



National Transportation Safety Board

Washington, DC 20594

Marine Accident Brief

Accident No.: DCA-10-FM-003
Vessel No. 1: *Thriller 09*
Vessel No. 2: *CG 25689*
Accident Type: Collision
Location: Charleston Harbor, South Carolina
Date: December 5, 2009
Time: 2028 eastern standard time¹
Owner/Operator: *Thriller 09:* Foxrose, LLC
CG 25689: U.S. Coast Guard
Property Damage: *Thriller 09:* \$94,300
CG 25689: \$1,380
Injuries: *Thriller 09:* 6
CG 25689: 0
Complement: *Thriller 09:* 2 crew and 22 passengers
CG 25689: 3 crew

Summary

On Saturday, December 5, 2009, at 2028 local time, the 25-foot-long U.S. Coast Guard response boat – small (RB-S) *CG 25689* collided with the 55-foot-long small passenger vessel *Thriller 09* in Charleston Harbor, South Carolina (figures 1 and 2). Before the accident, the *CG 25689*, accompanied by the RB-S *CG 25788*, had been providing a security escort to the U.S. cargo ship *Green Ridge*, which was outbound to sea. At the time of the accident, the *CG 25689* had completed the escort and was traveling back up the main shipping channel, returning to the Military Outload (MOL) detachment operations facility on Goose Creek. The *Thriller 09* was on a 1-hour nighttime sightseeing cruise in Charleston Harbor.

¹ Times are given according to the 24-hour clock in eastern standard time (universal time coordinated –5).



Figure 1. The CG 25689. Photo by the Coast Guard.



Figure 2. Profile view of *Thriller 09* postaccident.

On board the *CG 25689* were 3 crewmembers; on board the *Thriller 09* were 2 crewmembers and 22 passengers. Following the accident, six passengers on the *Thriller 09* sought and received medical treatment for injuries. No crewmembers on the *CG 25689* or the *Thriller 09* were injured. The Coast Guard was party to the National Transportation Safety Board (NTSB) investigation of the accident.

Accident Description

Thriller 09 Events

The *Thriller 09* master and his wife, who were also the owners of the boat, arrived at Ripley Light Marina, where the vessel was berthed, about 1900 on December 5, 2009, to prepare for the evening cruise through Charleston Harbor. The company's website advertised the tour as a "sleigh ride" to view the holiday lights around Charleston Harbor from the water. To give the vessel a more festive appearance, the master had installed rope lighting (clear plastic tubing containing white light-emitting diode [LED] lights) around the vessel's hull, below the rub rail. He had conducted sleigh-ride tours on this vessel in December 2008 as well. The accident trip was to be the first sleigh-ride tour of the 2009 season. Before getting under way, the master installed the mast supporting the white navigation masthead light and then verified the proper operation of all navigation lights.

About 1930, the passengers boarded the *Thriller 09* and selected their seats.² As soon as all 22 passengers were on board, the master conducted a safety briefing, which included an offer to provide a lifejacket if desired by any passenger. The safety briefing did not include a demonstration of donning a lifejacket, but the master stated that assistance would be provided to anyone needing it. One passenger requested a lifejacket. The master's wife (who served as deckhand and tour narrator, and was referred to as "mate") provided the jacket, and also assisted the passenger in donning it.

About 2005, the *Thriller 09* departed its berth at Ripley Light Marina to begin its tour of Charleston Harbor. The master piloted the vessel from the port helm position. The mate sat in the starboard helm position and provided narration that identified Christmas decorations and points of interest, and detailed some Charleston Christmas traditions. Christmas music was broadcast continuously, punctuated by the mate's narration. The mate was also responsible for keeping a visual lookout for other vessels and for helping to identify the navigation aids that the master used to make course changes.³ In his interview with NTSB investigators, the master stated that he concentrated on keeping a visual lookout and steering the vessel. He also said that he kept the vessel at a slow speed to prevent a wake in the Ashley River's designated no-wake zone above the Coast Guard station, which was located about 1 mile downriver from the marina, near the river's entrance to Charleston Harbor. After passing the Coast Guard station, the master increased speed to about 21 knots, the minimum speed to put the vessel on plane.⁴ The master

² The tour was delayed 1 hour from its standard operation time to avoid any conflict with the annual Charleston Harbor Holiday Parade of Boats, which had taken place earlier that day.

³ According to the vessel operating policy, the "first mate constantly assists the master looking for traffic or obstructions."

⁴ Planing occurs when a boat's speed and hull shape generate sufficient lift to support a portion of the craft above the water.

stated that he used a “cheat sheet” that he had created, which contained a list of compass headings for steering the vessel toward various objects in the waterway, such as channel markers, buoys, and other navigational aids. After passing south of the city, the master made a couple of course changes to port, which put the vessel on an east course of about 082 degrees magnetic, approaching the Rebellion Reach section of the main shipping channel into Charleston. While still some distance from the main channel, the master observed a car carrier vessel (the *Green Ridge*) a short distance south of Fort Sumter National Monument, heading for the jetties leading to sea. He told investigators that earlier he had heard a *securité*⁵ call from the *Green Ridge*, which stated that the vessel was getting under way, and he had concluded that the *Green Ridge* would be well past the section of the shipping channel that he planned to cross to make his approach to Shem Creek, which was on the tour route. The master did not recall seeing the stern light of the car carrier or any other lights indicating that other vessels were under way in the shipping channel.

As the *Thriller 09* approached the Rebellion Reach section of the main shipping channel, it crossed over a wake, which the master believed was from the outbound *Green Ridge*. Shortly thereafter, the *Thriller 09* crossed a second wake. The master told investigators that he had been concentrating on heading for a red navigation marker at the entrance to Shem Creek. The mate recalled that she had just completed a section of narration and was checking her notes. As she pushed the microphone button to resume her narration, she saw the red sidelight and bow of an approaching boat on the *Thriller 09*'s starboard bow. She yelled “boat” into the public address system, which alerted the master and the passengers. The master then saw the other vessel and, anticipating a collision, he increased speed and turned to port in an attempt to get across the track (path) of the approaching vessel. Then, after briefly observing the oncoming vessel, the master elected to turn to starboard in an attempt to swing the stern away from the approaching vessel and reduce the force of the impact. The master stated that when he first observed the boat, it was approaching fast and was about 100 yards away. He estimated that he had only seconds before impact. Both he and the mate said that they initially believed that the other vessel was a rigid-hull inflatable boat.

