

NATIONAL TRANSPORTATION SAFETY BOARD
Virtual Meeting of February 9, 2021
(Information subject to editing)

Rapid Descent into Terrain
Calabasas, California
January 26, 2020
DCA20MA059

This is a synopsis from the NTSB's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

Executive Summary

On January 26, 2020, about 0946 Pacific standard time, a Sikorsky S-76B helicopter, N72EX, entered a rapidly descending left turn and crashed into terrain in Calabasas, California. The pilot and eight passengers died, and the helicopter was destroyed. The on-demand flight was operated by Island Express Helicopters Inc. (Island Express), Long Beach, California, under visual flight rules and the provisions of Title 14 *Code of Federal Regulations* Part 135. The flight departed from John Wayne Airport-Orange County (SNA), Santa Ana, California, about 0907 and was destined for Camarillo Airport (CMA), Camarillo, California, about 24 miles west of the accident site.

After the helicopter departed from SNA, it flew at altitudes that remained below 1,700 ft mean sea level (msl) and generally between 400 to 600 ft above ground level (agl), and the flight's progress through controlled airspace en route to CMA was uneventful. Weather conditions reported to the pilot by air traffic controllers during the flight included an overcast ceiling at 1,100 ft agl, visibility of 2.5 miles with haze, and cloud tops at 2,400 ft msl.

At 0944:34 (about 2 minutes before the accident), while the helicopter was flying west at an altitude of about 1,370 ft msl (450 ft agl) over US Route 101 (US 101) and rising terrain, the pilot announced to an air traffic control facility that he was initiating a climb to get the helicopter "above the [cloud] layers," and the helicopter immediately began climbing at a rate of about 1,500 ft per minute. About the same time, the helicopter began a gradual left turn, and its flight path generally continued to follow US 101 below. About 36 seconds later and while still climbing, the helicopter began to turn more tightly to the left, and its flight path diverged from its overflight of US 101.

The helicopter reached an altitude of about 2,370 ft msl (about 1,600 ft agl) at 0945:15, then it began to descend rapidly in a left turn to the ground. At 0945:17 (while the helicopter was descending), the air traffic controller asked the pilot to "say intentions," and the pilot replied that the flight was climbing to 4,000 ft msl. A witness near the accident site first heard the helicopter

then saw it emerge from the bottom of the cloud layer in a left-banked descent about 1 or 2 seconds before impact.

The accident investigation focused on the following safety issues:

- **The pilot's preflight weather and flight risk planning.** The pilot completed a flight risk analysis form about 2 hours before the accident flight's departure. Based on the form's risk scoring criteria, the pilot's score for the accident flight was within the company's low-risk category. Updated weather information available at the time the accident flight departed included conditions that met the criteria for the form's risk items that would have required the pilot to seek input from the director of operations and to provide an alternative plan. However, company guidance was unclear as to whether the accident pilot was expected to complete an updated form (and he did not do so).
- **The flight's entry into instrument meteorological conditions (IMC), and the pilot's inadequate adverse weather avoidance.** At the time the pilot took action to initiate a climb, the helicopter had already begun penetrating clouds. Although the pilot's adverse-weather-avoidance training emphasized avoiding entry into IMC by slowing the helicopter and maneuvering or landing, there was no evidence that he attempted to do so.
- **The pilot's spatial disorientation.** As the helicopter climbed rapidly into the cloud layer and IMC while in a gradual left turn, the pilot's associated loss of outside visual references made him susceptible to experiencing vestibular illusions (in which the vestibular system in the inner ear produces a false sense of helicopter attitude and trajectory) that can lead to spatial disorientation.
- **Influences on the pilot's decision to continue the flight into adverse weather.** The pilot's continuation of the accident flight into IMC was inconsistent with his typical judgment and decision-making behavior and was likely influenced by his self-induced pressure, lack of an alternate plan, and plan continuation bias.
- **Island Express' incomplete implementation of its safety management system (SMS).** The company had an SMS that was neither required by the Federal Aviation Administration (FAA) nor part of the company's FAA-approved or -accepted programs. Although the company used some SMS tools, it did not implement the entire program and did not perform any safety assurance evaluations, such as those that could have ensured the effectiveness of the flight risk analysis forms.
- **The benefits of a mandatory SMS.** Had Island Express' SMS been required by the FAA, it would have been subject to FAA oversight to inspect the SMS for alignment with FAA objectives and to provide feedback to help the company implement the entire program.

