NTSB/MAR-02/05
PB2002-916405

Marine Accident Report

Collision Between the U.S. Coast Guard Patrol Boat *CG242513* and the U.S. Small Passenger Vessel *Bayside Blaster*, Biscayne Bay, Florida January 12, 2002

National Transportation Safety Board
Washington, D.C.

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Abstract: This report discusses the collision that occurred on the evening of January 12, 2002, between the U.S. Coast Guard patrol boat *CG242513*, which was on a routine patrol of Biscayne Bay, Florida, and the small passenger vessel *Bayside Blaster*, which was on a sightseeing tour of the area. The accident resulted in no deaths or serious injuries. However, both Coast Guard crewmembers and 2 of the *Bayside Blaster*'s passengers were taken to a hospital for examination. Damages to the patrol boat (which was a total loss), the *Bayside Blaster*, and a moored recreational boat totaled $184,722.

From its investigation of the accident, the National Transportation Safety Board identified safety issues regarding the adequacy of the following: operation of the Coast Guard patrol boat; operation of the *Bayside Blaster*; Coast Guard oversight of routine patrols; Boatrides International, Inc. (owner of the *Bayside Blaster*) management oversight; kill switch operation on Coast Guard nonstandard boats; lifejacket stowage on the *Bayside Blaster*; and Coast Guard safety oversight of small passenger vessels in Miami.

On the basis of its findings, the Safety Board made recommendations to the U.S. Coast Guard, to Boatrides International, Inc., and to the Passenger Vessel Association.

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Acronyms and Abbreviations

AOR	area of responsibility
CFR	*Code of Federal Regulations*
COI	certificate of inspection
DOT	U.S. Department of Transportation
FWC	Florida Fish & Wildlife Conservation Commission
ICAO	International Civil Aviation Organization
MLB	motor lifeboat
OOD	Officer of the Day
PQS	personnel qualification standard
SAR	search and rescue
UTB	utility boat

Executive Summary

About 2013 on January 12, 2002, the 24-foot Coast Guard patrol boat *CG242513*, with two crewmembers on board, was on a routine recreational boating safety and manatee-zone patrol in Biscayne Bay, Florida, when it collided with the small passenger vessel *Bayside Blaster*, carrying 2 crewmembers and 53 passengers. Both Coast Guard crewmembers were ejected from their boat. The patrol boat continued running, circled to port, and struck the *Bayside Blaster* again. The unmanned Coast Guard patrol boat continued to circle for 10 to 15 minutes, striking a moored recreational boat two times and pilings near the shore. Police officers responding to the scene pinned the Coast Guard patrol boat to the pilings and shut off the engines. Five passengers who reported being injured were taken to the Coast Guard Station, where they were triaged. After triage, two passengers were transported to a hospital, and the others did not request further medical treatment. The two Coast Guard crewmembers were triaged by paramedics on Palm Island, taken to a nearby hospital for further examination, and released the morning of January 13. As a result of the accident, the Coast Guard patrol boat, valued at $80,000, was declared a total loss. The damage to the *Bayside Blaster* was estimated at $80,000, and the damage to the moored recreational boat was $24,722. Damages from the accident were estimated at $184,722.

The Safety Board's investigation of the accident identified the adequacy of the following as major safety issues:

- Operation of the Coast Guard patrol boat;
- Operation of the *Bayside Blaster*;
- Coast Guard oversight of routine patrols;
- Boatrides International, Inc., management oversight;
- Kill switch operation on Coast Guard nonstandard patrol boats;
- Lifejacket stowage on the *Bayside Blaster*; and
- Coast Guard safety oversight of small passenger vessels in Miami.

The National Transportation Safety Board determines that the probable cause of the collision between the Coast Guard patrol boat *CG242513* and the small passenger vessel *Bayside Blaster* was the failure of the coxswain of the Coast Guard patrol boat to operate his vessel at a safe speed in a restricted-speed area frequented by small passenger vessels and in conditions of limited visibility due to darkness and background lighting. Contributing to the cause of the accident was the lack of adequate Coast Guard oversight of nonstandard boat operations.

As a result of the investigation, the Safety Board makes recommendations to the U.S. Coast Guard, to Boatrides International, Inc. (owner of the *Bayside Blaster*), and to the Passenger Vessel Association.

Factual Information

Accident Narrative

Bayside Blaster

The U.S. small passenger vessel *Bayside Blaster* (see figure 1) left Bayside Marina, Miami, Florida, on an excursion to Biscayne Bay about 1930[1] on January 12, 2002, with a master, a deckhand, and 53 passengers on board.

Figure 1. The *Bayside Blaster*.

The *Bayside Blaster* followed its normal route from the marina, under the bridge on the west side of Dodge Island, eastward through the main channel along Dodge Island, and under the MacArthur Causeway Bridge. North of the causeway, the vessel maneuvered around the north end of Star Island and then south along its west side, traveling at idle speed (3 to 4 knots), while the master and deckhand alternated providing bilingual (English and Spanish) narration of the sights in the area (see figure 2).

[1] All times in this report are Eastern Standard Time, based on the 24-hour clock.

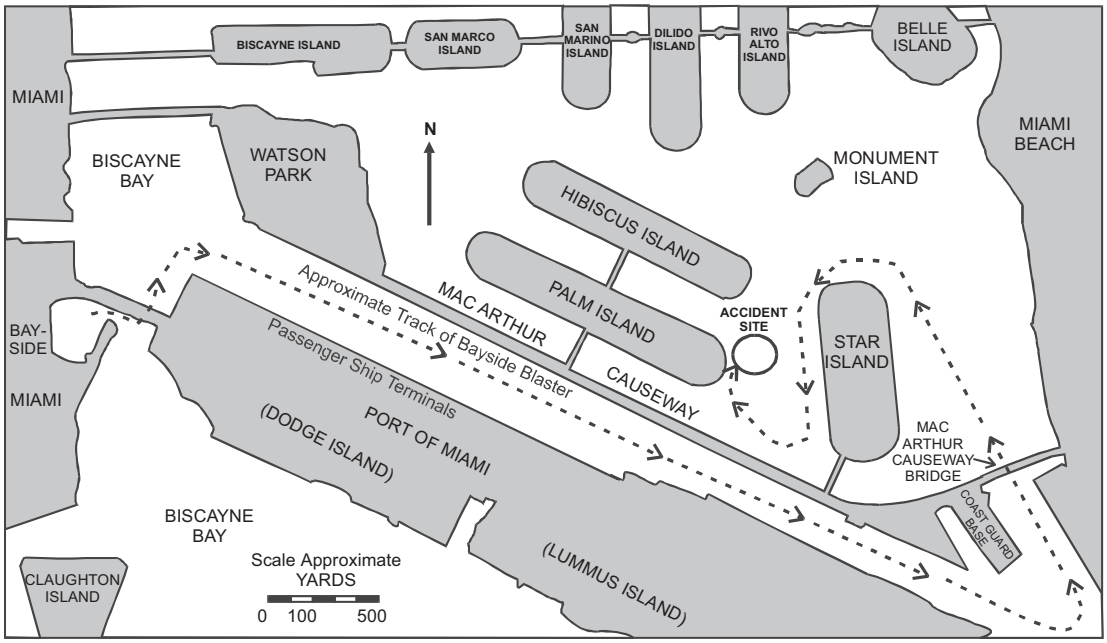


Figure 2. *Bayside Blaster* route.

From the south end of Star Island, the *Bayside Blaster* traveled west to Palm Island at a slow speed of 6 to 8 knots. Arriving at a point about 100 feet from the island, the master again slowed the vessel to idle and resumed the narrated tour. About 2010, the master began to round the east end of Palm Island, with the intention of touring between Palm and Hibiscus islands. The master and the deckhand were at the center steering station. The deckhand had just completed a narration describing a house on Palm Island when he noticed a commotion from the passengers seated in the bow area. Looking off the starboard bow, the deckhand saw the running lights and bow wave of an oncoming boat approaching at high speed.

The deckhand alerted the master and told him, "Go." The master applied right rudder and increased the throttle in an attempt to avoid the approaching boat.

Coast Guard Patrol Boat

About 1940, a Coast Guard petty officer at Coast Guard Station Miami Beach sought out the station Officer of the Day (OOD) and requested permission to undertake a recreational boating safety patrol of the north part of Biscayne Bay. According to the OOD, the coxswain requested, "to get under way for recreational boating safety . . . and while in the area go see [another Coast Guardsman] at a private residence on Palm Island." The OOD granted permission for the patrol and the visit to the private residence, but cautioned the petty officer "to complete some boardings around their visit" [that is, to board recreational boats and conduct safety checks on them while in the area of their visit].

About 2005, the petty officer got under way on the 24-foot Coast Guard patrol boat *CG242513* from Coast Guard Station Miami Beach for the recreational boating safety patrol, to enforce safe recreational boating rules and proper speeds in manatee-protection zones in Biscayne Bay (see "Waterway Information" section for more information). On board the patrol boat were two Coast Guardsmen: a coxswain (the petty officer who had requested the patrol) and a crewmember (also a petty officer). While the 24-foot patrol boat was departing the station at slow speed (about 6 knots), a crewmember on a nearby Coast Guard 41-foot utility boat (UTB) informed the coxswain of the patrol boat that his port navigation light (red sidelight) was out. The patrol boat's coxswain said that he tapped the light and it came back on.

The patrol boat then traveled north under the MacArthur Causeway Bridge. After clearing the bridge, the coxswain accelerated to full speed[2] (about 4,000 rpm, or 32 knots) and steered around the north end of Star Island and along the north shore of Hibiscus Island. After traversing about halfway along the north side of Hibiscus Island, the coxswain reversed course and headed toward the east end of the island (see figure 3).

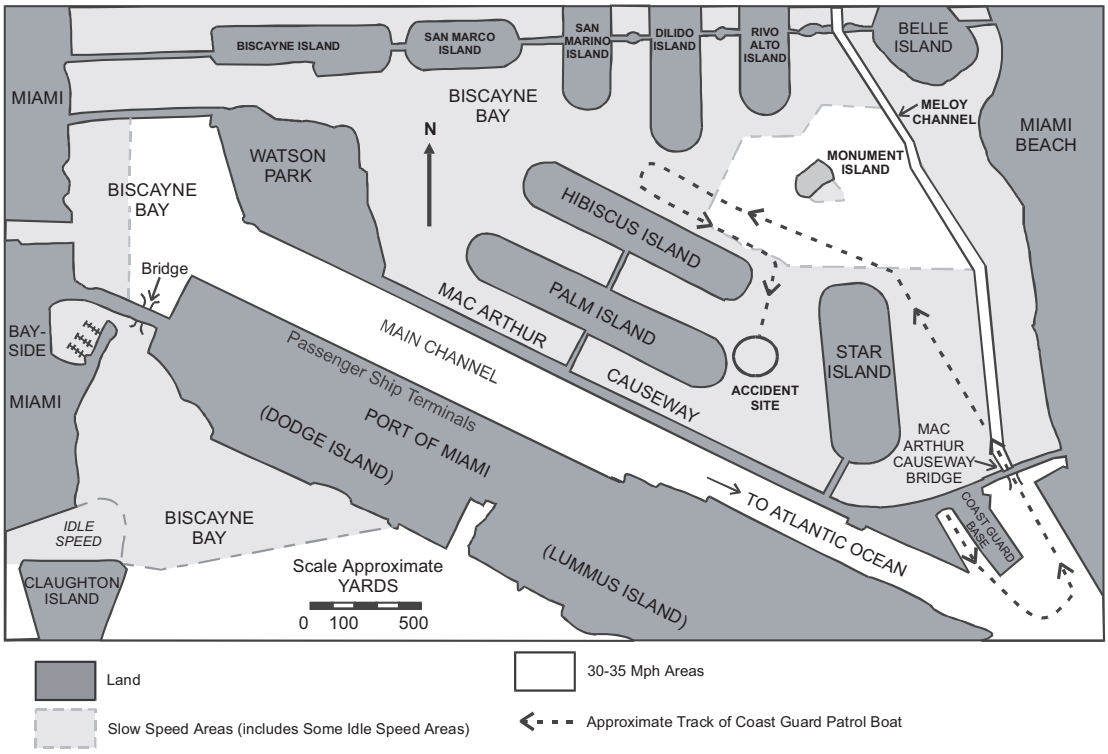


Figure 3. Manatee-protection speed zones in the accident area, with Coast Guard patrol boat route.

[2] The manufacturer's operating limit for the outboard engine is 4,400 rpm. Coast Guard Station Miami Beach had established 4,000 rpm as the maximum throttle setting for operations to reduce stress on the engines.

Still traveling about 32 knots, the patrol boat rounded the east end of Hibiscus Island and proceeded south in the waterway between Hibiscus and Star islands, heading toward the east end of Palm Island. The coxswain testified that "knowing [he] was going too fast in the manatee area" as the patrol boat approached Palm Island, he "started bringing the throttle back." The crewmember confirmed that the coxswain had his hands on the throttle as they entered the manatee zone. At the same time, both crewmembers saw a silhouette directly ahead and heard people screaming. The coxswain turned sharply to port and applied full starboard throttle in an attempt to avoid the obstacle.

About 2013, the patrol boat struck the *Bayside Blaster*'s starboard quarter, sideswiping it with the patrol boat's starboard bow. According to the crewmember, at or immediately after the impact, both she and the coxswain were ejected over the starboard side of the boat and into the water. With the patrol boat's engines still running about full throttle, the boat continued in a left-hand (counterclockwise) turn.

In the water, both Coast Guard crewmembers removed their automatically inflated lifejackets to more easily swim to nearby Palm Island; they did not remove their law enforcement equipment. Both were forced to dive under the water at least once to avoid the circling patrol boat. During one pass, the coxswain, while underwater, was struck in the back by the patrol boat's hull but not its propellers. As the crewmembers swam toward Palm Island, they called for help to people they saw on the island. Two people entered the water from a residence on Palm Island, swam to the crewmembers, and helped them to shore.

The master of the *Bayside Blaster* slowed his boat after the impact to determine whether the passengers were all right. The deckhand also looked over the side of the vessel to see whether any passengers were in the water, to check for damage, and to determine whether the vessel was taking on water. As the *Bayside Blaster* slowed, the unmanned patrol boat circled back and struck the *Bayside Blaster* again on the starboard side (see figure 4). After the patrol boat struck the *Bayside Blaster* the second time, the deckhand went to the helm console, where the master was calling the Coast Guard to report the accident. Coast Guard records show that the call was made at 2015. After the second impact, the master of the *Bayside Blaster* increased his speed and headed the vessel north to avoid being struck again by the circling boat. He maneuvered the *Bayside Blaster* toward the northwest side of Monument Island, about 800 yards north of the accident site, and beached the vessel's bow on the sandy beach.

En route to the island, lifejackets were distributed to the passengers, first by the deckhand and then by the passengers. Once the master beached the boat, the deckhand directed everyone to the forward end of the vessel. He then jumped off the bow and began to help the passengers disembark onto the beach. All passengers received a lifejacket either while on the *Bayside Blaster* or while on the island.

The *Bayside Blaster*'s uninjured passengers were ferried from the island by another company boat to Bayside Marina, their departure point. Five people who reported they were injured were taken with others in their group in Coast Guard vessels to the Coast Guard station, where medical technicians were waiting to triage them and where

ambulances were on hand to transport them to local hospitals. According to Coast Guard Station Miami Beach, two passengers with injuries were transported to South Shore Hospital. The other three injured passengers declined transport to a hospital and were taken to Bayside Marina by government vehicle.