The mate stated that she realized that the other boat would strike the *Thriller 09* aft of her position at the starboard helm. About 2028, the other vessel struck the *Thriller 09* near the third row of passenger seats, about amidships; then, its bow rode up over the *Thriller 09*'s gunwale⁶ before sliding back into the water. The master estimated that the other vessel struck the *Thriller 09* at about an 80-degree angle, measured from the bow of the *Thriller 09*. A passenger stated that he saw that the other vessel's hull had a gun on the bow, and he recognized it as a Coast Guard vessel.

The master immediately stopped the *Thriller 09* and activated the Digital Selective Calling feature on his radio to report an emergency. He then called the Coast Guard on VHF channel 16 to report the collision. As the mate was attending to the passengers and assessing

⁵ A *securité* radio call, usually broadcast on a common frequency such as very high frequency (VHF) channel 16 or medium frequency (MF) 2182 kilohertz, is used to alert shore stations and vessels that important safety information is about to be transmitted. Such radio transmissions begin with “*securité, securité, securité,*” which is followed by the safety-critical information.

⁶ The gunwale is the upper edge of a vessel's side.

their injuries, the master quickly determined that the *Thriller 09* was not taking on water. However, he found that a section of metal hand railing had broken off the starboard gunwale and that the vessel's hull was damaged above the waterline. In addition, the third bench seat on the starboard side had broken loose from the deck mounting near the outboard side where the impact had occurred, and the outboard portion of the seat had been displaced upward, about 1 foot in height.

CG 25689 and CG 25788 Events

The two 3-person crews scheduled to operate the *CG 25689* and the *CG 25788* on the day of the accident arrived at the MOL detachment's operations facility (located on Goose Creek near the U.S. Transportation Command [TC] docks) about 1400 on December 5, 2009. The crews were scheduled for the 1500–2300 watch; however, it was normal practice for crewmembers to arrive about an hour early to draw equipment, including weapons and ammunition, and to get the vessels ready for operation. About 1500, the *CG 25689* and the *CG 25788* both got under way en route to the TC dock where the *Green Ridge* was loading a cargo of military equipment. The two boats relieved two other 25-foot-long Coast Guard RB-Ss that were enforcing a stationary security zone around the moored *Green Ridge*.

While the *CG 25689* and *CG 25788* crews enforced the stationary security zone, there was little vessel traffic, and the watch was uneventful. At 1830, two commercial tugboats arrived to assist in undocking the *Green Ridge* and, at 1900, the vessel got under way for sea. While the *Green Ridge* was under way in the harbor, the two Coast Guard boats escorted it and maintained a 500-yard moving security zone around it. The *CG 25788* was positioned off the port bow of the *Green Ridge*, and the *CG 25689* was positioned aft, on the vessel's starboard quarter. The *CG 25689* coxswain was the senior coxswain for the flotilla. The flotilla encountered three or four vessels during the outbound transit, and the Coast Guard crews used their blue lights,⁷ loudhailers, and law enforcement authority as needed to ensure that each vessel remained clear of the *Green Ridge* and at a safe distance.

When the *Green Ridge* passed Fort Sumter, the *CG 25689* coxswain noticed a pilot boat proceeding outbound in the jetties. He saw no other vessels or perceived risks, and this made him conclude that the escort was no longer necessary. He consulted with the *CG 25788* coxswain, who agreed to terminate the escort. The *CG 25689* coxswain then reduced speed and began turning the vessel around to head back up the shipping channel. The *CG 25788*, which had been positioned forward of the *Green Ridge* during the escort, did not immediately reverse course to turn back when the *CG 25689* terminated the escort. Consequently, the *CG 25788* was not positioned to witness the collision between the *CG 25689* and the *Thriller 09*.

The *CG 25689* coxswain stated that as he headed his vessel back up the shipping channel, he slowed it to ensure that the gunner could safely detach himself from his safety harness at the gun on the bow and move into the cabin. The other crewmember in the cabin, a boatswain's mate first class, had been occupying the forward port seat (to the coxswain's left), a position normally designated for the assigned lookout. This crewmember moved to one of the two aft seats to allow

⁷ The two Coast Guard boats only used the blue lights during interception of vessels entering the safety zone around the *Green Ridge*. Also, the *CG 25788* coxswain stated that he activated his vessel's blue lights after he heard the *CG 25689*'s report of the collision.

the gunner to take the forward seat near the port window to maintain a visual lookout, monitor the radar, and handle radio communications.

The gunner entered the cabin of the *CG 25689* through the rear door, stowed his helmet in his bag, and sat down in the forward port seat. He called the *CG 25788* crewmembers on the portable 800-megahertz (MHz) radio and informed them that the *CG 25689* was heading back to the MOL detachment facility and would stop for fuel. About this time, the *CG 25689* coxswain gradually increased speed to get the vessel up on plane. He estimated that the vessel reached a speed of 25 knots. The coxswain stated that the vessel was in the middle of the Rebellion Reach section of the main shipping channel and was lined up with the range markers. The gunner stated that at this point, the crewmember sitting in the aft seat told him to call the *Green Ridge* and inform the car carrier's pilot that the Coast Guard escort had been terminated.

The gunner said that he picked up the microphone for the VHF radio and turned around to face the boatswain's mate while discussing the call to the *Green Ridge*. Just then, the coxswain sighted the green sidelight of the *Thriller 09* in close proximity, crossing his bow from port to starboard. He estimated that the bearing to the green sidelight was 60–90 degrees on his port bow, and that he did not believe that changing course was an option because the collision was imminent by the time he saw the green sidelight. The gunner said that he heard the coxswain yell, and he turned his head in time to see the coxswain pull back on the throttles; then he saw what appeared to be a white hull ahead. The gunner stated that he had not visually scanned the horizon or checked the radar for contacts because he was busy communicating on the VHF radio and interacting with the crewmember in the aft seat about calling the *Green Ridge*. The gunner stated that, on seeing the other vessel's hull, he dropped the microphone and braced for impact. The coxswain said that he stopped the vessel's propulsion engines and tried to reverse them, but he shifted astern too quickly and both engines stalled. The *CG 25689* fell off plane and quickly decelerated.

After the collision, the coxswain restarted both engines, assessed the damage to the *CG 25689*, and positioned the vessel about 50 feet from the *Thriller 09*.

The track of the *CG 25689* was captured by the vessel's automatic identification system (AIS).⁸ The trackline appears in figures 3 and 4, as does the trackline of the *Thriller 09* as captured by its global positioning system (GPS). Evidence indicates that in the minutes before the accident, the *Thriller 09* and the *CG 25689* were approaching each other at an approximately constant bearing rate, as shown by the nearly parallel bearing lines in figure 4.