- **The benefits of flight simulation devices for pilot training in adverse weather avoidance.** Flight simulation devices can present pilots with representations of deteriorating weather conditions that cannot be realistically duplicated during flight training conducted in helicopters in visual meteorological conditions. The use of simulation devices during scenario-based helicopter pilot training has the potential to improve pilots' abilities to accurately assess weather and make appropriate weather-related decisions.
- **The benefits of a flight data monitoring (FDM) program.** FDM involves the recording and analysis of flight-related information to help pilots, instructors, or operators improve performance and safety. An FDM program, which can be integrated into an SMS, has the potential to provide important information regarding pilot performance during flights, which may be particularly beneficial for operators like Island Express that conduct single-pilot operations and, thus, have little opportunity to directly observe their pilots in the operational environment.
- **The value of crash-resistant flight recorder systems in preventing future accidents.** Certain circumstances of this accident could not be conclusively determined, including the visual cues associated with the adverse weather and the pilot's focus of attention in the cockpit following the flight's penetration of clouds and entry into IMC. A crash-resistant flight recorder system capable of capturing audio and images could have provided this valuable information, possibly enabling the identification of additional safety issues and the development of safety recommendations to prevent similar accidents.

Findings

1. None of the following safety issues were identified for the accident flight: (1) pilot qualification deficiencies or impairment due to medical condition, alcohol, other drugs, or fatigue; (2) helicopter malfunction or failure; or (3) pressure on the pilot from Island Express Helicopters Inc., the air charter broker, or the client to complete the flight.
2. Although the air traffic controller's failure to report the loss of radar contact and radio communication with the accident flight was inconsistent with air traffic control procedures, this deficiency did not contribute to the accident or affect its survivability.
3. Had the pilot completed an updated flight risk analysis form for the accident flight that considered the weather information available at the time the flight departed, the flight would have remained within the company's low-risk category but would have required the pilot to seek input from the director of operations and to provide an alternative plan.
4. At the time that the pilot took action to initiate a climb, the helicopter had already begun penetrating clouds, and the pilot lost visual reference to the horizon and the ground. The loss of outside visual reference was possibly intermittent at first but likely complete by

the time the flight began to enter the left turn that diverged from its route over US Route 101.

5. The pilot's poor decision to fly at an excessive airspeed for the weather conditions was inconsistent with his adverse-weather avoidance training and reduced the time available for him to choose an alternative course of action to avoid entering instrument meteorological conditions.
6. The pilot experienced spatial disorientation while climbing the helicopter in instrument meteorological conditions, which led to his loss of helicopter control and the resulting collision with terrain.
7. The pilot's decision to continue the flight into deteriorating weather conditions was likely influenced by his self-induced pressure to fulfill the client's travel needs, his lack of an alternative plan, and his plan continuation bias, which strengthened as the flight neared the destination.
8. Island Express Helicopters Inc.'s lack of a documented policy and safety assurance evaluations to ensure that its pilots were consistently and correctly completing the flight risk analysis forms hindered the effectiveness of the form as a risk management tool.
9. A fully implemented, mandatory safety management system could enhance Island Express Helicopters Inc.'s ability to manage risks.
10. The use of appropriate simulation devices in scenario-based helicopter pilot training has the potential to improve pilots' abilities to accurately assess weather and make appropriate weather-related decisions.
11. Objective research to evaluate spatial disorientation simulation technologies may help determine which applications are most effective for training pilots to recognize the onset of spatial disorientation and successfully mitigate it.
12. A flight data monitoring program, which can enable an operator to identify and mitigate factors that may influence deviations from established norms and procedures, can be particularly beneficial for operators like Island Express Helicopters Inc. that conduct single-pilot operations and have little opportunity to directly observe their pilots in the operational environment.
13. A crash-resistant flight recorder system that records parametric data and cockpit audio and images with a view of the cockpit environment to include as much of the outside view as possible could have provided valuable information about the visual cues associated with the adverse weather and the pilot's focus of attention in the cockpit following the flight's entry into instrument meteorological conditions.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the pilot's decision to continue flight under visual flight rules into instrument meteorological conditions, which resulted in the pilot's spatial disorientation and loss of control. Contributing to the accident was the pilot's likely self-induced pressure and the pilot's plan continuation bias, which adversely affected his decision-making, and Island Express Helicopters Inc.'s inadequate review and oversight of its safety management processes.