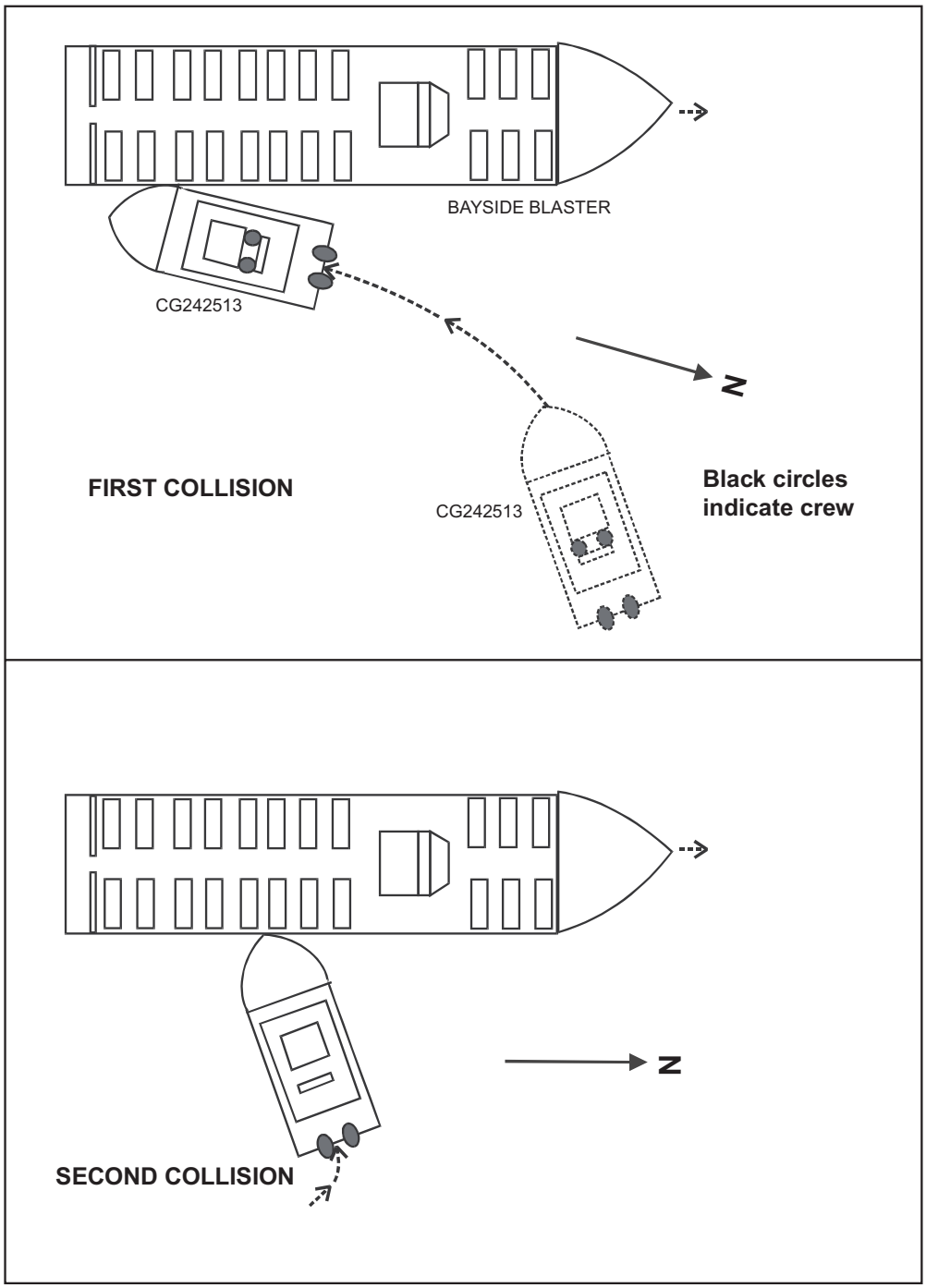


Figure 4. Approximate collision angles between the Coast Guard patrol boat and the *Bayside Blaster*.

Meanwhile, the Coast Guard patrol boat continued turning in counterclockwise circles toward the east side of Palm Island. Twice, the Coast Guard patrol boat struck a 46-foot recreational boat moored bow-out at a dock on Palm Island. The Coast Guard patrol boat's T-top struck the bow pulpit of the recreational vessel during the first collision. The T-top was knocked over and dragged on the port side of the Coast Guard patrol boat. According to witnesses on shore, the patrol boat began making very small left-hand circles with the T-top dragging (attached to the boat by engine control cables and electrical wiring) in the water. At 2035, about 20 minutes after it first collided with the *Bayside Blaster*, the Coast Guard patrol boat hit pilings on the northeast side of Palm Island. It was wedged into the pilings by a Florida Fish & Wildlife Conservation Commission (FWC) boat and a Miami Beach Police Department boat that had responded to the emergency (see figure 5). The officers managed to shut down the patrol boat's engines (figure 6 shows the patrol boat after the accident). See "Emergency Response" section for further details.

Injuries

The two Coast Guard crewmembers suffered bruises, and five of the *Bayside Blaster*'s passengers reported injuries as a result of the accident. After triage at the Coast Guard station, two passengers were transported to a hospital and three declined further treatment. The two Coast Guard crewmembers were taken to a nearby hospital for further examination and released early on the morning of January 13. The injuries sustained in the accident are shown in table 1.[3]

Table 1. Injuries sustained

Injuries	*Bayside Blaster*		*CG242513*	Total
	Crew	Passengers	Crew	
Fatal	0	0	0	0
Serious	0	0	0	0
Minor	0	5	2	7
None	2	48	0	50
Totals	2	53	2	57

Title 49 *Code of Federal Regulations* (CFR) 830.2 defines a fatal injury as any injury that results in death within 30 days of an accident. It defines serious injury as that which requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; results in a fracture of any bone (except simple fractures of fingers, toes, or nose); causes severe hemorrhages, nerve, muscle, or tendon damage; involves any internal organ; or involves second- or third-degree burns, or any burn affecting more than 5 percent of the body surface.

[3] Injuries are categorized according to the injury criteria of the International Civil Aviation Organization (ICAO). The Safety Board uses the ICAO injury criteria in all its accident reports, regardless of transportation mode.

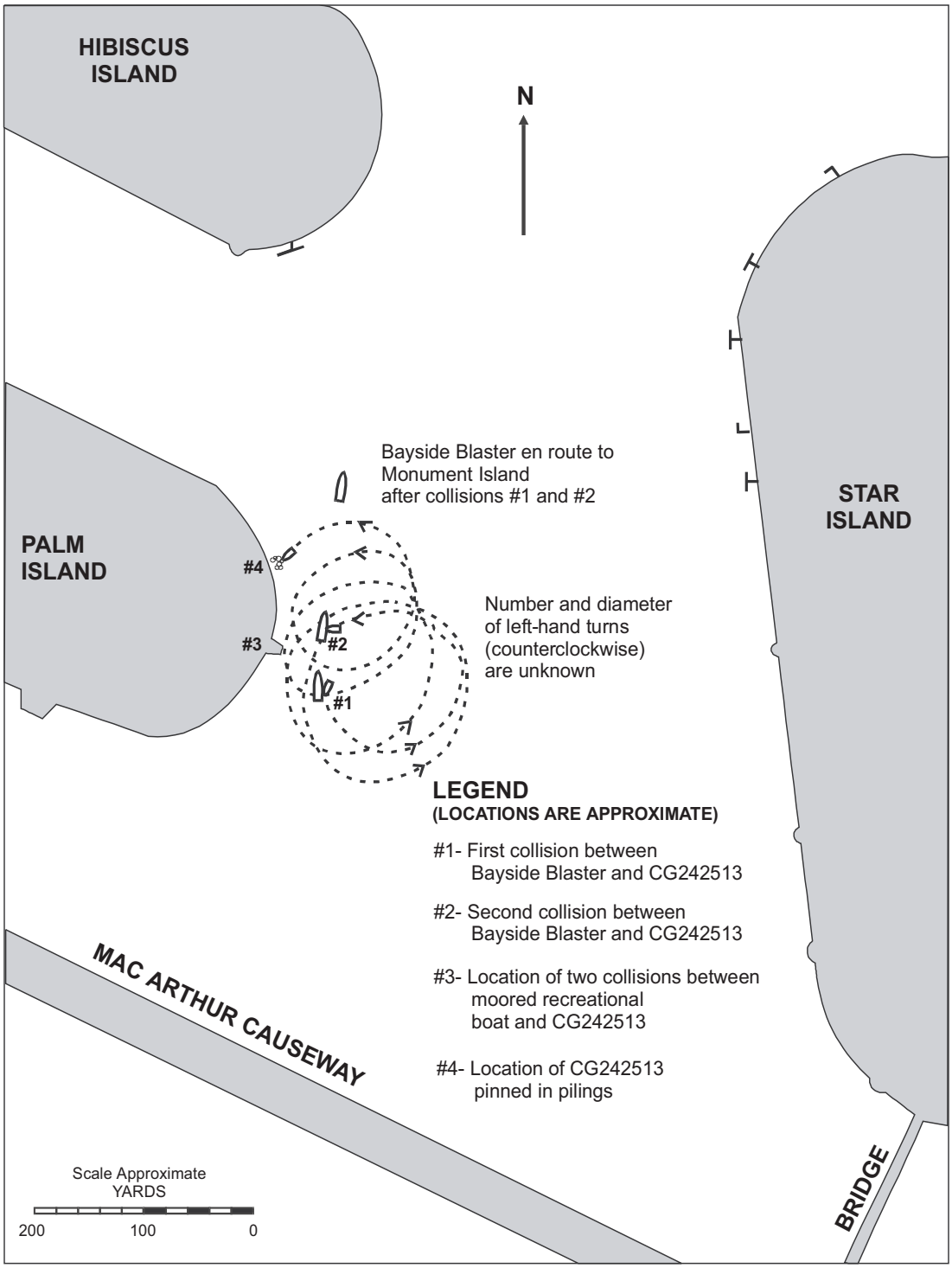


Figure 5. Possible track of the Coast Guard patrol boat from the time it collided with the *Bayside Blaster* to the time it was secured to pilings on Palm Island (for illustrative purposes only).

Figure 6. Damaged Coast Guard patrol boat.

Damages

The Coast Guard patrol boat, valued at $80,000, was declared a total loss. The damage to the *Bayside Blaster* was also estimated at $80,000. The damage to the moored recreational boat was $24,722 (see "Wreckage" section for more information). The *Bayside Blaster* returned to service on April 21, 2002.

Crew Information

Coast Guard Patrol Boat

Coxswain. The coxswain, a petty officer second class (E-5), age 24, had served in the Coast Guard for 4 1/2 years at the time of the accident. Before being stationed at Coast Guard Station Miami Beach, he served on the Coast Guard cutter *Long Island.* He reported to Station Miami Beach in July 2000 and was qualified as a coxswain of 41-foot UTBs in February 2001, which automatically qualified him to coxswain nonstandard Coast Guard boats (those 30 feet or less in length), which included the 24-foot patrol boat. According to the Coast Guard, while it had not yet established servicewide training standards for nonstandard boats, Station Miami Beach had generated a personnel qualification standard (PQS) checklist for its nonstandard boats, a common practice throughout the Coast Guard. The qualification review board for the station's UTB served as the review board for all

station boats. Some questions asked during the qualification review pertained to nonstandard boats, though a check ride on a nonstandard boat was not required for qualification. The Coast Guard has since issued nonstandard boat PQS certification and check ride requirements, which are distinct for each type of nonstandard boat in addition to being separate from the requirements for standard boats.

At the time of the accident, the coxswain had been operating the 24-foot patrol boat for 11 1/2 months as a qualified coxswain. He stated that he had been through the accident area many times during his tour at Coast Guard Station Miami Beach. Coxswains were required to conduct at least one day trip and one night trip on any type of boat every 6 months through all designated areas of interest in the Station Miami Beach area of responsibility (AOR), which included the location of the accident. According to the coxswain's individual training record, which covered June 1, 2001, to January 11, 2002, he had accumulated 6 hours of night operation time in the station's AOR over two separate trips. The coxswain's training record also revealed that he had practiced boat-handling skills, specifically, maneuvering in tight quarters on Coast Guard Station Miami Beach's 41-foot UTB, and that he had spent 8.2 hours practicing piloting and navigation onboard the same boat. Station records showed that he had a total of 49 hours of operating experience on the accident boat and nearly 34 hours of operating experience on the other 24-foot patrol boat at the station. The coxswain's personnel file contained no record of any reprimands or anything else negative.

The coxswain had 8 hours of sleep two nights before the accident and 11 hours of sleep the night before it. Station policy allows the boat crewmen the day off on the day before their scheduled duty period begins. Therefore, the coxswain did not work the day before the accident. He began his duty at 0700 on the day of the accident and operated the 41-foot UTB from approximately 0840 to 1200. About 1330, he ate lunch and then reviewed PQSs with the OOD. The rest of the afternoon, he watched a televised football game, which started at 1630, in the station crew lounge with other Coast Guardsmen. Alcoholic beverages are not permitted in the lounge. According to the station log, the 24-foot patrol boat got under way on the accident voyage about 2005.

During the Safety Board interview, the coxswain rated his overall health as good and indicated that he was not taking any prescription or nonprescription medication.

Crewmember. The crewmember, a petty officer third class (E-4), age 23, joined the Coast Guard on February 1, 2000. After completing basic training, she was assigned to Coast Guard Station Miami Beach on July 7, 2000. She also attended a specialty training school for a machinery technician rating at the Coast Guard Training Center in Yorktown, Virginia. She had been qualified as a boat engineer for about a year at the time of the accident. According to the crewmember's individual training report, which covered the period June 1, 2001, through January 11, 2002, she had accumulated 2 hours of night operation time in the station's AOR during one trip. She had also participated in 16 hours of team coordination training in October 2001. The training report revealed that the crewmember had had no specific training in the operation of nonstandard boats, although she had completed the station's PQS to qualify as a boat crewman and engineer on

nonstandard boats. The crewmember's personnel file contained no record of any reprimands or other negative items.

The crewmember indicated that she stood day work duty, 0700 to 1500, on January 10, 2002. She had gotten 7 1/2 hours of sleep on January 10. On January 11, she was off duty and ate dinner about 1900. That night she slept for 8 hours. On January 12, the day of the accident, she began her duty at 0700 and ate lunch about 1300. She got under way to escort cruise ships out of Miami Harbor about 1600 and returned to the station about 1730.

The crewmember reported that her overall heath was good. Although she had a history of hypertension, no medication was currently prescribed for the condition.

Bayside Blaster

Master. The Master, age 49, worked part-time on the *Bayside Blaster* one day a week, on Saturdays, and only during the second shift (1600 to 2400). He had worked for Island Queen Sightseeing Tours, Inc., the parent company of Boatrides International, Inc., the owner and operator of the *Bayside Blaster*, for about 3 years as a deckhand before receiving a Coast Guard master's license in October 1998. Previously, he had worked as a deckhand on a 75-foot vessel and as a mate on several fishing vessels in Key West, Florida, for a year. The owner of the *Bayside Blaster* indicated that there had never been any reprimands or other negative items in the master's personnel file.