⁸ AIS is a maritime navigation safety communications system. At 2- to 12-second intervals on a moving vessel, the AIS automatically transmits vessel information, including the vessel's name, type, position, course, speed, navigational status, and other safety-related information to appropriately equipped shore stations, other vessels, and aircraft. The rate at which the AIS information is updated depends on vessel speed and whether or not the vessel is changing course. The AIS also automatically receives information from similarly equipped vessels.

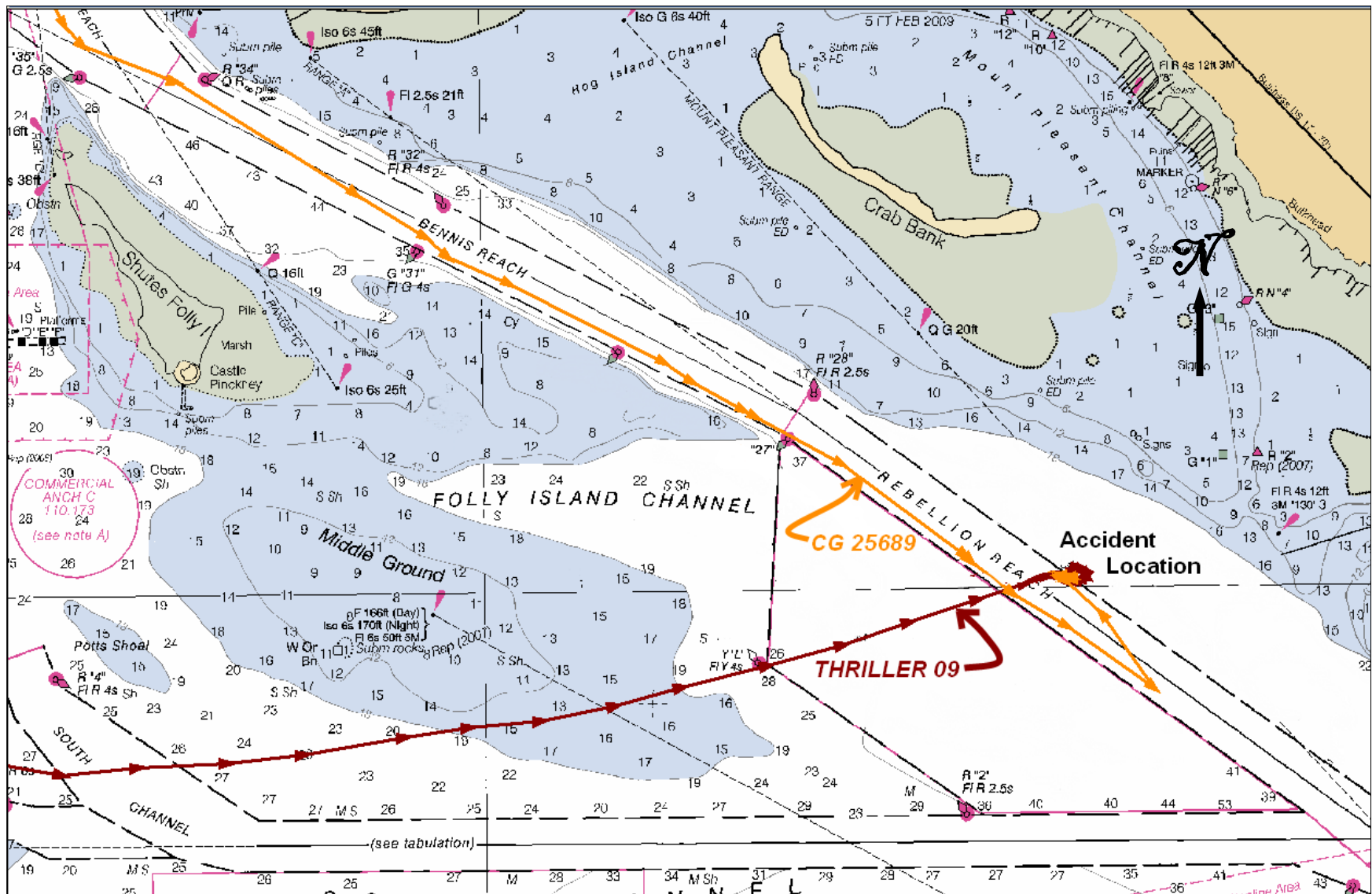


Figure 3. Tracklines of the CG 25689 (orange) and the Thriller 09 (red).

