerged/flooded bow higher
4 Partially submerged/flooded, stern higher
5 Sunk
(6) Aground

EXPLANATORY NOTES:

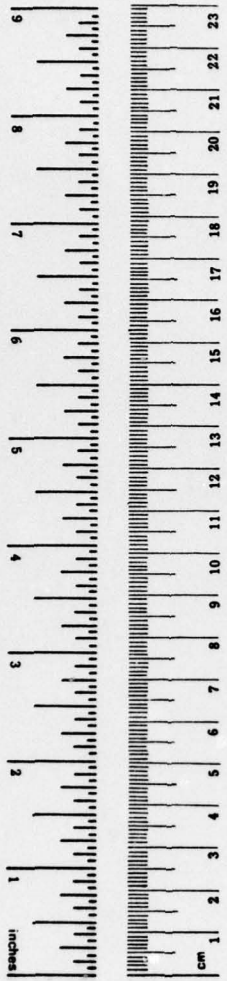
CG-D-61-78 COLLISION ACCIDENT INVESTIGATIONS FOR 1977 SEASON APRIL 1978

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F