On October 9, 1998, the master completed a Coast Guard-approved Master of Passenger Vessels training course at Sea School in Fort Lauderdale, Florida. On October 21, 1998, he received a Coast Guard master's license as a master of near-coastal steam or motor vessels of not more than 100 gross tons.

The master of the *Bayside Blaster* said that on January 9 through 11, he slept about 6 hours each night. From 0700 to 1800 on January 11, he was at his other job, and that night he slept for about 9 hours. On the day of the accident, January 12, he went to his other job from 0700 to about 1100. He reported eating lunch about 1200 and taking a nap from 1300 to 1500. At 1650, he started his shift on the *Bayside Blaster*. About 1715, he began loading passengers for the 1730 trip, which returned to the dock about 1845. He took a few minutes to relax, drank some coffee, and about 1915, began loading passengers for the second trip. About 1930, he got under way on the accident trip.

The master reported that his overall health was good and that he was not taking any prescription or nonprescription medication.

Deckhand. The deckhand, age 25, had worked for Island Queen Sightseeing Tours for about 3 years. He had left their employment to work for other companies and had been back working for Island Queen Sightseeing Tours for 4 or 5 months before the accident. In the previous 3-year period, he had worked on all four boats owned by the company, including the *Bayside Blaster*. Since returning to the company, he had worked solely on the *Bayside Blaster* as a deckhand. He had not completed any formal maritime training,

nor was any required. The owner of the *Bayside Blaster* indicated that there were no reprimands or anything else negative in the deckhand's personnel file.

The deckhand reported sleeping about 7 1/2 hours on the night of January 9. He slept for approximately 11 hours on the night of January 10. He spent January 11 shopping with his family and slept about 10 1/2 hours the night before the accident. He started work at 1030 on January 12, washing down the boat for the afternoon cruise. Before the accident run, he worked on three trips—at 1330, 1530, and 1730. Between trips, he stood by at the dock and waited for the next trip.

Vessel Information

Coast Guard Patrol Boat

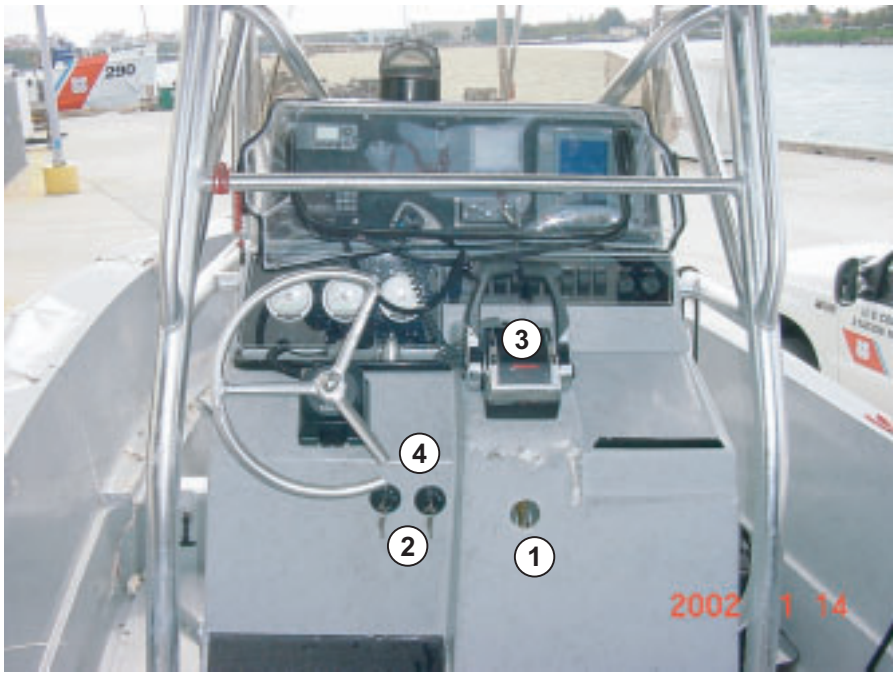
The Coast Guard patrol boat was a fiberglass-reinforced plastic Boston Whaler Guardian, 24 feet long by 8 feet 3 inches wide, built in 1997 and powered by two 200-horsepower Mercury outboard engines. The coxswain's control/console station was in the center of the boat, with a leaning post behind it. The console was covered by an overhead T-top made of canvas stretched over a metal framework. Radio and radar antennas were mounted on the T-top. The boat was equipped with separate red and green sidelights and a white all-around light. The vertical separation between the sidelights and the white all-around light was about 1 foot.[4]

The red and green sidelights were moved from the bow area to the forward outside corners of the T-top when it was installed in 2001. The white all-around light was also moved to the T-top and installed on top of a 1-foot extension aft of the radar antenna. Safety Board investigators examined the boat involved in the accident and found that the radar antenna partially blocked the white all-around light for about 10° on either side of dead ahead (see "Other Information" section for further discussion of navigation lights on Coast Guard patrol boats).

The manufacturer's operating limit for each outboard engine is 4,400 rpm. Coast Guard Station Miami Beach had established a 4,000-rpm limit for normal (nonemergency) high-speed operations. Depending on sea state and vessel load, 4,000 rpm on both engines produced speeds of about 32 knots.

The steering wheel was offset left of center on the console. Immediately right of center were the engine controls, which consisted of a single lever control (shift and throttle on the same lever) for each engine, mounted together (see figure 7). Two separately keyed ignition switches (one for each engine) were mounted under the wheel. The steering wheel had a knob attached to ease turning (see figure 8).

[4] The Inland Navigation Rules stipulate that the minimum vertical separation between sidelights and the white all-around light will be 1 meter (3.3 feet).



1. Kill switch location
2. Engine ignition keys
3. Throttles
4. Damaged steering wheel

Figure 7. Postaccident photograph of Coast Guard patrol boat console.

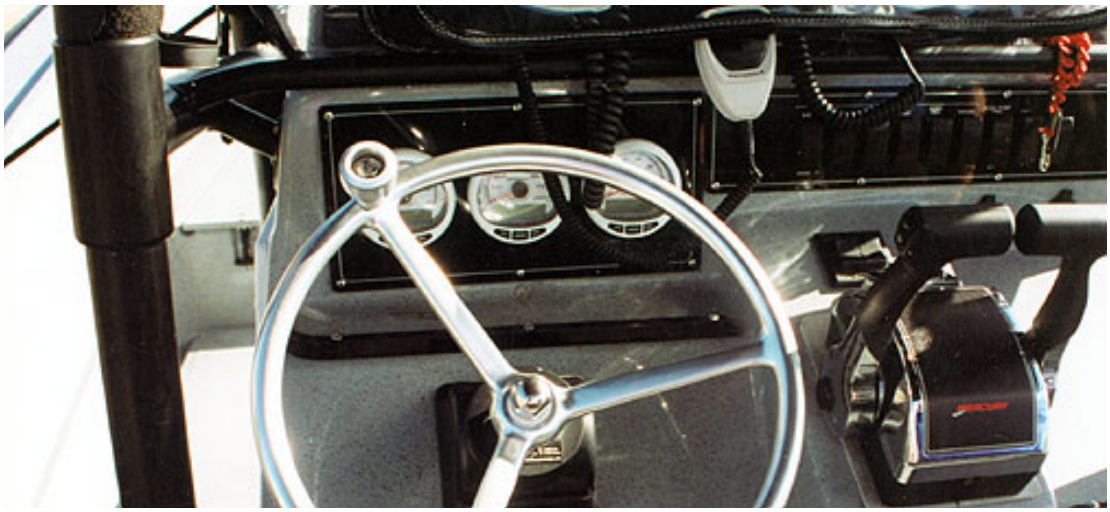


Figure 8. Patrol boat steering wheel, with steering-assist knob.

The Coast Guard patrol boat was equipped with a toggle-style engine kill switch (see figure 9), provided by MerCruiser, the engine's manufacturer. The kill switch was mounted on the aft vertical face of the center console, to the right of the engine ignition

switches and about 1 1/2 feet lower than the engine control levers (see figure 7). A plastic loop on one end of a coiled lanyard (about 1 foot long, it could be stretched to about 4 feet) fit over the kill switch, where it was held in place by a plastic cover. The other end of the lanyard was connected to a plastic handcuff key clip on the coxswain's belt (see figure 10). About three months before the accident, Coast Guard Station Miami Beach had changed to a coiled lanyard because the straight one used previously had interfered with work, according to the commanding officer of the station.

Figure 9. Kill switch with lanyard attached.

The system is designed so that if the plastic loop and lanyard are pulled in any direction from the kill switch (when, for example, the operator inadvertently moves away from the console), the engines should stop. In such a system, the kill switch maintains an open circuit while the engines are operating. When the lanyard-and-loop assembly is pulled from the switch, the toggle closes the switch, which grounds the ignition circuits and shuts down the engines. When the kill switch is in the on position, the engines can be started regardless of whether the lanyard-and-loop assembly is in place.

The handcuff key clip was connected to a loop on the coxswain's web belt. The crewmember confirmed during her interview that the kill switch was connected by the lanyard to the coxswain's belt. After the accident, the handcuff key clip was found broken (figure 10). A Safety Board investigator took possession of the handcuff key clip and kill switch lanyard from the commanding officer of Coast Guard Station Miami Beach and delivered them to the Safety Board's Materials Laboratory for examination (see "Test and Research" section for more information).

Engineering staff at Coast Guard Station Miami Beach completed a daily examination of each boat at the station, following a checklist. At the time of the accident, the list did not include checking the kill switch operation. However, the station's standing orders required the kill switch to be checked daily. The station duty engineer stated that he

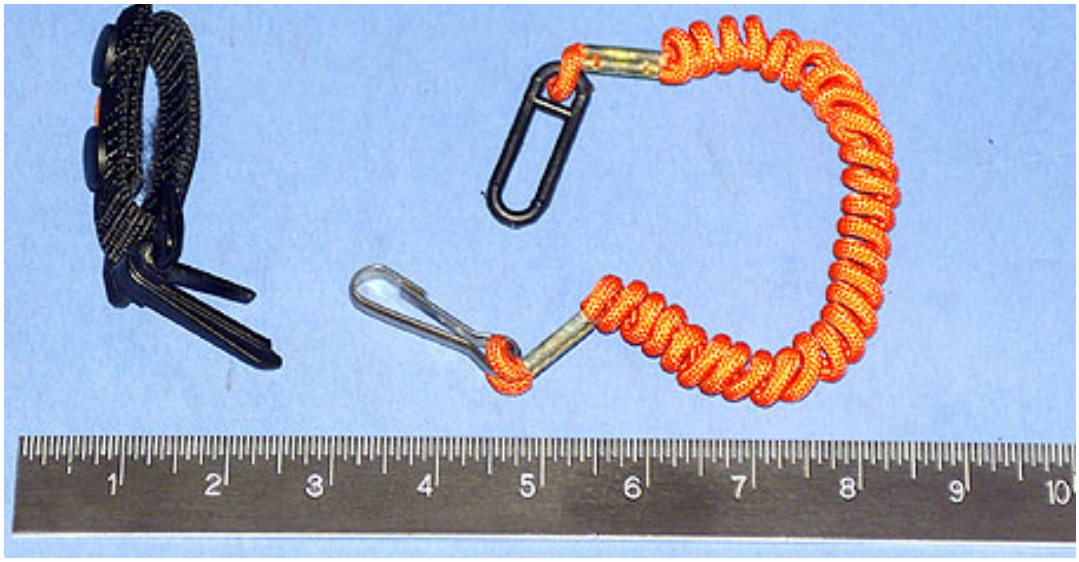


Figure 10. Belt loop with broken clip (left) and lanyard with metal clip and plastic loop (right).

had checked the kill switch on the morning of the accident and that it had operated properly.

The checklist also included a visual examination of the engines, with a check of fuel and oil levels, and operational tests of engines, navigation lights, searchlight, worklights, and bilge pumps. The only deficiency noted on the January 12, 2002, checklist for the *CG242513* was that the starboard worklight was inoperative.

After Safety Board investigators viewed the salvaged Coast Guard patrol boat, located part of the kill switch, and viewed the damaged steering wheel and the broken plastic clip hook from the coxswain's belt used to attach the kill switch lanyard, they interviewed a Miami Beach police officer about the kill switch. The officer reported that the kill switch lanyard was hanging from the switch when he leaned into the patrol boat. After wedging the boat into pilings at Palm Island, he and the FWC officers shut off the engines by pulling on the console's wiring harness and hitting the console with a baton. After the patrol boat was salvaged and T-top placed upright, the kill switch and lanyard were found in the deck drain. (The lanyard was not connected to the switch.)

At the request of Safety Board investigators, the Station Miami Beach commanding officer polled his coxswains about the kill switch lanyard becoming fouled with the steering wheel during turns. The coxswains universally reported having experienced the problem more than once.

Safety Board investigators advised the Coast Guard team conducting an internal investigation of the accident and Coast Guard Headquarters Office of Boat Forces[5] that the kill switch did not activate in the accident. As a result, a safety advisory regarding engine kill switches was sent out by the Coast Guard Assistant Commandant for Operations, in ALCOAST[6] message 038/02 on January 30, 2002:

> Crews operating non-standard boats and cutterboats are at significantly higher risk for ejection from their boat than their counterparts operating larger standard boats. In FY 2001 alone, over 70 Coast Guard members had unplanned departures from their boats. . . . As a result of these mishaps, two Coast Guard members lost their lives and one was seriously injured.

The Coast Guard message also stated that kill switches must be used at all times while such boats are under way, and that kill switch lanyards must be attached to a metal D-ring on the coxswain's lifejacket or survival vest. The Coast Guard message equated the wearing of the kill switch lanyard to putting on a seat belt when operating an automobile. Further, the message required that the kill switch and lanyard be inspected daily, incorporated into a daily checklist, and tested weekly. It also stated that Coast Guard headquarters intended to have kill switches installed on all nonstandard boats, and that boats less than 40 feet long are to have kill switches installed within 24 months. Finally, the message mandated inspecting kill switch and lanyard configurations for condition and switch location, and making changes if necessary.

The Coast Guard reported that its inspection of the kill switch wiring inside the console after the accident revealed a disconnected wire. The report indicated that the disconnected wire would have kept a ground from being completed in the ignition circuits when the toggle switch was closed, thereby preventing the engines from stopping. Possible explanations offered by the Coast Guard report for the disconnected wiring are, first, that the boat was used earlier in the day to respond to a boat taking on water offshore about 10 miles from Coast Guard Station Miami Beach. The coxswain in the case stated that he had run the boat at high speed in moderate seas, causing moderate to severe pounding of the boat. Such pounding, according to the Coast Guard report, could have disconnected the wiring. Second, the report stated that the wiring could have been disconnected by one of the police officers who boarded the boat and tried to stop the engines by pulling wires in the console. Third, the Coast Guard report stated that the wiring could have been disconnected when the console was torn loose from the deck.

Bayside Blaster

The *Bayside Blaster,* O.N. 1033547, was a fiberglass-reinforced plastic, 65-foot-long by 18-foot-wide, 54-gross-ton small passenger vessel, built by the Defender Yacht

[5] The office functions in the Coast Guard Headquarters Operations Directorate and is responsible for planning coordination and facility management for Coast Guard groups, stations, aids to navigation teams, port security units, and all small boats less than 65 feet long (standard and nonstandard). The office also develops boat crew survival equipment standards and requirements, provides for their acquisition and maintenance, and coordinates small boat training.