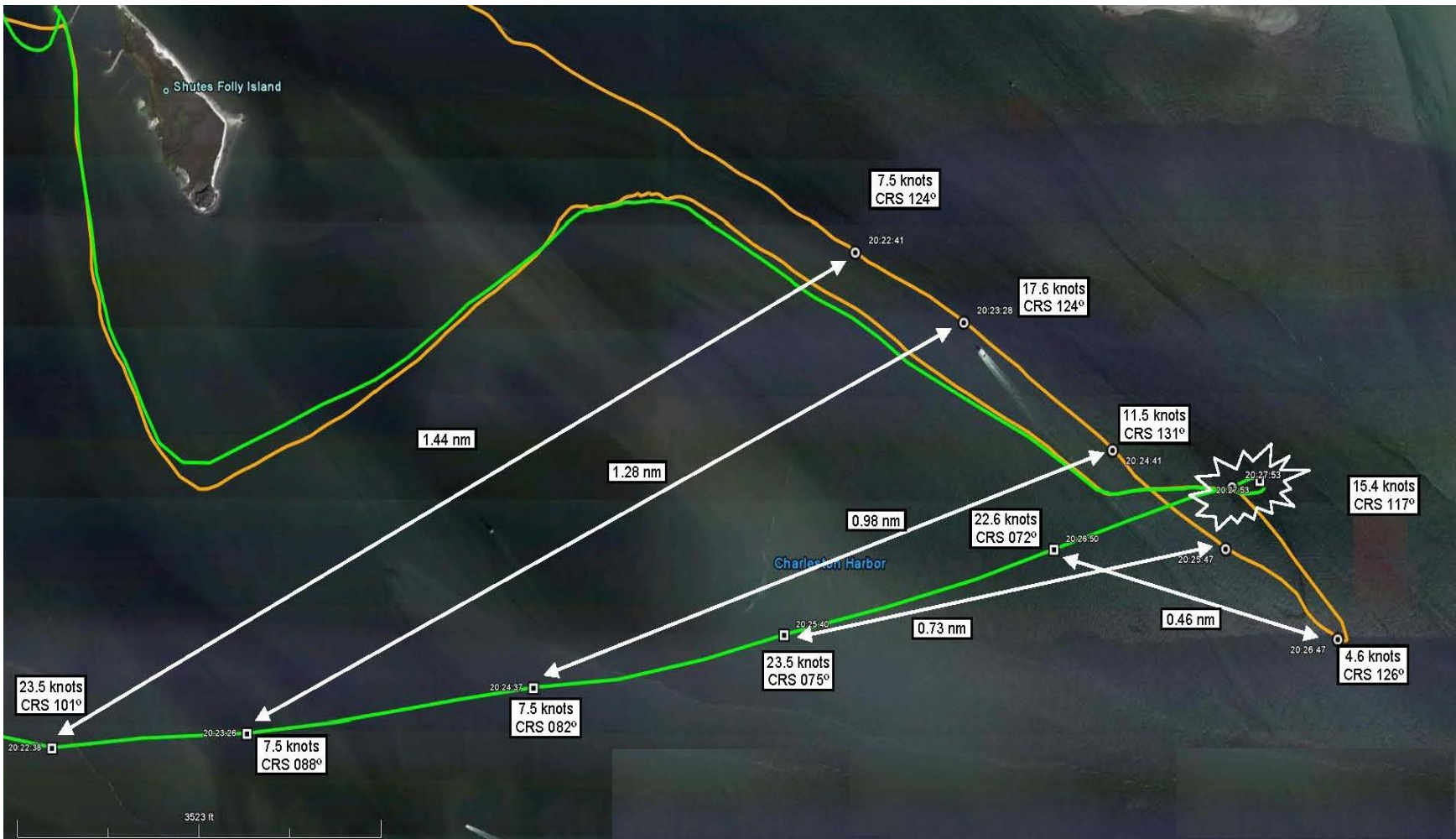


Figure 4. Graphic shows the tracklines of the CG 25689 (orange) and the *Thriller 09* (green). The white lines indicate the relative bearings between the vessels at various times. The star shape outlined in white indicates the approximate location of the collision. Background by Google Earth.

Emergency Response

After the collision, the *CG 25689* coxswain did not immediately notify the Coast Guard Charleston Sector Command Center (SCC), but one of the vessel's other crewmembers contacted the *CG 25788* via radio to inform its crew of the accident and request that it proceed immediately to the accident location. The *CG 25689* coxswain then navigated alongside the *Thriller 09*, and the boatswain's mate boarded the *Thriller 09* to assess the condition of the passengers and the vessel. Based on communication with the master, the mate, and several passengers, the boatswain's mate determined that the *Thriller 09* was not taking on water, and that all persons on board were accounted for. He also determined that two passengers, a 24-year-old woman and a 17-year-old male who had been seated near the point of impact, were injured and needed medical treatment. Two other passengers were also identified as injured. With the exception of the 24-year-old woman, the injured passengers were capable of walking.

At 2029, about 1 minute after the collision, the Charleston SCC received its first notification about the accident from the *Thriller 09* master via VHF channel 16. The master informed the SCC watchstander that a Coast Guard boat had struck his vessel and that passengers on board his vessel were injured. That radio call initiated the Coast Guard's response to the collision. At 2030, SCC watchstanders requested the launch of Coast Guard Station Charleston's 41-foot-long utility boat, the *CG 41372*, and began notifying the Coast Guard chain of command as well as local first responders. By 2036, the *CG 41372*, located at Station Charleston about 3 nautical miles (nm) from the collision site, was en route to the accident location.

When the *CG 25689* boatswain's mate returned to his vessel, he contacted the SCC via cellular telephone and requested that the emergency medical service (EMS) response be directed to Charleston Harbor Resort and Marina because of the vessels' proximity to that location. Shortly thereafter, the *CG 25788* arrived alongside the *Thriller 09* and placed a crewmember on board to perform a second injury assessment. The *CG 41372* also arrived, and its coxswain boarded the *Thriller 09*. Because he had received a higher level of emergency medical technician (EMT) training than had others at the scene, the *CG 41372* coxswain assumed responsibility for care of the most seriously injured passenger, the 24-year-old woman. The coxswain applied a cervical collar to her and medically evacuated her from the *Thriller 09* to the *CG 41372* for transport to Charleston Harbor Resort and Marina. The other injured passengers and the 17-year-old's mother also boarded the *CG 41372*. About 2059, the *CG 41372* crew notified the SCC that all injured passengers were on board and that the vessel was headed to Charleston Harbor Resort and Marina.

Units and personnel from the Mount Pleasant Police Department, the Mount Pleasant Fire Department, and the EMS Department of Charleston County responded to the incident shoreside. At 2045, the SCC contacted the Charleston County EMS Communications Center via the 800 MHz public safety radio system, requesting EMS support to transport several injured passengers. About 2049, the EMS Communications Center dispatched the two nearest advanced life support (ALS) EMS transport units and a district EMS supervisor to Charleston Harbor Resort and Marina. Both EMS transport units, staffed by two EMTs and the district EMS supervisor, arrived on scene about 2100. In addition to the county assets, at 2052, the town of Mount Pleasant

dispatched an emergency response vehicle to the location, and it arrived about 2057. Traffic control, scene management, and law enforcement assistance was also dispatched to the scene.

At 2113, the *CG 41372* arrived at Charleston Harbor Resort and Marina, where emergency response personnel made their initial assessment of the four injured passengers; all four were determined to be stable. By 2139, the injured passengers were en route to the Medical University of South Carolina, and they arrived there about 2153. At 2221, the SCC contacted the Charleston County EMS Communications Center a second time via the 800-MHz public safety radio system to request additional EMS support at Charleston Harbor Resort and Marina for a fifth passenger, a 54-year-old woman, who had sustained an injury to the upper portion of her face. At 2223, an emergency response vehicle was dispatched to the marina to transport the woman. It arrived at the marina at 2230, departed at 2245, and arrived at Roper Hospital in Charleston at 2300. At 0032 on December 6, 2009, a sixth passenger from the *Thriller 09*, a 49-year-old woman, self-reported to the emergency room at the Medical University of South Carolina for treatment.

In total, 8 emergency response units were deployed and 16 emergency response personnel performed various EMS or law enforcement functions. Of the eight emergency response units, two had ALS capability and one had basic life support capability. One search-and-rescue vessel and three law enforcement vehicles were involved in the response.

Injuries

None of the *CG 25689* crew was injured. Of the six *Thriller 09* passengers treated at hospitals following the accident, none had life-threatening injuries, nor did the injuries meet the International Civil Aviation Organization (ICAO) definition of a “serious” injury.⁹ All passengers were released from the emergency room with instructions for followup care.