Recommendations

New Recommendations

To the Federal Aviation Administration:

1. Require the use of appropriate simulation devices during initial and recurrent pilot training for Title 14 *Code of Federal Regulations* Part 135 helicopter operations to provide scenario-based training that addresses the decision-making, skills, and procedures needed to recognize and respond to changing weather conditions in flight, identify and apply mitigation strategies for avoiding adverse weather, practice the transition to the use of flight instruments to reduce the risk of spatial disorientation, and maintain awareness of a variety of influences that can adversely affect pilot decision-making.
2. Convene a multidisciplinary panel of aircraft performance, human factors, and aircraft operations specialists to evaluate spatial disorientation simulation technologies to determine which applications are most effective for training pilots to recognize the onset of spatial disorientation and successfully mitigate it, and make public a report on the committee's findings.

To Island Express Helicopters Inc.:

3. Participate in the Federal Aviation Administration's Safety Management System Voluntary Program.
4. Install flight data recording devices capable of supporting a flight data monitoring (FDM) program on each helicopter in your fleet and establish an FDM program that reviews all available data sources to identify deviations from established norms and procedures as well as other potential safety issues.

Previously Issued Recommendations Reiterated in this Report

To the Federal Aviation Administration:

After the action in Safety Recommendation A-16-34 is completed, require all 14 *Code of Federal Regulations* Part 135 operators to establish a structured flight data monitoring program that reviews all available data sources to identify deviations from established norms and procedures and other potential safety issues. (A-16-35)

Require all 14 *Code of Federal Regulations* Part 135 operators to establish safety management system programs. (A-16-36)

To Airbus Helicopters, Bell, Leonardo Helicopter Division, MD Helicopters, Robinson Helicopter Company, and Sikorsky, a Lockheed Martin Company:

Provide, on your existing turbine-powered helicopters that are not equipped with a flight data recorder or a cockpit voice recorder, a means to install a crash-resistant flight recorder system that records cockpit audio and images with a view of the cockpit environment to include as much of the outside view as possible and parametric data per aircraft and system installation, all as specified in Technical Standard Order C197, "Information Collection and Monitoring Systems." The recorder system installation should be considered essential equipment that remains installed for the life of the helicopter and have provisions to ensure it remains operational during each flight. (A-20-29)

Previously Issued Recommendations Classified and Reiterated in This Report

To the Federal Aviation Administration:

Require all 14 *Code of Federal Regulations* Part 135 operators to install flight data recording devices capable of supporting a flight data monitoring program. (A-16-34) Classified "Open—Unacceptable Response"

Require all existing turbine-powered, nonexperimental, nonrestricted-category aircraft that are not equipped with a flight data recorder or cockpit voice recorder and are operating under 14 *Code of Federal Regulations* Parts 91, 121, or 135 to be retrofitted with a crash-resistant flight recorder system. The crash-resistant flight recorder system should record cockpit audio and images with a view of the cockpit environment to include as much of the outside view as possible, and parametric data per aircraft and system installation, all as specified in Technical Standard Order C197, "Information Collection and Monitoring Systems." (A-13-13) Classified "Open—Unacceptable Response"