[6] Message sent by U.S. Coast Guard headquarters to all Coast Guard units.

Company in 1995. The *Bayside Blaster* was powered by two 1,600-horsepower diesel engines. It was owned and operated by Boatrides International, Inc., Miami, Florida, a subsidiary of Island Queen Sightseeing Tours, Inc., a company that operated three other vessels. According to the company's website, Island Queen Sightseeing Tours is a family-owned business that has operated for over 50 years.

Passenger seating in the *Bayside Blaster* was on fixed benches, divided by a center walkway. Eight rows of benches were aft of the raised operator's station (see figure 11) and three rows of benches were forward of the station. A canvas awning covered the rear passenger area, and a separate canvas awning covered the operator's steering station.

Figure 11. *Bayside Blaster* seating, looking aft from steering station.

The *Bayside Blaster* was equipped with separate red and green sidelights, a white masthead light, and a stern light. The red and green sidelights were installed on the side bulkheads, at the forward corners of the operator's raised station in the center of the vessel. Postaccident examination of the *Bayside Blaster*'s navigation lights by the Coast Guard in Miami showed that the sidelights were not properly screened, that the arc of visibility of the sidelights was approximately 30° greater than it should have been, and that the vertical separation between the masthead light and the gunwale was less than the required minimum of 2 1/2 meters (8.2 feet). The masthead light was mounted on the forward bulkhead of the operator's station, near the top edge, and the light's arc of visibility terminated at the port and starboard beams. Safety Board investigators found the stern light mounted on the top of the canopy, at its rearmost edge. The light fixture was designed to be an all-around white light, but the forward half of the lens was covered with duct tape to make it a stern light.

The *Bayside Blaster* was inspected by Coast Guard Marine Safety Office Miami and was issued a certificate of inspection (COI)[7] on August 20, 2001, permitting the vessel to carry 83 passengers, with a minimum crew of a master and two deckhands, on a limited coastwise route on the Atlantic Ocean and the Gulf of Mexico between Melbourne, Key West, and Cape Romano, Florida, not more than 3 miles from shore. The Coast Guard's inspection for certification of the *Bayside Blaster* included approval of the navigation lights and lifejacket locations. The *Bayside Blaster* provided 90-minute sightseeing cruises along Millionaire's Row, the Port of Miami, and Miami Beach, usually only on weekends.

Waterway Information

Miami Harbor is a deepwater port on the east coast of Florida. It is principally a consumer port (most imported cargo is consumed in the area rather than transshipped elsewhere) and is of great importance as a cruise port. Two unmarked jetties protect the harbor entrance, known as Government Cut. Miami Beach is the barrier island that separates Biscayne Bay from the ocean. Causeways and bridges connect a series of islands throughout Biscayne Bay to Miami Beach and the city of Miami on the mainland. A Coast Guard complex, including Coast Guard Station Miami Beach, is on the north side of the main ship channel at the east end of the MacArthur Causeway, and a large cruise ship complex and container port are on the south side of the main channel. The MacArthur Causeway forms the north shore of the main ship channel. North of the causeway, in Biscayne Bay, are Palm, Hibiscus, and Star islands.

The area of the bay where the accident occurred has background lighting from various sources in the Miami harbor area, including downtown office buildings to the west and private residences around Biscayne Bay. The MacArthur Causeway and the brightly lit container port are located south of the accident site, and an area of white and red lights on the islands and bridges is located to the north. The lights are generally at the same level as the navigational lights of vessels on the water.

The coxswain reported that in Miami, the background lights are always a "big" visibility factor, and that on nights when the causeway has more traffic, it is more difficult to operate. The coxswain also stated that he knew there was a blind spot coming around the end of Hibiscus Island, and that he made a wide turn at 4,000 rpm.

Most of Biscayne Bay has low-speed restrictions on vessels, imposed by the State of Florida to protect manatees, a marine mammal that is covered by the Federal Marine

[7] Small passenger vessels carrying more than six passengers for hire may not operate without a valid Coast Guard COI, which is issued by the Coast Guard Officer in Charge, Marine Inspection, for the zone. The COI, among other conditions, stipulates minimum firefighting, lifesaving, and staffing requirements. When determining the number and competencies of the crewmembers, the Officer in Charge, Marine Inspection, considers many factors, including the size of the vessel, its route, the type and horsepower of the vessel's propulsion machinery, the number of passengers, the type and location of lifesaving equipment, and the hazards peculiar to the route and service.

Mammal Protection Act of 1972 and the Endangered Species Act of 1973. The Florida Manatee Sanctuary Act was passed in 1978 to regulate motorboat speeds and operations in critical areas of manatee concentration. In those zones, boats must operate at idle or slow speeds (the designation can vary by time of year). Idle speed is defined as the minimum speed that will maintain the steerageway of a vessel while producing no wake. Slow speed is defined as the speed at which a vessel is off plane, has settled into the water, and is proceeding without a wake or with a minimal wake. In the area of the accident, slow speed is the maximum allowed year-round.

The area immediately north of Star Island and northeast of Hibiscus Island has a vessel speed limit of 35 mph. Two signs mark the boundary of the manatee-protection zone where the accident occurred. One sign is on the northwest corner of Star Island and the other is on the northeast corner of Hibiscus Island. A boat rounding Hibiscus Island and heading south immediately enters the State-designated slow-speed zone. The distance from where the Coast Guard patrol boat made the turn at Hibiscus Island to the area of the accident is about 400 yards (see figure 5).

Meteorology Information

Hourly observation tables from the National Weather Service for Miami International Airport, approximately 8 miles west of the accident site, show that at the time of the accident, there were broken clouds, with a visibility of 10 miles and a temperature of about 67º F. The winds were 6 knots from the south-southeast. According to the Coast Guard, the seas were calm and there was no precipitation in the vicinity at the time of the accident.

Sun and moon data provided by the U.S. Naval Observatory Astronomical Applications Department for Miami, Dade County, Florida, for January 12, 2002, list the sunset at 1750 and the end of twilight at 1815. Moonrise occurred at 1827. The moon was in a waning crescent phase, with 1 percent of its visible disk illuminated.

Operations

Coast Guard Operations

Coast Guard Station Miami Beach is a multimission boat station. Its primary duties are search and rescue (SAR), law enforcement, and port security. It has a response requirement of providing two boats and crews on 30-minute standby, 24 hours a day, 365 days a year. To maintain daily control of the response duties, senior second-class or first-class petty officers rotate as OOD. At the time of the accident, the OODs stood a 24-hour duty period on a 5- to 7-day rotation and were not part of the boat crews. The boat crews for the standby operations were organized into four duty sections. Each section had at least two complete boat crews (two each of the following: coxswain, engineer, and crewmember) and a boarding team (boarding officer and boarding team member). The

senior coxswain in each duty section was responsible for the overall mission-readiness of his section.

Guidelines from the command structure to the OODs and duty sections were provided by verbal direction and the station's standing orders. The duty coxswain was responsible for the overall mission-readiness of all SAR resources under his or her control, and while under way had overall responsibility for the operation of the vessel. The main duties of the duty boat crewmember while under way were to follow the directions of the coxswain and to act as primary lookout. The standing order that covered the operation of small boats required the OOD to give permission for all boat launches. The order also provided operating limitations for each type of boat based on seas, wind, and visibility. The standing order did not mention specific speed or nighttime limitations for any patrol.

Coast Guard Group Miami is the supervising unit for Station Miami Beach. Group Miami is responsible for coordinating the operations of 16 separate units, which include four small boat stations, among them Station Miami Beach. The Seventh Coast Guard District, headquartered in Miami, is the supervising unit for Group Miami and is the program manager for nonstandard boats at Station Miami Beach.

Coast Guard Nonstandard Boat Oversight

According to the Coast Guard, small boat operations are divided into two categories—standard and nonstandard boats. Standard boats are those more than 30 feet long and include the 41-foot UTBs and the 47-foot motor lifeboats (MLBs). Standard boats are designed and procured by Coast Guard headquarters. For standard boats, crew training, crew qualifications, vessel outfitting, and vessel operating limitations are set by Coast Guard headquarters. In addition, a 41-foot UTB standardization team from the Coast Guard Training Center and a 47-foot MLB team from the National Motor Lifeboat School at Cape Disappointment, Washington, biannually visit every boat station that has standard boats to inspect the standard boats and check the standardization of crew qualification. During the years when the national visit is not made, the group office that supervises the station conducts a ready-for-operations inspection for the same purpose. Both inspections concentrate solely on standard boats. The *Boat Crew Training Manual* (Commandant Instruction M16114.9C), issued by Coast Guard headquarters in May 1998, contains guidance for training and certifying personnel to operate Coast Guard boats.

Nonstandard boats, those measuring 30 feet or less in length, compose the remainder of the small boats at stations. The local Coast Guard district office has procurement authority. Thus, the manufacturer, size, and equipment of nonstandard boats vary widely, depending on the operating region and the conditions at individual stations. Nonstandard boats are typically highly maneuverable, lightweight vessels that have a greater speed, a shallower draft, and require fewer crewmembers than standard boats. Nonstandard boats make up 53 percent of the boats operated by Coast Guard station boat crews and carry out 3 percent of SAR missions.[8]

[8] U.S. Department of Transportation (DOT), *Audit of the Small Boat Station Search and Rescue Program*, Office of Inspector General, report MH-2001-094, September 14, 2001 (Washington, DC: DOT, 2001).

According to Coast Guard officials, at the time of the accident, no formal training or certification requirements existed for operating nonstandard Coast Guard boats. When someone was qualified on standard boats at a Coast Guard station, he or she was automatically considered qualified to operate nonstandard boats, although qualification on a particular type of vessel did not automatically qualify an individual on all types of vessels. As noted earlier, the Coast Guard has since issued nonstandard boat PQS certification and check ride requirements, which are distinct for each type of nonstandard boat in addition to being separate from the requirements for standard boats.

During his interview, the coxswain stated that all the qualification requirements to become a coxswain at Station Miami Beach were carried out on the 41-foot UTB. He also reported that during the coxswain qualification process, he was asked only "a couple of questions" about nonstandard boats and did not have to complete any qualification standards specific to the operation of nonstandard boats. The crewmember also stated that Coast Guard personnel are qualified on the 41-foot UTB, but noted that they do some drills and familiarization exercises on nonstandard boats.

An addendum to the Coast Guard Station Miami Beach nonstandard boat qualification guide for coxswains, engineers, and boat crewmen contains qualification requirements regarding the nonstandard boats used at the station. One section on boat handling contains an eight-item checklist. Three items assess operator proficiency in mooring and anchoring the boat, in the proper use of tilt/trim controls, and in maneuvering the boat in tight quarters. The remaining items require the operator to explain different aspects of boat handling, but they do not require an individual to demonstrate skill in boat handling. A review board consisting of the unit's department heads recommends qualified personnel to the commanding officer, who approves and designates them as qualified.

Recreational Boating Safety and Manatee-Zone Enforcement Patrols

Undertaking a routine patrol is left to the discretion of the OOD or coxswain.[9] No specific patrol routes or minimum number of patrols per day were required at the time of the accident. The OOD had final authority in the duty section and approved the areas to be patrolled, the boat to be used, and the crew. According to the coxswain, he decided to go on the patrol, with permission from the OOD. He further stated that he intended to conduct a patrol of the manatee-protection zone near Palm Island because of the high incidence of high-speed operation of personal watercraft in the area.

According to Coast Guard officials, station management learns of improper operation of its patrol boats (personnel not obeying speed limits or operating recklessly) from other crewmembers, from citizen complaints, or from postaccident or incident investigations. The commanding officer of Station Miami Beach stated that he had not received any complaints about the manner in which his coxswains had operated their boats before the accident. The marine patrol unit of the Miami Beach Police Department reported that no previous complaints had been filed against Coast Guard Station Miami

[9] The Coast Guard defines a routine patrol as a random-timed patrol in the AOR in support of Coast Guard missions.

Beach personnel for operating at high speeds in restricted zones. The FWC also reported that it had not received any complaints from the public or reports from its personnel about Coast Guard boats speeding in the restricted zones.

A Florida statute (68C-22.003(2) and (3)) exempts law enforcement officers from speed restrictions when entering a "motorboats prohibited" or "no entry" area in the performance of their duties if the entry is reasonably warranted, is conducted to directly protect manatees, or is necessary to prevent the loss of life or property or to render emergency assistance. Because the Coast Guard personnel involved in the accident were conducting a routine patrol, they were not exempt from the State's manatee-zone speed restrictions.

Island Queen Sightseeing Tours Operations

According to the procedures and policy manual of Island Queen Sightseeing Tours, which lists duties of the company's employees, the vessel master is responsible for the operation and maintenance of company vessels and for supervising deckhands while under way. He is also responsible for reporting deficiencies in policies, equipment, procedures, or personnel to the operations manager.

Island Queen employees were responsible for completing the deck assignment checklist for their assigned deck while under way, unless they were attending to passengers (for example, narrating). The checklist included cleaning the vessel and restocking the refreshments sold to passengers. When they were not attending to the checklist or other shipboard duties, the crewmembers were required to monitor passengers for safety and for enforcement of the alcoholic beverage policy.

The procedures and policy manual states, "Employees shall not operate any company vehicle or crew any vessel when taking any type of drug (prescribed or over the counter) that affects faculties in any way contrary to safety." The company is a member of the American Professional Captains Association's Maritime Drug Consortium.[10] The consortium conducts drug testing for preemployment, for periodic testing, for random testing, for postaccident testing, and for reasonable cause. It also provides medical review officer services and an employee assistance program for employees with substance-abuse problems.

Boat crews for all four Island Queen Sightseeing Tours vessels were drawn from the same staffing pool and scheduled in advance by the Island Queen operations manager. Typically, the day crews and evening crews changed about 1730. The *Bayside Blaster* was required to have a crew consisting of a licensed master and two deckhands. The operations manager said that two deckhands were scheduled for the 1930 trip on the *Bayside Blaster* on the evening of the accident. However, the second deckhand for the 1930 trip did not report for work the day of the accident. The master stated that he decided it was safe to sail with only one deckhand and that he had done it before, although infrequently. The

[10] Title 46 CFR 16.201-260 (subpart B) requires marine owners to have an approved drug-testing program for their employees involved in vessel operations.

operating manager said that he was not informed that the *Bayside Blaster* was short one deckhand before the trip started. He indicated that it was not the first time the *Bayside Blaster* had sailed shorthanded, but that it did not typically do so.

Medical and Pathological Information

Two marine casualty investigators from the Coast Guard Marine Safety Office, Miami, conducted Breathalyzer tests for alcohol on the crewmembers of the *Bayside Blaster* immediately after the accident, while they were on Monument Island. The results were negative. Between 0405 and 0420 on January 13, urine samples were taken by a contractor to test for the presence of drugs. The master of the *Bayside Blaster* tested negative. The deckhand tested positive for cannabinoids/THC (marijuana). Witnesses stated that the deckhand performed his duties in a seamanlike manner and did not appear to be impaired. After the accident, the owner reported that he had suspended the deckhand from his safety-sensitive position as deckhand but had continued to employ him. The deckhand was placed in the Maritime Drug Consortium's drug rehabilitation and monitoring program for at least 1 year. He was drug-tested on February 27, 2002, with negative results. His latest drug test, on October 15, 2002, was also negative. He was reinstated to a safety-sensitive position on May 1, 2002.