The table below lists the injuries to the *Thriller 09* passengers, categorized according to ICAO injury criteria:

| Type of Injury* | Crew | Passengers | Total |
|-----------------|------|------------|-------|
| Fatal | 0 | 0 | 0 |
| Serious | 0 | 0 | 0 |
| Minor | 0 | 6 | 6 |
| None | 2 | 16 | 18 |
| Total | 2 | 22 | 24 |

*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 one that 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.

⁹ The NTSB uses the ICAO criteria in all its accident reports, regardless of transportation mode.

Postaccident Drug and Alcohol Tests

Thriller 09 Crew

The Coast Guard breath-tested the master and the mate of the *Thriller 09* for alcohol within about 1 hour of the accident, and the results were negative. Within 18 hours of the accident, the master and the mate also provided urine specimens to a drug-testing laboratory. The laboratory reported that each of the samples was negative for illegal drugs.

CG 25689 Crew

A qualified Coast Guard staff member tested the CG 25689 coxswain for alcohol within about 1 hour of the accident. The result was negative. The other two CG 25689 crewmembers were not alcohol-tested. All three crewmembers were drug-tested within 18 hours of the accident, and all results were negative. However, the laboratory determined that the urine specimen collected from one of the crewmembers had abnormal characteristics, reported as “negative dilute.”¹⁰ A second urine specimen collected about a week later was also reported as negative dilute, with no presence of drugs detected.

Personnel Information

Thriller 09

Master. The master of the *Thriller 09*, age 44, held a 50-gross-ton, near-coastal-waters master’s license as well as a commercial assistance towing endorsement issued by the Coast Guard in February 2005. Before taking his Coast Guard master’s license examination, he attended a 3-week preparation course in Charleston. He had been involved with small boats, both sail and power, from an early age, and his initial experience had been on inland lakes. He later purchased his own powerboats and sailboats, and he operated boats on the ocean. Most of his boating experience had been on small powerboats and larger sailboats. The master had lived in the Charleston area since about 2003. He purchased the *Thriller 09* new from the boat builder and began operating it in commercial passenger service in May 2008.

The master said that in the days before the accident, he had maintained a consistent work-rest cycle. On each of the 3 days before the accident, he awoke about 0710 and went to bed about 2300. He said that he normally slept about 8 hours per night and rated his quality of sleep as good. His last physical examination took place about 2 years before the accident. At that time, no significant medical issues were identified. The master reported that his vision was 20/20 and that he did not regularly take prescription or over-the-counter medications.

Deckhand (Mate). The deckhand, age 44, first became involved in small boat sailing in 1992. She did not possess a Coast Guard credential, nor did the Coast Guard require her to have one to serve as deckhand on the *Thriller 09*. However, the vessel’s Coast Guard Certificate of

¹⁰ According to Federal regulations at 49 CFR Part 40, a dilute specimen is “a urine specimen with creatinine and specific gravity values that are lower than expected for human urine.”

Inspection required the deckhand position. Her experience with the *Thriller 09* began in May 2008, when the boat was first put into service.

The deckhand stated that she did not regularly take prescription or over-the-counter medications.

CG 25689

Coxswain. The *CG 25689* coxswain, age 31, was a native of Charleston, where he had operated a number of powerboats for pleasure and recreational fishing with his father while growing up. He was on active duty in the Coast Guard from October 1998 until his enlistment expired in late 2002. He then elected to remain in the Coast Guard Reserve. In February 2003, he was recalled to active duty and remained through voluntary 1-year extensions until the December 2009 accident. While on active duty, the coxswain had served on 25-foot-long boats involved in MOL operations, providing escort service to vessels carrying military cargo. He underwent training to qualify as coxswain of 25-foot-long RB-Ss, as tactical crewmember (weapons qualification), and as tactical coxswain. Tactical coxswain training involved maintaining a level gun platform and maneuvering the boat to prevent unauthorized vessels from getting close to any ship in a security zone. He was promoted to boatswain's mate third class in 2001, and to boatswain's mate second class in April 2008.

The coxswain had been working a day shift (0700–1500) until 4 days before the accident (Tuesday, December 1). He had Wednesday off. No ship was in port on Thursday, 2 days before the accident, and his section shifted to the 1500–2300 watch on Friday. He said that when standing 1500–2300 watches, he usually woke up about 0900 and went to sleep after midnight. He said that he needed 6–7 hours of sleep per night. He told investigators that he was a new father, and that interruptions to his sleep were common. However, he stated that in the 2 weeks preceding the accident, he had been sleeping well and that he did not feel tired at the time of the accident.

The coxswain's last physical examination took place 2 years before the accident. He stated that he had no health problems, that his vision was 20/20, and that he was not taking any medications.

Gunner. The *CG 25689* gunner, a port security specialist third class, age 23, joined the Coast Guard Reserve in June 2007, where he drilled twice per month. He also attended The Citadel, from which he graduated in May 2009. About a month later, he was called to active duty and was assigned to the Charleston MOL unit, riding the boats as an extra while working on his boat crew qualifications. In fall 2009, he was assigned to a training section with several other new personnel to hasten the qualification process.

The gunner told investigators that he had been on the 1500–2300 watch on the Wednesday and Thursday preceding the accident. He told investigators that while on 1500–2300 watches, he normally went to bed at 2345 and arose about 1000. He had been off duty on Friday, and he had arisen about 1030. That night, he went to bed at 2215. On Saturday, December 5, the day of the accident, he arose about 1000 and arrived at 1400 at the MOL unit, 1 hour before the start of his 1500–2300 watch.

Boatswain's Mate. The third crewmember, age 35, was a boatswain's mate first class. He held Coast Guard qualifications as boarding team member, boat crewmember, boarding officer, and physical fitness coordinator. He did not hold a qualification as coxswain. The boatswain's mate had the equivalent of a 2-year degree and had been working on a 4-year degree in criminal justice.

The boatswain's mate joined the Coast Guard Reserve in January 2001 and had about 6.5–7 years of active duty in the Reserves. For the previous 13 years, except for the time he served in the Coast Guard, he served as a police officer in North Carolina. He was involved with small boat operations for about the last 4.5 years of his time in the Coast Guard; he served the last 2.5 years at the Station Charleston MOL detachment. The boatswain's mate had performed about 80–150 escorts, which were equally divided between nighttime and daytime missions. In addition to serving as boat crewmember, the boatswain's mate had been a section leader for the previous 1.5 years, which involved supervising 10–15 enlisted members assigned to his watch rotation.

