



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 19, 2007

In reply refer to: A-07-87 and -88

The Honorable Robert A. Sturgell
Acting Administrator
Federal Aviation Administration
Washington, D.C. 20591

The National Transportation Safety Board has investigated several helicopter accidents in which the aircraft crashed or ditched into the Gulf of Mexico. As further discussed below, in some cases, helicopter occupants did not survive while awaiting the arrival of search and rescue teams. With better access to liferafts stored on board the aircraft and better signaling devices, these occupants would have had a greater chance of surviving. These accidents and related safety issues are discussed below.

Background

Accident Involving a Houston Helicopters, Inc., Sikorsky S-76A (N90421)

On September 6, 2005, about 1605 central daylight time, the flight crew of a Sikorsky S-76A helicopter (equipped with 12 seats), N90421, operated by Houston Helicopters, Inc., executed a forced ditching into the open waters of the Gulf of Mexico about 24 miles southeast of Sabine Pass, Texas, following an in-flight fire and eventual dual-engine power loss. Both flight crewmembers and three of the 10 passengers sustained serious injuries; seven passengers sustained minor injuries. The flight was operating under the provisions of 14 *Code of Federal Regulations* (CFR) Part 135.¹

As the helicopter hit the water, the floats on the right side burst, causing the helicopter to roll sharply to the right. The occupants quickly evacuated the rapidly flooding cabin. Neither of the two 18-pound liferafts that were stored under the outboard first row of cabin seats (see figure 1 for an example of the location of these liferafts) was retrieved before the helicopter sank. The captain stated during a postaccident interview that he thought about retrieving one of the liferafts but could not find them; the first officer stated that there was not enough time to remove the liferafts because the helicopter sank so rapidly. Without a liferaft to protect them from the Gulf waters, several of the passengers suffered hypothermia. All occupants wore personal

¹ The description of this accident, DFW05MA230, can be found on the Safety Board's Web site at <<http://www.nts.gov/ntsb/query.asp>>.

flotation devices (PFD)² to keep them afloat during the 7 1/2 hours that passed before they were all rescued. Although the flight crew's PFDs were equipped with survivor locator lights,³ the lights were ineffective at signaling to rescue sources within sight, including two helicopters that passed overhead and a boat that passed within their view. Although U.S. Coast Guard search and rescue crews used night vision goggles to locate the survivors about 5 hours after the ditching, the locator lights on the survivors PFDs were reported to be barely visible at night in the vast Gulf waters.⁴



Figure 1. Photograph showing liferaft location on board a Sikorsky S-76 helicopter

Accident Involving a PHI Sikorsky S-76A++ (N22342)

On October 22, 2006, about 0730 central daylight time, a Sikorsky S-76A++ helicopter (equipped with 12 seats), N22342, operated by PHI, of Lafayette, Louisiana, impacted the water while approaching an offshore platform in the Gulf. Both occupants, the captain and the first officer, were wearing PFDs and survived; however, the first officer sustained minor injuries. During the impact, the helicopter rolled inverted and submerged. The helicopter was equipped with a liferaft, located under the center row of seats, but it was not used. Crewmembers stated during postaccident interviews that they would have accessed the liferaft if they had more time to evacuate. The flight was operating under the provisions of 14 CFR Part 91.⁵

² HHI's operation specifications required that the crewmembers and passengers wear PFDs during flight.

³ These locator lights are about the size of a half dollar coin and are typically activated by contact with water. Once activated, they emit steady illumination.

⁴ Oil platforms in the Gulf exist between Corpus Christi, Texas, and Mobile, Alabama—an area that measures about 650 miles by 2,250 miles.

⁵The brief of this accident, DFW07LA011, can be found on the Safety Board's Web site at <<http://www.nts.gov/ntsb/query.asp>>.

Both crewmembers' PFDs were equipped with personal locator beacons (PLB). The first officer's PLB activated on 121.5 megahertz (MHz) frequency, and the captain's PLB activated on 406 MHz frequency; the captain's PLB was also equipped with a global positioning system (GPS).⁶ After evacuating, the first officer removed his 121.5 MHz PLB and activated it. About 1 hour later,⁷ he activated the captain's 406 MHz PLB. Although the activation signal from the 406 MHz PLB transmitted to the U.S. Mission Control Center, the GPS signal did not transmit because the GPS was submerged in water. As a result, there was no way to promptly identify the location of the signal. After 1 1/2 hours in the water, the flight crewmembers saw an aircraft flying overhead, but the aircraft occupants did not spot them. Eventually, the flight crewmembers were able to swim to an oil platform about 1/4 mile away, where they were later rescued.