Postaccident blood samples were taken from the Coast Guard coxswain and the crewmember at Mount Sinai Medical Center, Miami Beach, to test for the presence of drugs and alcohol. The coxswain's sample was taken about 4 hours after the accident, and the other crewmember's was taken approximately 5 hours after the accident. The results for both coxswain and crewmember were negative for drugs and alcohol.

Wreckage

Coast Guard Patrol Boat

The bow section of the Coast Guard patrol boat was crushed back about 4 feet, with evidence of buckling on the inside and outside of the hull (see figure 6). The stainless steel trailer eyebolt was broken and bent downward. The T-top and center console assembly was torn loose from the deck plate mounting attachments. The aft mounting plates were torn upward, and the forward mounting plates were bent forward and torn out. The port forward frame of the T-top was crushed rearward. The starboard engine propeller shaft was broken, as evidenced by the freely rotating propeller. The starboard side of the outboard engine's lower gear housing and one of the propeller blades had fresh contact marks. The red plastic assembly of the port running light was missing, but the starboard running light was present and undamaged. A Safety Board investigator took possession of both lights from the commanding officer of Coast Guard Station Miami Beach and delivered them to the Safety Board's Materials Laboratory for examination (see "Test and Research" section for more information).

The ignition switches on the center console were found in the off position, with the keys inserted in the switches. The kill switch assembly was destroyed. The actual switch was found in the deck drain on the port side, along with, but not connected to, the kill switch lanyard. Inspection of the wiring harnesses inside the console showed that a connection was pulled apart. The connection was traced to the remains of the wiring to the kill switch. The steering wheel was broken and about a third of its circumference was missing, along with the knob on the wheel used for steering.

Bayside Blaster

Damage to the starboard side of the hull began about 20 feet forward of the transom. A series of scrapes and gouges originated in that area and extended aft, toward the stern and up to the deck. The gunwale aft was buckled inward above its joint with the main deck. The gunwale cap was torn loose and shifted rearward. The aft starboard canopy stanchion was torn away from the gunwale.

Three bench seats on the starboard side aft were torn from the deck. They had been mounted to the deck with wood screws. The screws had left gouges in the deck, indicating that the seats had been displaced to the port side across the center aisle and against the seats on the port side. A canopy stanchion attached to one of the seats was torn loose and bent.

Other Damage

The Coast Guard patrol boat struck a moored 46-foot fiberglass recreational boat, damaging the boat's bow pulpit area and the forward section of its port side.

Survival Aspects

Emergency Response

At 2015, the master of the *Bayside Blaster* notified Coast Guard Station Miami Beach of the accident via VHF-FM radio channel 16. According to the recorded radio communication, he reported that a runaway vessel with no one on board had "broadsided" his vessel. Simultaneously, a witness on Palm Island telephoned Coast Guard Station Miami Beach to report the collision.

An operator of a private vessel also notified Coast Guard Station Miami Beach of the accident on VHF-FM radio after the *Bayside Blaster* had left the scene. He confirmed the location of the Coast Guard patrol boat and stayed in the area, remaining clear of the patrol boat until it hit the pilings and stopped.

At 2017, Coast Guard Station Miami Beach dispatched two boats to the scene. The Coast Guard station notified the city of Miami emergency dispatcher, who passed the information to the Miami Beach Police Department marine unit and the FWC. Both units dispatched patrol vessels to the scene. A boat from Miami Fire-Rescue also responded. A

Coast Guard Auxiliary vessel and a commercial towing company, Seatow Miami, overheard the VHF radio traffic and responded to the scene. Island Queen Sightseeing Tours also responded with another of the company's small passenger vessels, the *Island Queen*.

At approximately 2025, the first response vessels on scene were two Coast Guard boats, followed shortly by the other vessels noted above. At that point, the Coast Guard patrol boat was still running in circles. About 2035, when the patrol boat collided with the shore pilings on Palm Island, the FWC and Miami Beach Police Department marine unit vessels came alongside the patrol boat. A Miami Beach officer reached for the ignition switches and observed that the kill switch lanyard was hanging from the kill switch. He pulled the lanyard off, then tried to reach the ignition switches, ultimately striking them with his baton.

At the same time, two FWC officers boarded from the starboard side of the Coast Guard patrol boat. One officer tried to pull the throttles to neutral but could not stop the engines or slow their speed. The other FWC officer reached into the console interior and began pulling at the wiring harness in an attempt to shut off the engines. The engines subsequently shut down. A search of the vessel by the responding officers confirmed that no one was on board.

After the *Bayside Blaster* beached on Monument Island, most of the passengers disembarked off the bow onto the island. The master accounted for all passengers by asking each group to check for all its people. FWC officers directed Coast Guard and Miami Beach Police Department personnel to make a passenger list. After the list was complete, passengers not going to the Coast Guard station for triage were transported on the *Island Queen* to the Bayside Marina. Coast Guard boats transported people reporting injuries and others in their group to Coast Guard Station Miami Beach, where ambulances were standing by for triage. Five passengers complained of minor injuries and two passengers were transported to the hospital by local emergency medical services. Three of the passengers did not request any further medical care and were transported to the Bayside Marina by government vehicle.

The Coast Guard crewmembers reached shore with the help of two people from Palm Island who swam out to render aid. An ambulance called by the Palm Island security force transported the two Coast Guard crewmembers to Mount Sinai Hospital, Miami Beach, for examination. The crewmembers were released from the hospital early on the morning after the accident and returned to Coast Guard Station Miami Beach.

The master and deckhand brought the *Bayside Blaster,* under its own power, back to Bayside Marina, escorted by a Coast Guard Auxiliary vessel. The Coast Guard patrol boat was towed by Seatow Miami to a nearby boat ramp, put on a highway boat trailer, and transported to Coast Guard Station Miami Beach.

Emergency Systems/Survival Equipment

Coast Guard Patrol Boat. The crewmembers on board the Coast Guard patrol boat were wearing automatically inflating lifejackets that had been provided to station personnel about 6 months earlier. They were also wearing web belts with law enforcement equipment attached (9-millimeter pistol, magazines, baton, and handcuffs). The lifejackets are worn uninflated during routine underway operations. When needed, a carbon dioxide cartridge inflates a bladder in the lifejacket. The cartridge is activated by a manual pull toggle, or it activates automatically after being immersed in water for about 4 seconds. In all previous training with the inflatable lifejackets, station personnel had used a mouth-inflation tube to inflate them. Crewmembers had received no training in which the lifejackets were inflated using the carbon dioxide cartridge.

When the crewmembers were ejected into the water, the lifejackets inflated automatically. The crewmembers found that the lifejackets constricted their necks and made it hard to breathe. They also had difficulty turning their heads and found it hard to swim because the buoyancy of the lifejackets rolled them onto their backs. The crewmembers said that they removed their lifejackets to make it easier for them to swim, to allow them to look out for the circling patrol boat, and to enable them to dive under the boat to keep from being hit.

Since the accident, Coast Guard Station Miami Beach has instituted annual training in the use and operation of the inflatable lifejackets, including in-water training, inflation by mouth tube, and manual and automatic carbon dioxide inflation. The training includes swimming with lifejackets inflated.

Bayside Blaster. The *Bayside Blaster* was equipped with 90 Coast Guard-approved adult-size lifejackets stowed in lockers at the bow (see figure 12). The lifejackets could be reached through two vertical hatches at the forward edge of the forward passenger seating area. The hatches were not labeled. The owner reported that the signs had been removed during ongoing refinishing of the decks and bulkheads. Fourteen Coast Guard-approved child-size lifejackets were stored in a compartment at the operator's station. The compartment was labeled "Childs Lifejackets," but the locker's opening mechanism was broken. Safety Board investigators observed that opening the compartment required prying the latch with a knife or similar object.

Small passenger vessels such as the *Bayside Blaster* that carry 150 or fewer passengers or have overnight accommodations for 49 or fewer passengers are required by 46 CFR part 180.78 to have lifejackets "stored in convenient places distributed throughout accommodation spaces."[11] The CFR further requires that "each life jacket kept in a storage container must be readily available." Federal regulations (46 CFR part 185.604(f)) also require that each container for lifejackets be marked with the number and identification of the items stowed inside. The Coast Guard last inspected the *Bayside Blaster* on August 20, 2001, and found no deficiencies in lifejacket stowage, although the inspection required

[11] The same regulation is found at 46 CFR 117.78 for small passenger vessels that carry more than 150 regular passengers or more than 49 overnight passengers.

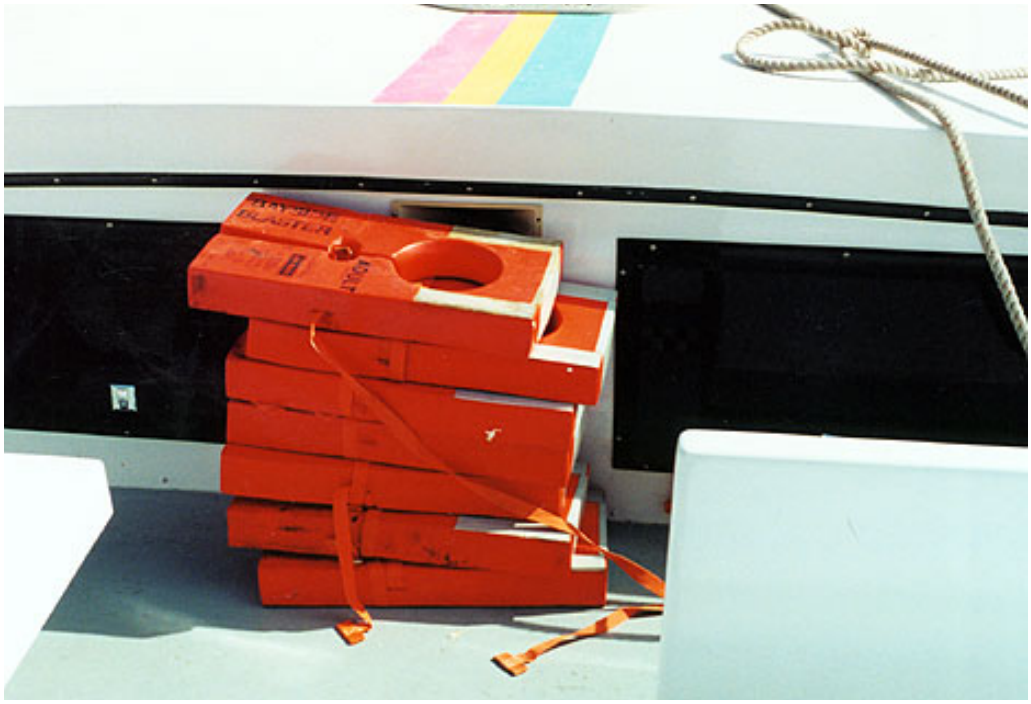


Figure 12. *Bayside Blaster*'s forward lifejacket stowage lockers.

replacing the reflective tape on some lifejackets. The *Bayside Blaster* was certified for service as a result of the inspection.

In a recent accident on the small passenger vessel *Port Imperial Manhattan* investigated by the Safety Board,[12] lifejacket stowage was identified as a problem. The Safety Board concluded, "If the lifejacket stowage had been more evenly distributed throughout the passenger cabin of the *Port Imperial Manhattan*, the lifejackets would have been more accessible to the passengers." After the accident, the owners voluntarily made changes to improve the stowage and distribution of lifejackets on this vessel and on another company vessel with similar lifejacket stowage problems. As a result of the *Port Imperial Manhattan* investigation, the Safety Board issued the following Safety Recommendation to the Coast Guard on July 3, 2002:

> M-02-13
>
> Issue a directive to small passenger vessel operators to review the distribution of lifejackets on board their vessels and to ensure that the lifejackets are accessible and segregated.

[12] National Transportation Safety Board, *Fire On Board the Small Passenger Vessel* Port Imperial Manhattan*, Hudson River, New York City, New York, November 17, 2000,* Marine Accident Report NTSB/MAR-02/02 (Washington, DC: NTSB, 2002).

On November 19, 2002, the Coast Guard responded, stating that it "will issue a Safety Alert reminding small passenger vessel operators of the requirements and suggest that they review the stowage arrangements on their vessels to ensure compliance with the regulations."

Tests and Research

Kill Switch Attachments

The Safety Board's Materials Laboratory examined the following kill switch attachments from the Coast Guard patrol boat: a curled nylon lanyard (about 3/16 inch in diameter by about 1 foot long curled, or about 4 feet long stretched), with a plastic loop (about 1 3/4 inches long by about 5/8 inch wide by 5/32 inch thick) on one end and a metal clip (1 7/8 inches long by 1/2 inch wide by 5/32 inch thick) on the other. The end of the plastic loop fit into the kill switch on the boat console. The metal clip end was attached to a plastic clip of about the same size, on a nylon loop (about 2 1/2 inches long [1 1/2 inches in diameter] by about 1 inch wide by about 1/8 inch thick) that had been attached to the coxswain's belt. The end of the plastic clip on the belt loop was broken off (see figure 10). The end of the plastic clip was not found.

The inside surface of the recovered part of the plastic clip from the belt loop showed several areas of damage and two smeared surface areas, each displaying a similar arced shape that matched the end of the lanyard's metal clip. A V-shaped impression was observed where material had been displaced upward and outward. The V-shaped impression was deepest at the edge, and its direction was across the width of the clip, stopping just past the center. The edges of the fracture face were sharp and well-defined. The fracture intersected a void containing a series of surface lines emanating from the void. The void was located at the maximum material thickness of the section of the clip. According to the Materials Laboratory, the void was typical of a shrinkage void in an injection-molded product.

The inner surface of the kill switch loop attachment, which would normally contact the kill switch toggle, appeared to be disturbed by a rubbing action. There were no indications of severe deformation.

Coast Guard Patrol Boat's Navigation Lights

The Safety Board's Materials Laboratory examined the Coast Guard patrol boat's port and starboard running lights**.** The port running light assembly was damaged. It consisted of the base with the bulb, but the red lens was missing. The bulb's glass envelope was removed from the port running light assembly for examination under a scanning electron microscope. One end of the filament end was fractured in a brittle manner, typical of the fracture of a cold filament (no electrical flow through the filament). The other filament end was fractured in a globular fashion, typical of the fracture of a hot element (with electrical flow).

According to the Materials Laboratory, to produce these fracture features, the sequence of events must have been as follows: (1) the globular fracture and bending of the filament were produced first, while electricity was flowing, and (2) the brittle fracture was produced later, when the filament had cooled. The starboard running light assembly was undamaged and consisted of the base, the green lens, and the bulb. The Materials Laboratory determined that the filaments of the port and starboard running lights displayed stretching and deformation features consistent with being illuminated at the time of impact.

Other Information

Postaccident Developments

Nonstandard Boat Program. The DOT Inspector General's report, *Audit of the Small Boat Station Search and Rescue Program*, made recommendations to the Coast Guard concerning nonstandard boats. As noted in the report, a Coast Guard risk analysis was conducted in July 2000 as a result of the increase in accidents involving nonstandard boats. Improper operation of nonstandard boats was identified as the highest concern. Since then, the Coast Guard has made a number of changes in the nonstandard boat program. Some were already under development when the accident occurred; some were instituted as a result of the accident.