The boatswain's mate stated that he needed, and normally got, about 8 hours sleep. He recalled that on the Wednesday 3 days before the accident, he woke up about 0700 and arrived at work about 0830. He worked until 1500, then went home, and went to bed about 2200. On the Thursday 2 days before the accident, he awoke about 0520 and arrived at work about 0605. He worked until 1510, arrived home about 1830, and went to bed about 2230. On the day before the accident, he had the day off from work. He awoke about 0800 and went to bed about 2300. On December 5, the day of the accident, he woke up about 0900, had lunch at 1230, left for work at 1320, and arrived at work about 1350.

The boatswain's mate had completed a physical examination about 4 months before the accident. No medical conditions were noted. His vision was 20/20, and he did not regularly take prescription medications.

Weather

According to National Weather Service data from Charleston International Airport, located about 11 miles northwest of the accident site, the winds were north-northwesterly at 10 knots or less, the skies were clear, and the air temperature was 47° F. The Folly Beach Pier weather-reporting station (located about 8 miles south-southwest of the accident site) reported mean wave heights less than 1 foot and water temperature of 60° F. The National Oceanic and Atmospheric Administration's (NOAA) Charleston Harbor station, located about 2.5 miles northwest of the accident site, reported the low tide at about 1624 and the high tide at about 2225. At the time of the accident, the moon provided no illumination.

Waterway Information

Charleston Harbor is the approach to the city of Charleston and to the rivers Ashley, Cooper, and Wando. According to the *Coast Pilot 4*, Charleston Harbor is “easy of access day or

night in clear weather, and is one of the best harbors of refuge on the South Atlantic coast . . .¹¹ The Rebellion Reach section of the main shipping channel where the accident occurred is 1.4 nm long and 600 feet wide with a depth of 45 feet. It is served by range lights for inbound traffic located at Patriots Point on Hog Island.

Charleston Harbor is subject to the inland navigation rules.¹² Rule 5 of the inland navigation rules requires every vessel to maintain a proper lookout by sight and hearing as well as by all available means. Rule 6 requires each vessel to proceed at a safe speed so that each operator can take effective action to avoid collision. Vessel speeds in the open waterways of Charleston Harbor are unrestricted, subject to the inland navigation rules. Charleston Harbor is surrounded by urban areas that project light seaward in a variety of color and intensity. Background lighting from shore is known to increase operators' difficulty in evaluating vessel traffic, and navigation rule 6 cautions mariners to use appropriate vigilance under such conditions.¹³

Vessel Information

Thriller 09

General. The *Thriller 09* was certificated by the Coast Guard as a small passenger vessel subject to subchapter T Coast Guard regulations (46 CFR 175-185). It was 54.5 feet long, had a breadth of 12 feet, was powered by twin 440-hp turbocharged diesel engines, and was capable of speeds in excess of 40 knots. However, because of hull strength limitations and additional manning requirements for high-speed craft, the *Thriller 09* was not allowed to exceed 30 knots when passengers were on board. The vessel was certificated to carry a maximum of 45 persons (a crew of 2, and 43 passengers).

The boat was designed to comply with the 2001 *American Bureau of Shipping Guide for Building of High Speed Craft* and the 1978 *American Bureau of Shipping Rules for Building and Classing of Reinforced Plastic Vessels*. Thriller Powerboats of Fort Pierce, Florida, constructed the vessel in 2008. The *Thriller 09* was the ninth hull in the series of ten Thriller boats. According to information received from the Coast Guard, the last two boats in the series were built for Thriller Powerboats at the Twin Vee Catamarans, Inc., facility in Fort Pierce, while the first eight boats were built at Thriller Powerboats' own Fort Pierce facility. The *Thriller 09* was fitted with a limited navigation and communications suite consisting of a GPS, a digital electronic compass, and two VHF-FM transceivers. For accident reconstruction purposes, the NTSB retrieved and used data recorded by the *Thriller 09* GPS.

¹¹ *Coast Pilot 4, Atlantic Coast: Cape Henry to Key West*, 2010 (42nd) Edition (Washington, DC: U.S. Department of Commerce, NOAA, and National Ocean Service, 2010), p. 275.

¹² Inland Navigational Rules Act of 1980, (Pub. L. 96-591). Rules are published by the Coast Guard at *U.S. Coast Guard Commandant Instruction M16672.2D: Navigation Rules, International-Inland* (Washington, DC: U.S. Coast Guard, March 25, 1999).

¹³ Rule 6 ("Safe Speed") cautions vessel operators to determine speed by accounting for prevailing circumstances, such as the presence of background light from shore lights or from backscatter of their own vessels' lights.

Construction. The hull was constructed of fiberglass-reinforced plastic (FRP) and had a catamaran (twin-hull) configuration. The builder and the Coast Guard evaluated the vessel's hull strength, and applied appropriate wave height-speed restrictions to the vessel's operation. According to Thriller Powerboats, the twin-hull catamaran-type design on which the *Thriller 09* was based has been proven through years of successful offshore racing using high-powered engines at high speeds. According to the builder's design and construction technical paper, twin-hull structures were connected using transverse FRP core panel bulkheads spaced at 48 inches for both the hull and deck structures. Additional longitudinal frames were fitted between the bulkheads, which reduced bottom skin stresses. Two watertight bulkhead compartments were fitted, one forward of the engineroom and a second one amidships.

Damage. The *Thriller 09* sustained damage primarily to the starboard-side hull, above the waterline (figure 5). The damage in the impact area consisted of scratched, cracked, broken, and detached portions of the fiberglass hull shell, as well as fracturing of the interior hull framing and deck in this area. As a result of the collision, the starboard passenger bench seats at rows 2 and 3 were lifted and partially detached from the deck. The damage began 29 feet 7 inches from the bow and extended aft 12 feet 9 inches. According to the attorney for the boat owner/operator, the damage repair cost totaled \$94,300, excluding transportation and storage costs associated with shipping the boat to a Florida repair facility.



Figure 5. Damage to *Thriller 09* starboard side, looking aft from the bridge.