Accident Involving a SeaHawk Services, Ltd., Bell 206B (N360S)

On October 29, 1993, about 1015 central daylight time, a Bell 206B (a single-engine turbine helicopter equipped with five seats), N360S, owned by Offshore Logistics, Inc., and leased to SeaHawk Services, Ltd., was destroyed when it collided with the Gulf waters in the West Cameron 240 (WC 240) block of the Gulf, where the pilot had diverted after encountering deteriorating weather conditions. The pilot drowned and two passengers sustained minor injuries. Company flight-following was being used at the time of the accident. The flight was operating under the provisions of 14 CFR Part 91.⁸

According to the passengers, after diverting to WC 240, the pilot made several attempts to reach the platform; however, each time, a squall line forced the pilot to turn the helicopter around. The pilot completed four or five additional 360° maneuvers, during which the helicopter leveled and slowed to near 0 knots and descended toward the Gulf waters. The passenger who was seated in the left front seat stated that he was about to warn the pilot of their low altitude when a "10 to 15"-foot wave struck the bottom of the helicopter. The helicopter immediately rolled right and impacted the water. All three occupants escaped the inverted helicopter, swam to the surface, and inflated their PFDs. The helicopter continued to float inverted for about 6 hours. One of the passengers deflated his PFD and went back inside the helicopter three times in an attempt to retrieve the liferaft but was unsuccessful locating it.⁹

⁶ When a registered, GPS-equipped 406 MHz PLB activates, its signal provides the position of the user within approximately 110 yards (100 meters) and is detected by COSPAS-SARSAT (Cosmicheskaya Sistyema Poiska Avariynich Sudov [Space System for the Search of Vessels in Distress] – Search and Rescue Satellite-Aided Tracking). COSPAS-SARSAT automatically forwards the signal to the U.S. Mission Control Center (operated by the National Oceanic and Atmospheric Administration), which then directs the alerts to the Air Force Rescue Coordination Center and the U.S. Coast Guard.

⁷ Because N22342 impacted the water so close to the destination platform, the flight crewmembers believed that it would be quickly apparent to the operator that they were overdue and that they would be rescued soon. As a result, only one of the two PLBs was activated initially. Both flight crewmembers received user manuals from PHI for their PLBs, but they did not read the manuals nor did the flight crewmembers receive information about the differences between the 121.5 and 406 MHz PLBs.

⁸The brief of this accident, FTW94LA021, can be found on the Safety Board's Web site at <<http://www.nts.gov/ntsb/query.asp>>.

⁹ It is not known where the liferaft in this helicopter was stored; however, as is the case for many offshore helicopter operations in the Gulf, the liferaft was likely stored under one of the seats.

After the pilot failed to report landing at his final destination, an Air Logistics dispatcher initiated a radio search for N360S but failed to locate the aircraft. The dispatcher notified the operator of the missing flight and initiated an air search about 1045; however, the poor weather prevented the search aircraft from entering the search area. The U.S. Coast Guard immediately initiated an air and sea search after being notified about 1240 but was also hampered by the deteriorating weather throughout the day.

After the helicopter sank, one of the passengers swam to the WC 240 platform, which he estimated to be about 2 miles away. Shortly thereafter, the second passenger swam toward the platform. The pilot remained in the area and elected to float and await rescue. The first passenger reached the unmanned platform about 3 hours after setting out and used a cell phone he found in a shack to call his company's office. A Sea Hawk representative informed the Coast Guard and a Coast Guard cutter located and rescued the passenger from the platform about 1926. The second passenger was rescued by a workboat in the area about 1935. The same workboat located the deceased pilot (in his PFD) face down in the water about 0128 the following morning.

Accident Involving a Houston Helicopters, Inc., Bell 407 (N407HH)

On February 16, 2003, about 1225 central standard time, a Bell 407 (equipped with seven seats) that was transporting four passengers from Harbor Island, Ingleside, Texas, to an offshore oil platform experienced a catastrophic engine failure 5 minutes from its intended destination. The pilot transmitted a "Mayday" call before ditching the helicopter into the open waters of the Gulf and safely evacuated, along with the four passengers. The helicopter was equipped with a liferaft located under the cabin seats, but it was not deployed during the evacuation. Before the occupants were rescued, the pilot and one passenger drowned. The remaining three passengers sustained serious injuries. The flight was operating under the provisions of 14 CFR Part 135.¹⁰

One passenger stated during postaccident interviews that the loss of engine power and ditching were so sudden that the pilot did not have time to deploy the skid-mounted float system and that the helicopter rolled inverted and began to submerge within seconds after hitting the water. The pilot and passengers safely exited the helicopter, inflated their PFDs, and waited for rescue. According to the surviving passengers, the pilot did not brief the passengers about the location of the liferaft.¹¹ A search and rescue team located the survivors about 2 hours after receiving the "Mayday" call.