The audit recommendations concerned developing and implementing a strategic plan for improving SAR readiness. The report found that oversight at the Coast Guard headquarters level is needed to ensure standardization of nonstandard boats and rigid-hull inflatable boats in all aspects of their use, including operational doctrine, training, and boat design and configuration (there are about 293 different nonstandard boats of varying types and designs among the 554 Coast Guard rescue boats). The report found that commanding officers should give safety and training precedence over less urgent or less important command or program operational goals to ensure that units will be "always ready" for more urgent or more important operations. The report also indicated that Coast Guard headquarters involvement is needed to assure the implementation of Coast Guard risk analysis recommendations.

On March 11, 2002, the Office of Boat Forces and the Office of Safety jointly sent a mishap trend message from Coast Guard headquarters to 384 Coast Guard units operating nonstandard boats or having support responsibility for nonstandard boats. The message challenged leaders involved with small boat operations to reverse the trend of mishaps involving small boats. Specifically, it suggested training in operational risk management and team coordination as a way of reducing small boat mishaps. The message emphasized that human errors were causing a high number of the recent mishaps involving nonstandard boats. In the message, the Chief of Boat Forces encouraged boat

force leaders[13] to "impress upon all hands that throttles have more than two [stop and full] operational positions." He emphasized that "normal operating speeds must be something less than maximum speeds, and coxswains must have time to see, react, and avoid obstacles." He continued, "The image of the young Coastie zipping along at max throttle is becoming a stereotype, reflects poorly upon out [sic] professionalism, and encourages reckless behavior in our developing boat crews."

A draft nonstandard boat operations manual that had been available to units on the Coast Guard web site for over a year was in the final phases of revision when the accident occurred. On April 3, 2002, the *Non-standard Boat Operators Handbook* (Commandant Instruction M16114.28) was published. The manual covers basic boat operation and provides sample preventive maintenance and boat outfitting checklists. Chapter 5, section A, "Operating Parameters," addresses speed: "A high number of small boat mishaps can be attributed to excessive speed.[14]. . . As a crewmember, never hesitate to ask the coxswain to SLOW DOWN or take up a more forgiving heading. There is no justification for navigating recklessly or fatiguing crews unnecessarily. . . . Safe operating speed is an element of prudent seamanship."

On April 25, 2002, the Commandant of the Coast Guard issued a final action letter[15] to all Coast Guard stations regarding a March 2001 accident involving a Coast Guard small boat. The Coast Guard boat had deviated from its intended patrol route and had capsized in Lake Ontario, resulting in the deaths of two Coast Guardsmen. The Commandant found that "the deaths resulted from a series of equipment and experience shortfalls, as well as a number of mistakes" by Coast Guard personnel on the water and on shore. The Commandant specifically found that administration, supervision, and training related to nonstandard boats was inadequate and "that the normal boat tracking and mission monitoring process failed."

As a consequence of the Coast Guard's internal investigation of the March 2001 accident in Lake Ontario, the Commandant directed several actions related to nonstandard boat support, training, and operation. Among other things, he instructed the Assistant Commandant for Operations to ensure that small boat coxswains provide the unit maintaining their radio guard with a "float plan" and that they notify the guarding unit of any significant changes in their projected movements. Furthermore, he required each Coast Guard area and district commander to publish operating limits for each nonstandard boat under their responsibility and to reexamine each boat's suitability for its purpose.

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[13] A boat force leader is anyone who oversees boat operations or is in the coxswain's chain of command, such as a station commanding officer or officer-in-charge.

[14] The DOT Inspector General's audit reported that there had been a 225-percent increase in accidents in FY 2000 over FY 1998 and that "56 percent of the [FY 2000] accidents were caused by poor judgment, or navigation and operational errors and hence, were preventable."

[15] U.S. Coast Guard, *Final Action on the Administrative Investigation into the Boat Mishap and the Resulting Deaths and Injuries to Station Niagara Crewmen That Occurred on 23 March 2001*, file 5100, April 25, 2002, signed by Admiral James M. Loy, Commandant.

On April 29, 2002, the Coast Guard issued a revision to the *Boat Crew Training Manual* (Commandant Instruction M16114.9D, replacing M16114.9C). The revised manual gives more emphasis to nighttime training operations, specifically mandating that every 6 months, at least 10 percent of coxswains' minimum required underway time should be at night. New requirements to perform drills once at night and once during the day every 6 months will take effect in January 2003.

The Coast Guard Headquarters Chief of the Office of Boat Forces advised the Safety Board on May 14, 2002, that training teams for nonstandard boats were established in the spring of 2002. The teams became operational in the summer of 2002, and began making training visits to Coast Guard stations throughout the nation to assess the adequacy of nonstandard boat operations.

On June 13, 2002, the Chief of the Office of Cutter Forces at Coast Guard headquarters issued a new Coast Guard *Navigation Standards Manual* (Commandant Instruction M3530.2A) that sets forth navigation policies and procedures for all cutters and shore-based boats. The section of the manual that discusses unit command responsibilities[16] states that commanding officers shall:

> Identify specific areas within the unit's Area of Responsibility (AOR) that pose significant navigational or environmental risks to boats. The CO shall mitigate these risks by imposing specific operating restrictions such as speed limits, establishing safe operating distances from known hazards, increasing frequency of fixes, and restricting operating areas for specific boat types. Each unit shall maintain a chart on display in the operations/planning space that highlights known hazardous and special operating areas within the unit's AOR.

Navigation Lights on Coast Guard Patrol Boats. During the inspection of the damaged Coast Guard patrol boat, Safety Board investigators observed that the boat's white all-around light was blocked for about 10° each side of dead ahead by a radar antenna dome that had had been installed about 1 month before the accident. As a result of Safety Board investigators' conversations with the commanding officer, the all-around light on the station's other 24-foot patrol boat was inspected and found to be similarly obstructed. The light was correctly repositioned on January 15, 2002.

On January 29, 2002, the station sent a message to Coast Guard headquarters that outlined the obstructed-light problem so that other stations might learn about the issue. On two separate occasions in August 2002, one of the Safety Board investigators investigating this accident advised Coast Guard Headquarters Office of Boat Forces that he had observed two nonstandard boats (not in the Miami AOR) whose all-around white navigation lights were obscured by radar domes in front of the light. Those observations prompted Coast Guard Headquarters Office of Safety to send an ALCOAST message on September 5, 2002, to all stations having nonstandard boats. The message acknowledged that the obscuration of masthead lights on Coast Guard nonstandard boats by installed equipment was a problem of national scope that had been identified during the *Bayside*

[16] Page 2-3, item c.

Blaster accident investigation. Consequently, Coast Guard headquarters required that all boats display proper unobscured all-around white lights, in accordance with the Inland Navigation Rules.

Passenger Vessel Association

The Passenger Vessel Association is an association of small passenger vessel owners and operators in the United States. The organization serves the interests of more than 350 vessel owners and operators in the domestic passenger vessel industry, which represents about 65 percent of the industry nationwide. Association members operate more than 1,100 passenger vessels in the United States, carrying up to 200 million passengers annually. Members offer services including dinner cruises, tour and excursion services, car and passenger ferries, private charters, whale-watching trips, overnight cruises, and riverboat gaming. The association has a committee responsible for reviewing, developing, and implementing programs to encourage enhanced training and safety among its members. The association's *Risk Management Manual* contains a section on signage for lifesaving equipment that covers marking lifejacket lockers, but not the Federal requirement for storing lifejackets in convenient places and distributing them throughout accommodation spaces.

Analysis

General

The analysis first identifies factors that can be readily eliminated as causal or contributory to the accident. The major safety issues identified during the investigation are then discussed, regarding the adequacy of the following:

- Operation of the Coast Guard patrol boat;
- Operation of the *Bayside Blaster*;
- Coast Guard oversight of routine patrols;
- Boatrides International, Inc., management oversight;
- Kill switch operation on Coast Guard nonstandard patrol boats;
- Lifejacket stowage on the *Bayside Blaster*; and
- Coast Guard safety oversight of small passenger vessels in Miami.

Exclusions

The weather on the night of the accident was mild, with calm seas and a clear visibility of 10 miles. Such conditions should not and did not interfere with either vessel operator's ability to detect the other vessel. Both vessel operators were in generally good health and were not taking any prescription or nonprescription medications.

The master of the *Bayside Blaster* reported his rest history for the 72 hours before the collision. He indicated that he had slept 6 hours each night on January 10 and 11 and 9 hours the evening before the accident, and that he had taken a 2-hour nap before reporting for work at 1650 the day of the accident. His deckhand had slept about 10 hours the two nights before the accident. He had reported to work at 1030 and completed three trips—at 1330, 1530, and 1730—before the accident trip. The Coast Guard coxswain's 72-hour sleep history included 11 hours of sleep the previous two nights and 8 hours of sleep the night before the accident. The Coast Guard crewmember had obtained 7 1/2 and 8 hours of sleep the two nights preceding the accident. The coxswain and crewmember both reported to work at 0700 on the day of the accident. All four individuals reported obtaining adequate sleep on the days preceding the accident and were not affected by fatigue.

The Coast Guard crewmembers provided blood samples for alcohol and drug testing between 4 and 5 hours after the accident. The results for both crewmembers were negative for alcohol and drugs. Because testing for alcohol did not take place within the optimal 2-hour period after the accident, the test does not conclusively eliminate the possibility that alcohol was a causal factor in the accident. However, the crewmembers

spent more than 2 hours before the accident with other Coast Guardsmen in the crew lounge, where alcohol is not permitted.

Tests of the *Bayside Blaster* crew for alcohol immediately after the collision were negative. Urine samples were taken about 8 hours after the accident to test for drugs. The result was negative for the master of the *Bayside Blaster* but was positive for the deckhand for cannabinoids/THC, indicating that he had used marijuana sometime before the collisions.

The deckhand had been on duty since 1030 that morning and had served on three cruises that day; thus, any incapacitation should have been detected by coworkers or passengers. Witnesses said that the deckhand performed his duties in a seamanlike manner and did not appear to be impaired by drugs. The deckhand was placed in a drug-monitoring program and his subsequent test results were negative. Because the deckhand's performance did not indicate that he was impaired at the time of the accident, the use of drugs is not discussed further in this report.

Therefore, the Safety Board concludes that the crewmembers of both vessels were well rested and not impaired by drugs or alcohol, and that the weather and sea conditions were not factors in this accident.

Collision

The *Bayside Blaster*, with 2 crewmembers and 53 passengers on board, was on a routine evening tour in Biscayne Bay and was idling off Palm Island when the sightseeing vessel was sideswiped by Coast Guard patrol boat *CG242513*. The Coast Guard patrol boat, with two crewmembers on board, was traveling at an excessive speed for the restricted zone. The impact caused the Coast Guard crewmembers to be thrown overboard. The kill switch system to the patrol boat's engines failed to operate, and *CG242513* proceeded to run in circles. The circling occurred because the coxswain had made a hard turn to port in an effort to avoid hitting the sightseeing vessel, and the steering wheel remained in the turned position. The patrol boat subsequently struck one of the Coast Guard crewmembers in the water, the *Bayside Blaster* a second time, and another recreational boat before it came to rest against pilings near Palm Island. As a result of the accident, the two Coast Guard crewmembers sustained minor injuries requiring hospitalization, and five *Bayside Blaster* passengers reported injuries requiring treatment.

Operation of the Coast Guard Patrol Boat

There was no safety or law enforcement reason for the coxswain to operate his vessel at 32 knots while conducting a routine patrol at night in restricted waters close to shore. The coxswain knew he was nearing a no-wake, manatee-protection zone as the patrol boat rounded Hibiscus Island and that the area had strict speed restrictions, which

he claimed to be enforcing on the patrol. High-speed operations reduce the reaction time for collision avoidance and require the utmost vigilance on the part of the coxswain and crew. Such high speeds should be reserved for emergency responses, such as distress calls or pursuit of lawbreakers. According to the OOD, the coxswain asked "to get under way for recreational boating safety . . . . and while in the area, go see [another Coast Guardsman] at a private residence on Palm Island." The OOD agreed to the boating safety patrol and the residential visit.

Coast Guard patrol boats are not exempt from the no-wake speed restrictions in Florida's manatee-protection zones. The *CG242513* was on a routine, nonemergency boating-safety patrol the night of the accident. The coxswain testified that he knew he was approaching a no-wake zone. Yet, he entered the no-wake zone, about 400 yards from the accident location, at full speed. At 32 knots,[17] the boat would take about 22 seconds to cross the distance from the turn around Hibiscus Island to the collision point. The coxswain stated that he knew there was a blind spot coming around the end of Hibiscus Island but that he took the turn at nearly full throttle. Even in daylight, the speed at which the coxswain was operating would have been illegal and inappropriate in the area. The Safety Board, therefore, concludes that the coxswain of the Coast Guard patrol boat was operating his vessel in excess of Florida speed restrictions for no safety or law enforcement reason in a no-wake, manatee-protection zone.

The coxswain stated that he was familiar with the *Bayside Blaster* and had seen it operating in the area before. He acknowledged that background lighting in the area commonly interfered with visibility at night. A highway causeway and a brightly lit container port are located south of the accident site, and white and red lights on islands and bridges are west and north of the accident site. The darkness also limited the coxswain's ability to clearly see and distinguish other vessels that could have been operating in the vicinity of his vessel.

Knowing that passenger vessels like the *Bayside Blaster* routinely operated in this area at night and that visibility could be a problem should have prompted the coxswain to enter the turn around Hibiscus Island at a much slower speed. Had he done so, he or his crewmember would probably have sighted the passenger vessel in ample time to avoid a collision. The high speed of the Coast Guard patrol boat reduced the time the coxswain had to sight the *Bayside Blaster*, to evaluate the situation, and to take effective action to avoid the collision. It likewise severely limited the time available for the crewmember, who was acting as lookout, to see and evaluate the developing situation. Both the coxswain and the crewmember reported seeing the *Bayside Blaster*'s silhouette mere seconds before impact. Therefore, the Safety Board concludes that even if there were no speed restrictions, the coxswain's speed was imprudent for the prevailing conditions of darkness, background lighting, and potential for encountering passenger and recreational vessels in the area of the accident.

High-speed operations at night in nonemergency situations, particularly in restricted waters, needlessly endanger the safety of other users of the waterway, as well as

[17] At 32 knots or 36.8 mph, the boat would travel 54.0 feet per second.

Coast Guard personnel. That sentiment was emphasized in a March 11, 2002, message from Coast Guard headquarters that encouraged boat force leaders to "impress upon all hands that throttles have more than two [stop and full] operational positions" and that "normal operating speeds must be something less than maximum speeds, and coxswains must have time to see, react, and avoid obstacles."

At the time of the accident, no guidance mandated that commanding officers mitigate the risks in small boat operations by imposing specific operating restrictions such as speed limits and safe operating distances from known hazards.This lack of Coast Guard policies and procedures regarding operating speeds for nonstandard boats at the time of the accident gave wide latitude to Coast Guard personnel undertaking routine patrols using small, high-powered vessels. Consequently, the Safety Board concludes that the lack of Coast Guard speed restrictions for conducting routine patrols allowed coxswains too much latitude in selecting patrol speeds, which could endanger other boaters as well as Coast Guard crewmembers. Appropriately, the new Coast Guard *Navigation Standards Manual*, which was issued after the accident, requires the commanding officers of Coast Guard stations to establish speed limits in specific areas of the AORs "that pose significant navigational or environmental risks to boats." (For further discussion, see "Coast Guard Oversight of Routine Patrols" section.)