CG 25689

General. The *CG 25689*, built in 2006 by SAFE Boats International at Port Orchard, Washington, was a member of the SAFE Boat “Defender Class,” first built for the Coast Guard under an August 2002 contract. The Coast Guard classifies the 25-foot-long “Defender Class” vessel as an RB-S. The boat contract specifications required the vessel to be capable of performing heavy weather search-and-rescue missions in seas of up to 8 feet and winds of up to 25 knots. The boat had a maximum rated speed of 46 knots and a cruising speed of 35 knots. About 450 boats of this class have been built and delivered to the Coast Guard. RB-Ss were designed to support multiple Coast Guard missions and are used by the Coast Guard throughout the United States. Among the boats’ assigned missions are search-and-rescue, port security, and law enforcement duties. The boats are assigned to various Coast Guard units, including Maritime Safety and Security Teams, Maritime Security Response Teams, Marine Safety Units, and Small Boat Stations. The *CG 25689* was operated by the Station Charleston MOL detachment, a component of (Boat) Station Charleston and Sector Charleston. The MOL detachment’s mission was to provide security to vessels carrying U.S. military cargo in the Charleston area. The detachment provided security when cargo vessels were at dockside loading or unloading cargo (stationary security zone) and when they were transiting into or out of Charleston. Operational tasking of the MOL detachment boats was coordinated with U.S. Army (surface) cargo management command.

Construction. The vessel had a length of 29 feet 6.5 inches and a draft of 39 inches. It had a deep-V monohull constructed of marine grade (5086) aluminum with a stabilized closed-cell polyethylene foam collar. The boat was powered by twin outboard gasoline engines rated at 225 hp each. The vessel was fitted with a scalable integrated navigation system (SINS), an extensive array of communications and navigation equipment. Among the items included in the SINS were a radar/chart plotter system, a GPS, an AIS, a magnetic compass, two marine VHF-FM transceivers, and a secure communications radio. The *CG 25689*’s radar/chart recorder and GPS were capable of recording GPS data, but the devices were not configured to do so because routine data extraction was not anticipated in the use of the equipment.

Damage. Damage to the *CG 25689* was limited to the bow area and consisted of one large (19- by 16- by 20-inch) tear in the bow fabric cover and several small tears, scuffs, scrapes, and similar damage to the cover (figure 6). In addition, the beaching (doubler) plate on the bow stem showed scuffing and impact damage but no apparent indentation or fracturing of the hull. The Coast Guard estimated the damage cost to total \$1,380, including the bow cover replacement, materials, and some hull welding.

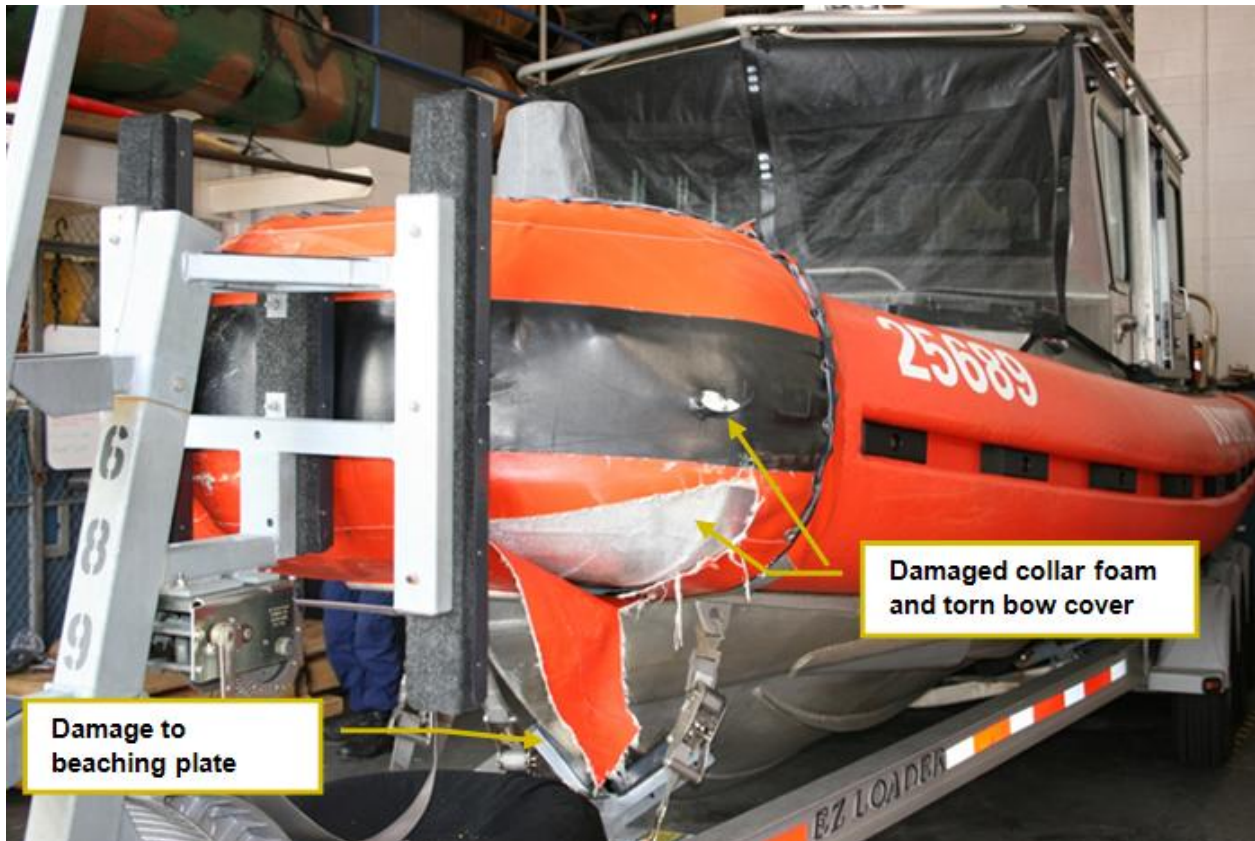


Figure 6. Damage to the CG 25689's bow collar foam, bow cover, and beaching plate.

Navigation Lighting

Both vessels were fitted with the required navigation lights for use during restricted visibility and nighttime operations. Crewmembers of both vessels and passengers of the *Thriller 09* reported that both vessels' lights were illuminated at the time of the accident. Investigators later verified that all required lights were operational. However, investigators identified two anomalies with the navigation lighting system of the *Thriller 09*. First, its port and starboard navigation sidelights, fitted at the outboard sides of each of the catamaran's bows, had range of visibility ratings of 1 nm rather than 2 nm as required by the navigation rules. In addition, the boat had decorative rope lights installed around the perimeters of its hulls, just below the rub rail (figure 7). According to the rope light manufacturer's specifications, the LEDs in the rope lights had a luminous intensity rating that exceeded the rating of the navigation sidelights.¹⁴

¹⁴ According to Coast Guard regulations, the minimum luminous intensity for 1-nm lights is 0.9 candelas. For 2 nm lights, the minimum luminous intensity is 4.3 candelas. According to a representative of the rope light manufacturer, the LED bulbs, which were spaced at 1-inch intervals, had a luminous intensity of 5.4 to 5.5 candelas.