Accident Statistics for Air Taxi Operations in the Gulf of Mexico

A review of the Safety Board's accident database for 2000 to 2006 found that Part 135 and Part 91 helicopter operators were involved in 62 incidents and accidents in the Gulf during

¹⁰ The brief of this accident, FTW03FA097, can be found on the Safety Board's Web site at <<http://www.nts.gov/ntsb/query.asp>>.

¹¹ Title 14 CFR 135.117 "Briefing of Passengers Before Flight" requires the pilot, before each takeoff, to ensure that all passengers have been orally briefed on ditching procedures and the location of required flotation equipment. Regulations also require that the oral briefing be supplemented with a printed card located in a convenient location for passenger use and contain instructions necessary for the use of emergency equipment on board the aircraft.

that time period, resulting in 38 fatalities and 25 serious injuries.¹² According to a safety review conducted by the Helicopter Safety Advisory Conference (HSAC),¹³ offshore helicopter operations in the Gulf served approximately 2.8 million passengers annually between 2000 and 2005. A December 2004 study presented by Shell Oil Company to members of the HSAC indicated that 67 percent of offshore oil industry helicopter accidents occur in the Gulf and forecasted that, if the accident rate continues, there could be an equivalent of 250 fatalities from all offshore helicopter operations in the next 10 years.

Discussion

Liferaft Accessibility

Although the nature of Gulf helicopter operations excludes these helicopters from having to comply with Federal regulations requiring liferafts onboard,¹⁴ all of the helicopters involved in the accidents cited in this letter were equipped with liferafts. Even so, none of the rafts were used following the accidents. In every case cited, crew and passengers either did not have sufficient time to locate and inflate the rafts once the helicopters were in the water or passengers did not know where liferafts were located. The Safety Board concludes that if the helicopters operating in the Gulf were equipped with liferafts that were easy to locate or designed to automatically deploy outside the aircraft after a ditching, all occupants on board the accident helicopters would have had a greater chance of surviving once they were in the water.

During roughly the same period that the four accidents previously discussed occurred, three other events occurred in the Gulf that all involved Bell 206 helicopters equipped with externally mounted liferafts.¹⁵ In each case, all occupants survived the initial crash and were able to await rescue in the liferafts, which were successfully deployed after the helicopters entered the

¹² Of the 62 incidents and accidents between 2000 and 2006, there were 15 fatalities that may have been prevented had the liferaft been retrieved or had the flight crew had signaling devices.

¹³ HSAC was formed in 1978 to promote improved communication and safe practices within the Gulf offshore community. HSAC consists of representatives from major petroleum oil companies; drilling companies; helicopter operators; oil industry service companies; helicopter manufacturers; and U.S. Federal agencies, including the Federal Aviation Administration, the Army, the Air Force, the Navy, the Coast Guard, the Department of the Interior, and the Customs Service. Since 1998, HSAC has annually surveyed 22 helicopter operators that provide on-demand Part 135 helicopter services in the Gulf of Mexico. The survey compiles operational and flight activity data, including fleet size and characteristics; number of passengers, flights, and flight hours; and accident statistics. These data are published annually in HSAC's Gulf of Mexico Offshore Helicopter Operations and Safety Review.

¹⁴ Title 14 CFR 135.167 "Emergency Equipment: Extended Overwater Operations," requires aircraft performing extended overwater operations to carry liferafts in "conspicuously marked locations easily accessible to the occupants if a ditching occurs." However, extended overwater operations for helicopters is defined in 14 CFR 1.1 "Definitions and Abbreviations" as "the operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline, and more than 50 nautical miles from an offshore heliport structure." Because there are more than 4,000 heliports in the Gulf located less than 50 miles apart, Part 135 helicopters operating over these waters are not required to carry liferafts. Helicopters operating under Part 91 also are not required to carry liferafts.