Operation of the *Bayside Blaster*

The master of the *Bayside Blaster* operated the vessel over the same route it normally took for conducting sightseeing tours in Miami Harbor, a route on which it was permitted to operate under the terms of its COI. Thus, at the time of the accident, the *Bayside Blaster* was operating on the waters where it was authorized to be, and the local Coast Guard station personnel were aware of the routes of the *Bayside Blaster* and other small passenger vessels. The master of the *Bayside Blaster* was operating his vessel at idle speed, about 3 to 4 knots, while conducting a boat tour of the area. Idle speed was correct and appropriate in a no-wake zone and close to shore. The vessel probably could not have gone much slower and still maintained steerage. The Safety Board, therefore, concludes that the *Bayside Blaster* was on an appropriate route for its service, and that the master was operating his vessel at a safe and prudent speed for the conditions and circumstances.

The Coast Guard patrol boat was moving at 32 knots, or 54.0 feet per second. At such a high speed, the boat would have covered the 400 yards from the turn around Hibiscus Island to the position of the *Bayside Blaster* in seconds. Under the circumstances, the master of the *Bayside Blaster* had little or no time to react to avoid a collision. Because the *Bayside Blaster* was operating at an appropriate speed in the no-wake zone, the master could logically expect that other vessels operating in the same area would also be operating within the mandated speed restrictions. He therefore had no reason to anticipate that he would encounter a craft operating at high speed in the area where he was operating, especially in the darkness.

Despite the nighttime darkness and background lighting, the master and deckhand observed the approaching Coast Guard vessel from their vantage point; however, they sighted the patrol boat only seconds before the collision. Consequently, the Safety Board concludes that the master and deckhand of the *Bayside Blaster* were maintaining a proper lookout.

The master of the *Bayside Blaster* had no options for avoiding a collision after sighting the oncoming patrol boat. Even if the master had sighted the patrol boat the instant it rounded Hibiscus Island, he would have had only 22 seconds to evaluate the situation and to select and execute an avoidance action. The master sighted the oncoming patrol boat only after the deckhand brought it to his attention, giving him less than the full 22 seconds in which to react. He could not turn left without grounding his vessel on the rocky shore of Palm Island. He could not turn right without steering into the probable path of the patrol boat. He could not accelerate rapidly without endangering the passengers or possibly increasing the speed and severity of the impact. Consequently, the Safety Board concludes that the Coast Guard patrol boat's high rate of speed, combined with its sudden appearance close to the *Bayside Blaster*, precluded the master of the *Bayside Blaster* from being able to take any effective action to avoid the collision.

After the second collision with the patrol boat, the master of the *Bayside Blaster* accelerated his vessel and headed north to Monument Island. If he had remained in the immediate area of the accident, he would have risked being struck again by the circling patrol boat. Monument Island was only 800 yards away and afforded a convenient soft, sandy bottom on which the master could ground his vessel without damaging it more. In addition, immediately after the second impact, the master did not know the full extent of his vessel's damage. For the safety of the passengers, he needed to make sure his vessel would not sink before they could disembark. Further, if the collision had ruptured a fuel tank, there could have been the added danger of fire.

The master beached the *Bayside Blaster* on the sandy shore of Monument Island, where he could safely disembark his passengers and examine his vessel. If he had not taken that action and the hull had been breached, the vessel might have been in danger of flooding and sinking. The Safety Board, therefore, concludes that it was appropriate for the master of the *Bayside Blaster* to beach his vessel on Monument Island to ensure the safety of his passengers, given the circumstance that he did not know the full extent of the damage to the vessel's hull and fuel tanks.

Navigation Lights

Boaters depend on other vessels to properly display navigation lights at night to help them visually detect other vessels and provide a reference to adjust their course or speed to avoid a collision. For this reason, the Safety Board reviewed the evidence related to the operation of the navigation lights on both vessels to assess their visibility on the night of the accident.

The Coast Guard patrol boat was showing all the navigation lights that it was required to display (although with some technical deficiencies, as discussed below). The navigation lights had been found operational the day of the accident during the daily check by the station engineering staff. However, the coxswain did not check the navigation lights before leaving the dock. When the patrol boat got under way from Coast Guard Station Miami Beach, the crew of another Coast Guard boat informed the coxswain that the boat's port navigation light was not operating. After being notified that the light was not lit, the coxswain tapped the light fixture with his hand, and it came on, indicating that the light might be sensitive to jarring forces. In the Safety Board's opinion, the coxswain should have realized that the port navigation light might have been subject to intermittent operation due to the jarring effects of high-speed operations, and he should not have taken the vessel on a nighttime patrol without ensuring that the light was showing steadily. Rather than proceeding with the patrol, he should have returned to the station and either requested that the station's engineers examine and repair the light or taken another boat on the patrol.

The deckhand on the *Bayside Blaster* stated that he saw the sidelights and masthead light of the Coast Guard patrol boat before the collision. A passenger also said that he saw the sidelights of the Coast Guard patrol boat before the collision. Further, the Safety Board's Materials Laboratory examined the patrol boat's sidelights and determined that the filaments of the port and starboard running lights displayed stretching and deformation features consistent with their being illuminated at the time of the accident.

The *Bayside Blaster* was showing all the navigation lights that it was required to display (although also with some technical deficiencies, as discussed below) and had decklights on as well. Four passengers stated that the navigation lights on the *Bayside Blaster* were on, and FWC officers tested the lights the evening after the collision and found them to be operating properly.

Although the deckhand on the *Bayside Blaster* recalled seeing the white masthead light on the approaching patrol boat, postaccident examination of the vessel by the Safety Board revealed that it was partially obscured by a radar dome. Further postaccident examination of the patrol boat by the Coast Guard revealed that the vertical separation between the sidelights and the masthead light was less than the minimum required under the Inland Navigation Rules. However, because the masthead light was sighted from the *Bayside Blaster* before the collision, the partial obscuration and inadequate separation of the masthead light and the sidelights apparently had no effect on the accident.

Partially obscured or inadequately separated navigation lights make vessels more difficult to see at night and constitute a hazard to safe operations. When Safety Board investigators checked the masthead light on the other nonstandard boat assigned to Station Miami Beach, they found the same condition. Later, a Safety Board investigator observed a similar problem on two separate occasions involving nonstandard boats operating in a different AOR and reported his observations to Coast Guard headquarters. As a direct result of information provided by the Safety Board, Station Miami Beach corrected the light problem on its remaining nonstandard boat, and Coast Guard headquarters mandated action to correct the problem nationwide.

Postaccident examination of the *Bayside Blaster* by the Coast Guard in Miami showed that the sidelights were not properly screened, resulting in arcs of visibility approximately 30° greater than required; that the arc of visibility of the masthead light was somewhat less than required; and that the vertical separation between the masthead light and the gunwale was less than the required minimum. Nevertheless, the *Bayside Blaster* was showing lights that were visible from the direction of the approaching patrol boat and that were sufficient to warn the patrol boat of its presence. The Safety Board, therefore, concludes that although both vessels had technical deficiencies in the configuration of their navigation lights, they were sufficiently lighted to alert other mariners of their presence, and the deficiencies did not contribute to the cause of the accident.

Coast Guard Oversight of Routine Patrols

Recent accidents involving Coast Guard patrol boats, as well as cautionary messages from the Coast Guard Commandant, indicate that station commanders are not exercising adequate oversight of small boat operations. Patrols should not be undertaken without an in-depth predeparture briefing in which the OOD and the coxswain review operational details of the intended patrol. The details should include the intended purpose of the patrol, the intended route (float plan), the communications schedule for checking in with the station, and any operating restrictions on the patrol. The coxswain involved in the accident provided no detailed float plan, and the duty officer did not request one. He merely knew that the coxswain was going to operate in the north part of Biscayne Bay and that the coxswain would, at some time, end up at a private residence on Palm Island. Further, there was no discussion of speed issues or of the condition of the boat that was to be used for the patrol. Consequently, the Safety Board concludes that the coxswain's being allowed to undertake the patrol without completing a thorough predeparture check of the patrol boat or without ensuring that critical navigation equipment was fully functional indicates a lack of effective oversight of patrol operations at Coast Guard Station Miami Beach.

The problem of safety in the operation of Coast Guard small boats goes beyond the collision in Miami. Serious accidents involving Coast Guard nonstandard boats in FY 2001 resulted in more than 70 Coast Guardsmen having "unplanned departures" from their boats, with two deaths and one serious injury resulting. In response to those accidents, on April 3, 2002, Coast Guard headquarters issued a *Non-standard Boat Operators Handbook* that covers basic boat operation and cautions against operating vessels at excessive speed. The Coast Guard has also acted to improve equipment outfitting, maintenance, and training in the nonstandard boat program. For example, the Commandant issued a directive for area and district commanders to publish operating limits for their nonstandard boats and reexamine each boat's suitability for its purpose. In the Safety Board's opinion, those actions are warranted by the recent accident history of these vessels and should help improve the safety of nonstandard boat operations.

In his April 25, 2002, final action letter to, among others, all area and district commanders and all Coast Guard boat stations, the Coast Guard Commandant mandated

that district commanders and station commanding officers ensure compliance with all policies pertaining to filing and adhering to small boat operational patrol plans, including the requirement that the coxswain file a float plan with his station indicating the location of intended operations before departing on patrol. Further, coxswains are required to notify their controlling station if they deviate in any way from the filed plan. The float plan requirements resulted from a nonstandard boat accident in which a Coast Guard patrol boat capsized in Lake Ontario after the boat had deviated from its intended patrol route, resulting in the deaths of two Coast Guard crewmembers. In his final action letter concerning that accident, the Commandant found "that the normal boat tracking and mission monitoring process failed." In other words, there was a failure in overseeing small boat operations by the responsible Coast Guard station. The float plan requirements, in the Safety Board's opinion, will provide a measure of oversight over small boat operations, but by themselves, still fall short of the degree of oversight necessary to ensure operational safety.

Station officials (commanding officers, executive officers, and OODs) are in the best position to provide continuing oversight of day-to-day operations at Coast Guard stations. Station level oversight of Coast Guard small boat operations could be improved by various means, including direct observation of coxswain performance by station officials and solicitation of feedback from waterway users. In addition, technological advances in transponder technology may provide an additional oversight tool if applied to station operations. Further, greater formality in the conduct of routine patrols would enhance oversight. For example, if coxswains were required to complete a written checklist before getting under way, they might be more likely to conduct thorough predeparture checks. If detailed predeparture briefings were held, as outlined above, coxswains might be more mindful of operational restraints. And if detailed postpatrol debriefings were held, coxswains might be less likely to take actions they could be held accountable for. Consequently, the Safety Board concludes that Coast Guard oversight of nonstandard boat operations was less than adequate at the time of the accident.

The Coast Guard policy reflected in the *Navigation Standards Manual* places the responsibility for safe operation of Coast Guard small boats on station commanding officers. However, without some means of oversight, commanding officers cannot know that the speed limits are being followed or that other safety requirements are being met. Station commanding officers provide overall supervision to boat coxswains and are responsible for ensuring that coxswains perform their duties safely. An effective oversight program would make unsafe operation less common, and monitoring of coxswain performance, as part of that oversight, would make coxswains less likely to operate their vessels unsafely. The Safety Board, therefore, believes that the Coast Guard should establish oversight procedures for use by the commanding officers or officers-in-charge of Coast Guard stations to improve the safety of Coast Guard routine small boat operations, including the institution of in-depth predeparture briefings, thorough predeparture checks of boats, monitoring of coxswain performance, and thorough postpatrol debriefings.

As noted earlier, the Coast Guard has issued a *Non-standard Boat Operators Handbook* that covers basic boat operation and cautions against operating vessels at

excessive speed. The Coast Guard has also acted to improve equipment outfitting, maintenance, and training in the nonstandard boat program. Requirements for nighttime training of crews have been revised in the new edition of the *Boat Crew Training Manual*; training teams for nonstandard boats have been established; and commanding officers are required by the new *Navigation Standards Manual* to impose specific operating restrictions (speed, distance from hazards, frequency of fixes, operating area). Such changes should help improve the safety of nonstandard boat operations. Ongoing evaluation and the establishment of verification procedures are, however, essential to ensure compliance with the policies and procedures. The Safety Board, therefore, believes that the Coast Guard should evaluate on an annual basis its program for reducing nonstandard boat accidents and for ensuring compliance with Coast Guard policies and procedures related to those vessels, and should publish the results annually for use by Coast Guard stations.

Boatrides International, Inc., Management Oversight

The *Bayside Blaster* departed on the accident voyage without one of the two deckhands required by its COI. Despite the specific requirement of the company's procedures and policy manual to report deficiencies, the master did not notify company management that he did not have the required crew before departing on the accident voyage. The master stated he made the decision that it was safe to sail with only one deckhand and that he had done so in the past, although infrequently. The operations manager stated that he was not informed the *Bayside Blaster* was short one deckhand before the vessel departed on the accident voyage. He also indicated that he was aware it was not the first time the *Bayside Blaster* had sailed shorthanded, but that it did not typically do so.

The owner of the *Bayside Blaster* indicated that the master had never been reprimanded and that nothing negative had ever been noted in the master's personnel file. The master was required to report the number of passengers on board before leaving the dock. It would have been a simple matter for management to require him at the same time to report whether he had a full crew on board. Moreover, because the *Bayside Blaster* had departed without a full crew in the past, company management should have been aware that it was possible for the vessel to be shorthanded and should have established procedures to arrange for backup crewmen so that such incidents did not occur in the future.

In assessing the impact on safety of the lack of the second deckhand on the *Bayside Blaster*, the Safety Board considered the opinions of the vessel master. The master stated that if the second deckhand had been present, he would have been selling drinks and film to the passengers and would not have been serving as a dedicated lookout. The lack of the required second deckhand did not affect the ability of the *Bayside Blaster* to maintain a proper lookout. The impact of the lack of the second deckhand was that one less person was available to assist the passengers in the emergency. The second deckhand could have been helpful in handing out lifejackets to passengers, in helping passengers don and secure

their lifejackets, and in helping the passengers disembark at Monument Island after the accident.

Had the accident been more serious, however, the need for the second deckhand could have been critical. If, for example, passengers had been seriously injured or thrown into the water and in danger of drowning, the second deckhand would have been needed for such duties as providing medical assistance or handling the boat while the master rendered medical assistance. If the boat had been more seriously damaged and in danger of sinking, the second deckhand would have been needed to help with damage control, to help distribute lifejackets, or to help the passengers safely abandon the vessel. The Safety Board, therefore, concludes that operating the *Bayside Blaster* without the required number of crewmembers could have had a negative impact on the safety of the passengers, although it did not in this accident. The Safety Board believes that Boatrides International, Inc., should establish procedures to prohibit its small passenger vessel from leaving the pier with passengers on board unless the vessel has the crew required by the vessel's COI.