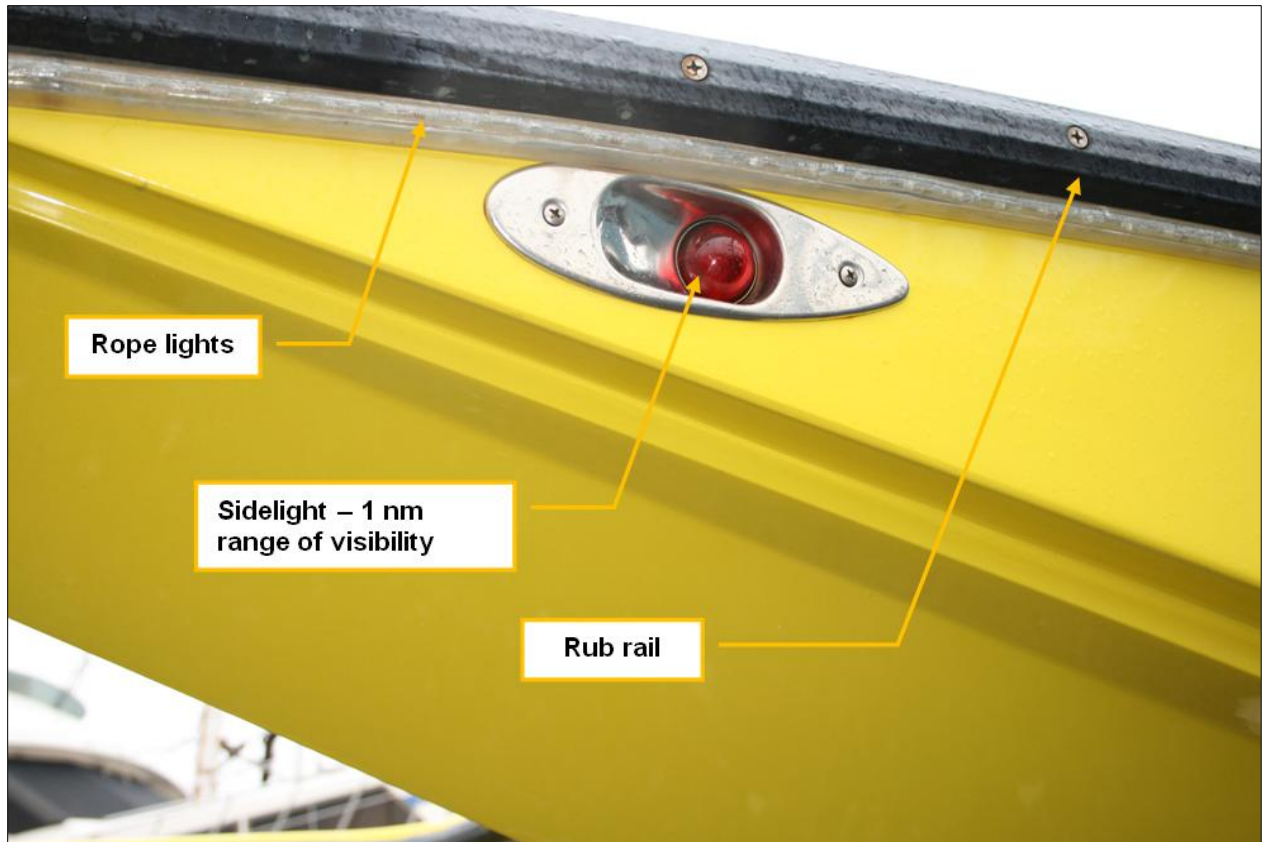


Figure 7. View of portside navigation sidelight and rope lights at the *Thriller 09*'s bow.

Postaccident Actions

Navigation Lights

Thriller Boats. After the accident, the Coast Guard required the owner/operator of the *Thriller 09* to modify the navigation sidelight installation to meet the 2-nm range of visibility requirements of navigation rule 22, Visibility of Lights (within part C of the inland navigation rules, Lights and Shapes).¹⁵ The owner was permitted to keep the rope lights installed on the boat but was prohibited from illuminating them when the vessel was under way.

As noted earlier, the *Thriller 09* was the ninth hull in a series of ten, the last two of which were constructed at Twin Vee Catamarans rather than the Thriller Powerboats facility. The Coast Guard checked the 10th boat and found it to be fitted with navigation sidelights of the appropriate visibility range (2 nm).

Coast Guard Safety Alert. On December 18, 2009, based on preliminary findings in its investigation of this accident, the Coast Guard issued safety alert 09-09 to advise the marine

¹⁵ Navigation Rules and Regulations: International Navigational Rules Act of 1977 (Public Law 95-75, 91 Stat. 308, or 33 U.S.C. 1601-1608) and the Inland Navigation Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 U.S.C. 2001-2038).

industry of the importance of maintaining the distinctive character of navigation lights. In the alert, the Coast Guard strongly reminded vessel owners “not to illuminate [decorative] lights during routine navigation unless operating in a Holiday boat parade or when the vessel is secured dockside.” The Coast Guard stated that to operate a vessel with decorative lights illuminated while under way could impair the distinctive character of the other navigation lights, established in navigation rule 20, Application (within part C of the inland navigation rules, Lights and Shapes). In addition, safety alert 09-09 noted that the small passenger vessel involved in the accident was fitted with a navigation sidelight fixture “stamped one nautical mile vice 2 miles.” The safety alert reminded vessel operators/owners and Coast Guard marine inspection personnel to ensure that proper navigation lighting fixtures are installed, that all components operate correctly, and that navigation lighting regulatory requirements are met.

NTSB Safety Recommendations on Cell Phone Use

During the accident investigation, NTSB investigators found that the *CG 25689* crewmembers had used their personal cellular telephones while under way. The cell phone use took place before the crew escorted the *Green Ridge* out of the harbor; no evidence indicates that the crewmembers used their personal cellular telephones in the period between the detachment from the *Green Ridge* and the collision with the *Thriller 09*. The NTSB subsequently issued recommendations to the Coast Guard to address the potential for distraction related to the use of wireless devices on vessels.¹⁶

Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision was the inadequate lookout by the crewmembers of both vessels, given the speed at which they were being operated and the nighttime conditions.

¹⁶The NTSB issued Safety Recommendations M-10-2 and -3 to the Coast Guard on August 11, 2010.