¹⁵ These events were as follows: September 4, 2003, involving an Air Logistics Bell 206-L1, N41GH, with one pilot and six passengers on board; March 6, 2004, involving a PHI Bell 206L-3, N81SP, with one pilot and two passengers on board; and November 17, 2006, involving an Air Logistics Bell 206-L3, N817AL, with one pilot on board. Only the March 6, 2004, accident was investigated by the Safety Board. The brief for this accident, FTW04LA088, can be found on the Board's Web site at <<http://www.nts.gov/ntsb/query.asp>>.

water. The Safety Board is aware that, in the past 5 years, the Federal Aviation Administration (FAA) has certificated externally mounted liferafts for several different models of helicopters. One type integrates the floats and incorporates either two 6-person or two 10-person liferafts with inflation systems. The float/liferafts are mounted on the landing gear skid tubes, and a mechanical handle/lever or an electrically activated switch in the cockpit and in an overhead console between the cockpit and passenger compartment initiates inflation of the liferafts after the floats inflate.¹⁶ Some of the external liferaft systems are equipped with an external (mechanically operated) T-handle that provides a backup means of deployment in case the flight crew is incapacitated. The largest supplier¹⁷ of externally mounted liferafts holds supplemental type certificates (STC) for Agusta, Bell, and Eurocopter model helicopters (figure 2 shows an Agusta Westland AB139 model helicopter equipped with an external liferaft).



Figure 2. An external liferaft pod on an Agusta Westland AB139 helicopter (as indicated by the red arrow).

In addition, the FAA recently granted an STC for a Sikorsky S-76 10-person liferaft system that would have the rafts mounted on each of two redesigned cargo doors. The two doors, 10-man liferafts, and inflation system weigh 121 pounds (55 kilograms) and can be inflated with a cockpit-mounted, electrically activated deployment switch. The external float-integrated liferafts and cargo-door-mounted liferafts meet all applicable requirements contained in Technical Standard Order-C70a, “Liferafts, Reversible and Nonreversible.” Because equipping

¹⁶ A manufacturer of an external liferaft system informed Safety Board staff that the liferaft can be activated even when the helicopter is submerged or on its side.

¹⁷ This manufacturer informed Safety Board staff that, thus far, it has retrofitted 215 of the 450 offshore helicopters operating in the Gulf of Mexico.

turbine-powered helicopters operating in the Gulf with externally mounted liferafts could increase the chances for occupant survival following an accident, the Safety Board believes that the FAA should require that all existing and new turbine-powered helicopters operating in the Gulf of Mexico and certificated with five or more seats be equipped with externally mounted liferafts large enough to accommodate all occupants.

Flight Crewmember Personal Flotation Devices Equipped with Rescue Tools

The survivors from N90421 (involved in the September 6, 2005, accident) treaded water for 7 1/2 hours before they were spotted by a search and rescue team using night vision goggles. Although the flight crewmembers' PFDs were each equipped with a survivor locator light, they were unable to successfully signal two helicopters that passed overhead and a marine vessel that was within sight. The pilot of the team that rescued the flight crew later stated that, even with the use of night vision goggles, it was difficult to see the survivors' locator lights at night in the vast Gulf waters. In contrast, the PFD of the captain onboard N22342 (involved in the October 22, 2006, accident) was equipped with a GPS-enabled 406 MHz PLB that, despite being unable to provide position information because its GPS antenna was immersed in water, did provide basic operator identification information that led to the eventual rescue of the survivors about 4 hours after the accident.

The Safety Board has learned that, although not required, three Part 135 air taxi operators in the Gulf provide PFDs with enhanced rescue tools for their flight crewmembers. An exemplar PFD contained a GPS-enabled 406 MHz PLB, a signaling mirror and a strobe light with a water-activated battery. Newer 406 MHz PLBs with GPS are available that are waterproof to a 16-foot depth and are approved by the Federal Communications Commission. If the crewmembers on board the accident helicopters discussed in this letter had PFDs that were equipped with similarly enhanced rescue tools, including a waterproof 406 MHz PLB with a GPS, search and rescue agencies may have been alerted sooner that they were in distress and may have more readily identified their approximate location in the Gulf. Although it is not possible to know how much faster, if at all, search-and-rescue times may have been in these instances, the Board sees no reason not to provide as many tools to survive as possible. Therefore, the Safety Board believes that the FAA should require that all offshore helicopter operators in the Gulf of Mexico provide their flight crews with PFDs equipped with a waterproof, GPS-enabled 406 MHz PLB, as well as one other signaling device, such as a signaling mirror or a strobe light.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require that all existing and new turbine-powered helicopters operating in the Gulf of Mexico and certificated with five or more seats be equipped with externally mounted liferafts large enough to accommodate all occupants.
(A-07-87)

Require that all offshore helicopter operators in the Gulf of Mexico provide their flight crews with personal flotation devices equipped with a waterproof, global-positioning-system-enabled 406 megahertz personal locator beacon, as well as one other signaling device, such as a signaling mirror or a strobe light. (A-07-88)

Please refer to Safety Recommendations A-07-87 and -88 in your reply. If you need additional information, you may call (202) 314-6177.

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred with these recommendations.

[Original Signed]

By: Mark V. Rosenker
Chairman