Kill Switch Operation on Coast Guard Nonstandard Patrol Boats

If the kill switch lanyard and clips had operated properly, the engines on the Coast Guard patrol boat would have shut down as soon as the coxswain was ejected from the boat. And if the Coast Guard patrol boat engines had stopped when the coxswain was ejected, the boat would not have struck the *Bayside Blaster* the second time. Further, the other property damage resulting from the accident would not have occurred, and the Coast Guard crewmembers would not have been placed in jeopardy of being run over by their own vessel. According to the coxswain, he was struck by the boat but sustained only minor bruising. If the runaway vessel's hull had struck him at a different angle or if the propellers had struck him, he could have been seriously injured or killed.

Given that more than 70 Coast Guard crewmembers were ejected from nonstandard boats in FY 2001,[18] ejection is a hazard in the operation of such boats. Automatic shutdown of the main engines in such circumstances is essential for the safety not only of the Coast Guard personnel involved but also of other waterway users. The Coast Guard sent a safety advisory to all Coast Guard units warning that crews operating nonstandard boats and cutter boats are at significantly higher risk for ejection from their boat than their counterparts operating larger, standard boats. The message required that Coast Guard small boat operators use kill switches at all times while such boats are under way and that kill switch lanyards be attached to a metal D-ring on the coxswain's lifejacket or survival vest. Further, the message required that kill switches and lanyards be inspected daily, incorporated into a daily checklist, and tested weekly. It also stated that it was Coast Guard headquarters' intention to have kill switches installed on all nonstandard boats, and that boats less than 40 feet long are to have kill switches installed within 24 months.

[18] Coast Guard headquarters' ALCOAST message, January 30, 2002.

The kill switch lanyard and connections were examined at the Safety Board's Materials Laboratory. The features on the belt clip fracture face were consistent with bending overload, and indicate that the belt clip was the weak link in the lanyard assembly. In a kill switch system, the weakest link should be the force required to operate the switch. Either the belt clip was the wrong attachment, or the lanyard may have been wrapped around another item in the console, thereby transferring all the force to the belt clip and not the kill switch.

It is possible that when the coxswain turned the steering wheel hard to the left to avoid striking the *Bayside Blaster*, the lanyard's position was such that it became fouled on the wheel or the steering knob. The coxswain said that he could not remember having any problems with the coiled lanyard snagging on anything. The Safety Board could not determine the most probable scenario. The two Coast Guard crewmembers confirmed that the kill switch lanyard was connected both to the kill switch and to the coxswain, and the police saw the lanyard connected to the kill switch when the patrol boat came to rest against the pilings on Palm Island. The Safety Board concludes that why the kill switch did not activate when the coxswain was ejected or whether fouling of the kill switch lanyard on the steering wheel was a factor in the engines' failure to stop cannot be determined.

The Coast Guard action and policy statement of January 30, 2002, appears to address most of the problems inherent with kill switch malfunction. However, the individual Coast Guard units are being tasked with conducting evaluations of the proper location and operation of kill switches, which may be beyond the technical qualifications of some units. The ALCOAST message does not discuss the role of the kill switch manufacturer. Because the placement and arrangement of kill switches may require special knowledge of ergonomics and human engineering, engineers and technicians with those skills should be part of any effort to redesign the kill switch system. The Safety Board concludes that the actions by the Coast Guard to improve kill switch use could be enhanced by including kill switch manufacturers and ergonomic/human engineering experts in the redesign process.

The kill switch system involves not only the toggle switch, the wiring, and the lanyard-and-loop assembly, but also the person at the controls who is connected to the switch by the lanyard. All these elements must operate correctly for the kill switch to perform as intended. Therefore, the Safety Board believes the Coast Guard should evaluate the adequacy of the design of present or future kill switch systems on Coast Guard small boats, giving full consideration to ergonomic/human engineering factors.

Lifejacket Stowage on the *Bayside Blaster*

The adult- and child-size lifejackets on the *Bayside Blaster* were stowed so that they were properly segregated from each other. However, all the lifejackets of each size were stowed in one location, the adult jackets at the bow and the child jackets near the operator's station. Stowing lifejackets in one location on board a vessel can make them

inaccessible during an emergency. Lifejackets are essential safety appliances that should be available to passengers in the earliest moments of an emergency. If a vessel is carrying a large number of passengers who must retrieve lifejackets from a central location, the crush of people all heading to the same location at the same time can incite panic, cause injury, or delay distribution of lifejackets to all passengers. Title 46 CFR 180.78 requires that lifejackets be "stored in convenient places distributed throughout accommodation spaces" and that "each life jacket kept in a storage container must be readily available." The Coast Guard approved the *Bayside Blaster*'s lifejacket stowage arrangements when it inspected the vessel in August 2001.

Passengers rely on the vessel crew to advise them when to retrieve and don lifejackets in an emergency. Because of the few crewmembers relative to the number of passengers carried on small passenger vessels, the crew may not have time to advise passengers of what they should do in a rapidly developing emergency. Further, during an emergency, crewmembers can become preoccupied with saving the vessel, leaving the passengers to fend for themselves. Lifejackets must be readily available throughout the accommodation spaces so that, if the lifejackets are needed, the passengers can retrieve them.

On the *Bayside Blaster,* the lifejackets were difficult to retrieve from the bow locker, and no lifejackets were stowed in the aft accommodation area. Further, the opening mechanism to the child-size lifejacket stowage compartment at the operator's station was broken and had to be pried open. Both the single stowage location of adult lifejackets and the broken opening mechanism on the child lifejacket stowage compartment delayed the distribution of lifejackets to all passengers. Fortunately, the delay did not affect the outcome of the accident. However, under different circumstances, the delay in distributing lifejackets could have had serious consequences. Therefore, the Safety Board concludes that if lifejackets had been stowed throughout the accommodation space on the *Bayside Blaster,* they would have been more readily accessible to the passengers.

Stowage of lifejackets on small passenger vessels was also an issue in the Safety Board's recent investigation of the November 2000 fire on board the *Port Imperial Manhattan*. Following that accident, the owner of the *Port Imperial Manhattan*, New York Waterway, voluntarily elected to modify lifejacket stowage on its vessels. Lifejackets on New York Waterway vessels are now stowed under the passenger seats. While the Coast Guard approved the original stowage arrangements for lifejackets on all these vessels, the owner of the *Bayside Blaster* should consider voluntarily reconfiguring the stowage of lifejackets to make them readily available to passengers. Therefore, the Safety Board believes that Boatrides International, Inc., should revise the stowage of lifejackets on board its vessel so they are located throughout the passenger areas for immediate use in case of emergency.

In its report of the *Port Imperial Manhattan* investigation, the Safety Board expressed concern that lifejacket stowage may be a widespread problem on small passenger vessels throughout the industry and issued Safety Recommendation M-02-13, asking that the Coast Guard:

> Issue a directive to small passenger vessel operators to review the distribution of lifejackets on board their vessels and to ensure that the lifejackets are accessible and segregated.

On November 19, 2002, the Coast Guard responded, stating that it "will issue a Safety Alert reminding small passenger vessel operators of the requirements and suggest that they review the stowage arrangements on their vessels to ensure compliance with the regulations."

The Safety Board considers the issue of proper lifejacket stowage on small passenger vessels to be of the utmost importance, and that the primary responsibility for the safety of passengers rests with the small passenger vessel operating companies. Because the Passenger Vessel Association represents 65 percent of the small passenger vessel operating companies, action taken by this organization can affect most of the industry. The association has established its Safety and Loss Control Committee, which reviews, develops, and implements programs to encourage enhanced training and safety among its members. The Safety Board believes that the association should include in its *Risk Management Manual* the information that lifejackets on small passenger vessels should be evenly distributed throughout passenger areas for immediate use in an emergency, as prescribed by 46 CFR 117.78 or 180.78.

Coast Guard Safety Oversight of Small Passenger Vessels in Miami

For the *Bayside Blaster* to receive a COI to carry passengers, the Coast Guard must inspect and certify that the vessel meets the small passenger regulations at 46 CFR 175-185. The *Bayside Blaster* was deficient in at least three respects:

- In the accident, Safety Board investigations found that lifejackets were not readily available to passengers in the aft part of the vessel. However, the *Bayside Blaster* had recently been inspected and approved for operation by the Coast Guard. As the oversight authority for marine safety, Coast Guard inspectors should not permit such arrangements. They should use inspections as an opportunity to review the purpose of the regulations with vessel owners and to improve the safety of passengers by ensuring that lifejackets are readily accessible in an emergency.
- After the accident, the Coast Guard in Miami advised the Safety Board that the navigation lights of the *Bayside Blaster* were not configured in accordance with the Inland Navigation Rules. The measurements taken by the Coast Guard after the accident should have been taken during its 2001 inspection, and corrections should have been made to ensure regulatory compliance.

- The statements of the master and operations manager that the *Bayside Blaster* had repeatedly, even if infrequently, operated shorthanded indicate that a continuing safety deficiency regarding small passenger vessel operations in Biscayne Bay remained undetected by the Coast Guard. While the owner of the vessel has a primary responsibility for safety oversight, the Coast Guard has an equally important responsibility to maintain oversight of the operations of all small passenger vessels under its inspection authority.

That the *Bayside Blaster* operated repeatedly with improper lifejacket stowage, improper navigation lights, and without a full crew indicates that Coast Guard oversight of small passenger vessel operations in the Miami area may be less than adequate. Although it is the responsibility of the owners of the *Bayside Blaster* and other small passenger vessels to maintain their vessels in compliance with the rules and regulations, it is also the responsibility of the Coast Guard Marine Safety Office to ensure that a vessel is in compliance before the Coast Guard issues a COI. In view of the noted deficiencies, the Safety Board concludes that the Coast Guard's marine safety inspection program for small passenger vessels in the Miami area may be less than adequate. The Safety Board, therefore, believes that the Coast Guard should evaluate the adequacy of the marine safety inspection program in the Miami area to ensure that small passenger vessels are in compliance with applicable regulations, including the requirements for lifejacket stowage, navigation lights, and manning.

Conclusions

Findings

1. The crewmembers of both vessels were well rested and not impaired by drugs or alcohol, and the weather and sea conditions were not factors in this accident.

2. The coxswain of the Coast Guard patrol boat was operating his vessel in excess of the Florida speed restrictions for no safety or law enforcement reason in a no-wake, manatee-protection zone.

3. Even if there were no speed restrictions, the coxswain's speed was imprudent for the prevailing conditions of darkness, background lighting, and potential for encountering passenger and recreational vessels in the area of the accident.

4. The lack of Coast Guard speed restrictions for conducting routine patrols allowed coxswains too much latitude in selecting patrol speeds, which could endanger other boaters as well as Coast Guard crewmembers.

5. The *Bayside Blaster* was on an appropriate route for its service, and the master was operating his vessel at a safe and prudent speed for the conditions and circumstances.

6. The master and deckhand of the *Bayside Blaster* were maintaining a proper lookout.

7. The Coast Guard patrol boat's high rate of speed, combined with its sudden appearance close to the *Bayside Blaster*, precluded the master of the *Bayside Blaster* from being able to take any effective action to avoid the collision.

8. It was appropriate for the master of the *Bayside Blaster* to beach his vessel on Monument Island to ensure the safety of his passengers, given the circumstance that he did not know the full extent of the damage to the vessel's hull and fuel tanks.

9. Although both vessels had technical deficiencies in the configuration of their navigation lights, they were sufficiently lighted to alert other mariners of their presence, and the deficiencies did not contribute to the cause of the accident.

10. The coxswain's being allowed to undertake the patrol without completing a thorough predeparture check of the patrol boat or without ensuring that critical navigation equipment was fully functional indicates a lack of effective oversight of patrol operations at Coast Guard Station Miami Beach.

11. Coast Guard oversight of nonstandard boat operations was less than adequate at the time of the accident.

12. Operating the *Bayside Blaster* without the required number of crewmembers could have had a negative impact on the safety of the passengers, although it did not in this accident.

13. Why the kill switch did not activate when the coxswain was ejected or whether fouling of the kill switch lanyard on the steering wheel was a factor in the engines' failure to stop cannot be determined.

14. The actions by the Coast Guard to improve kill switch use could be enhanced by including kill switch manufacturers and ergonomic/human engineering experts in the redesign process.

15. If lifejackets had been stowed throughout the accommodation space on the *Bayside Blaster*, they would have been more readily accessible to the passengers.

16. The Coast Guard's marine safety inspection program for small passenger vessels in the Miami area may be less than adequate.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the Coast Guard patrol boat *CG242513* and the small passenger vessel *Bayside Blaster* was the failure of the coxswain of the Coast Guard patrol boat to operate his vessel at a safe speed in a restricted-speed area frequented by small passenger vessels and in conditions of limited visibility due to darkness and background lighting. Contributing to the cause of the accident was the lack of adequate Coast Guard oversight of nonstandard boat operations.

Recommendations

As a result of its investigation, the National Transportation Safety Board makes the following safety recommendations:

To the U.S. Coast Guard:

Establish oversight procedures for use by the commanding officers or officers-in-charge of Coast Guard stations to improve the safety of Coast Guard routine small boat operations, including the institution of in-depth predeparture briefings, thorough predeparture checks of boats, monitoring of coxswain performance, and thorough postpatrol debriefings. (M-02-25)

Evaluate on an annual basis your program for reducing nonstandard boat accidents and for ensuring compliance with Coast Guard policies and procedures related to those vessels; publish the results annually for use by Coast Guard stations. (M-02-26)

Evaluate the adequacy of the design of present or future kill switch systems on Coast Guard small boats, giving full consideration to ergonomic/human engineering factors. (M-02-27)

Evaluate the adequacy of the marine safety inspection program in the Miami area to ensure that small passenger vessels are in compliance with applicable regulations, including the requirements for lifejacket stowage, navigation lights, and manning. (M-02-28)

To Boatrides International, Inc.:

Establish procedures to prohibit your small passenger vessel from leaving the pier with passengers on board unless the vessel has the crew required by the vessel's certificate of inspection. (M-02-29)

Revise the stowage of lifejackets on board your vessel so they are located throughout the passenger areas for immediate use in case of emergency. (M-02-30)

To the Passenger Vessel Association:

Include in your *Risk Management* Manual the information that lifejackets on small passenger vessels should be evenly distributed throughout passenger areas for immediate use in an emergency, as prescribed by 46 CFR 117.78 or 180.78. (M-02-31)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

CAROL J. CARMODY
Acting Chairman

JOHN A. HAMMERSCHMIDT
Member

JOHN J. GOGLIA
Member

GEORGE W. BLACK, JR.
Member

Adopted: December 17, 2002

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Appendix A

Investigation

The Safety Board learned of this accident from a news wire service report received by the Safety Board Communications Center on January 12, 2002. A two-person team, consisting of an investigator-in-charge and a survival factors specialist, arrived on scene on Sunday, January 13, 2002. The team was later augmented by two additional investigators, specializing in human performance. The investigative team documented the damage to the *Bayside Blaster* and the Coast Guard patrol boat *CG242513* and interviewed the crews of both vessels, as well as the *Bayside Blaster* passengers, Boatrides International and Coast Guard officials, and emergency responders. The on-scene investigation was completed on January 20, 2002.

The Safety Board investigated this public/nonpublic vessel accident under the authority of the Independent Safety Board Act of 1974, according to Safety Board rules. The designated parties to the investigation were the U.S. Coast Guard, Boatrides International, Inc. (owner of the *Bayside Blaster*), and the Florida Fish & Wildlife Conservation Commission.

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