

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 12, 2012

Human Performance

Human Performance Specialist's Factual Report

A. ACCIDENT

Operator: Sundance Helicopters (Flight Landmark 57)

Location: 14 miles east of Las Vegas

Date: December 7, 2011

Time: 1630 Pacific standard time¹

Aircraft: Eurocopter AS350-B2, N37SH

NTSB Number: DCA12MA020

B. GROUPS

The Human Performance Specialist joined two investigative groups in this investigation. The Operational Factors/Human Performance Group and the Aircraft Maintenance Group. This report summarizes human performance information that supplements the factual reports of these two groups.

Operational Factors/Human Performance	Aircraft Maintenance/Human Performance
Alex Lemishko, Chairman, NTSB	Kristi Dunks, Chairman, NTSB
Maryam Allahyar, NTSB	Maryam Allahyar, NTSB
Malcolm Brenner, NTSB	Malcolm Brenner, NTSB
Seth Buttner, American Eurocopter	Seth Buttner, American Eurocopter
Paul Alukonis, FAA	Gary Campbell, FAA
Kurt Barton, Sundance Helicopters, Inc.	Kyle Reynolds, Sundance Helicopters, Inc.
Michael Flaherty, Sundance Helicopters, Inc.	Jack Weese, Sundance Helicopters, Inc.
Burl Boyd, Sundance Helicopters, Inc.	

¹All times are Pacific standard time based on a 24-hour clock, unless otherwise noted.

C. SUMMARY

On December 7, 2011 at 1630 Pacific standard time, a Eurocopter AS350-B2, registration N37SH, operated by Sundance Helicopters as flight Landmark 57, crashed in mountainous terrain approximately 14 miles east of Las Vegas, Nevada. The 49 CFR Part 135 flight was a tourist sightseeing flight, which departed from Las Vegas McCarran International Airport (LAS), Las Vegas, NV, intending to fly to the Hoover Dam area and return to LAS, operating under visual flight rules. The helicopter impacted in a ravine in mountainous terrain between the city of Henderson and Lake Mead. The pilot and four passengers were fatally injured, and the helicopter was substantially damaged by impact forces and fire. Access to the accident site was moderately difficult and the investigators were assisted by the National Park Service. There were no installed on-board recording devices. Weather was reported as clear with good visibility and dusk light conditions.

Radar data obtained from the FAA show that the helicopter departed LAS and followed a normal route of flight easterly out of the LAS airport traffic area, then turned to the southeast toward Hoover Dam. Tour routings are standardized for all the area tour operators. The helicopter was level at 3,500 feet at approximately 120 knots. About one minute prior to the accident the radar indicated the helicopter climbed to 4,100 feet and turned about 90 degrees to the left. The left turn and climb are not part of the normal route. Radar then indicated the helicopter descended to 3,300 feet and tracked a northeasterly course for about 20 seconds, until entering a left turn then a descent of at least 2,500 feet per minute. The last radar target received was about 1/8 miles from the accident site.

D. DETAILS OF THE INVESTIGATION

The Operational Factors / Human Performance Group convened at Sundance Helicopters, Las Vegas, NV, on December 9, 2011, to begin the field phase of the accident investigation. The group reviewed relevant documents and interviewed witnesses and company personnel. The Human Performance Group also participated in the Aircraft Maintenance Group interviews of maintenance personnel on December 10, 2011. The field phase of the accident investigation concluded on December 11, 2011.

Subsequent interviews of the maintenance personnel and the drug and alcohol program manager were conducted by the Aircraft Maintenance Group chairman and Human Performance Specialist on January 11, 2012 at Sundance Helicopters. On January 25, 2012, the Aircraft Maintenance Group chairman and Human Performance

Specialist visited Malmrose Heli Services facility in South Jordan, UT, conducted interviews with company personnel, and reviewed relevant documents.

E. FACTUAL INFORMATION

1 Personnel Information

1.1 Operations Personnel²

1.1.1 Accident Pilot

The pilot, age 31, held a second class medical certificate, issued on May 5, 2009, with no limitations. He held a Commercial Rotorcraft rating (certificate number 3181315) as well as Instrument, Flight Instructor, and Ground Instructor Rotorcraft ratings. He trained at Silver State Helicopter School in Las Vegas, and then flew in Florida and New York building up 1000 hours for a commercial pilot's certificate which he earned on March 23, 2007. He also received his instructor pilot's certificate while at Silver State. On June 8, 2009 he was hired at Sundance Helicopters with 1206 hours total flight time (all in helicopters).

On December 7, 2011, the pilot was scheduled for 2 tour flights. The first flight was the Picnic Tour, which was scheduled earlier that afternoon and was completed successfully. The second flight was the Twilight Tour. The accident happened on the outbound leg of the Twilight Tour.

According to his wife, the pilot did not have any reported health issues or changes in his health in the 6 months prior to the accident, although, during this time, he had intentionally lost 15-18 lbs. He had good eyesight and did not wear glasses. He had good hearing. He was reported to be a nonsmoker and did not consume alcohol or use illegal substances. He did not drink coffee and did not use any prescription medications. He did not have any trouble sleeping. When he did not have work demands, he would normally go to bed by 2200 and awake about 0645 to get his children to school. His work demands were variable, however, and sometimes he arose by 0500 for work.

According to his wife, there were no major changes in his financial situation in the 12 months preceding the accident; however, his personal life had changed due to his marriage on June 4, 2011.

² For additional information about the operations personnel see the Operational Factors Group Chairman's Factual Report.

The pilot did not have any previous aviation accidents. He had never received discipline at work.³

1.1.1.1 Activity / 72-Hour History

The pilot's activities were described by his wife and family as follows:

On Sunday, December 4, the pilot was off duty. After waking about 0800, he went to Church about 0900 until about 1215. He spent several hours resting at home with his wife, had dinner at a relative's house; then watched a movie at home, got the children ready for bed around 2100 and went to bed around 2200.

On Monday, December 5, the pilot was also off duty. He awoke around 0645 and walked his step-daughter to the bus stop. He returned for a nap, then got up and walked his step-son to the bus stop. After that, he spent some time doing routine activities around the house. He and his wife went to bed around 2200. At times, they did not sleep right away but they would stay up a little and talk for a few minutes as they did that evening.

On Tuesday, December 6, the pilot was scheduled for work early. He awoke around 0700. He came home after work to eat. From 1845 to 2000, he and his wife went to church and he participated in a ball game. After returning home, the pilot had checked his schedule via email and learned that his scheduled first trip for Wednesday was cancelled. Around 2100, he got his children ready for bed and around 2200 went to bed himself.

On Wednesday, December 7, he got up and walked his children to the bus stop, their daughter first, then their son. He engaged in routine activities around the house, ate lunch, and helped his wife change and clean a child she was babysitting. He then got ready for work as he was running late. His wife stated that he did not change his epaulets as he had planned to do before he left. She described his mood as OK but said he was in a hurry when he left.

1.2 Maintenance Personnel⁴

On Tuesday, December 6, a team of 3 mechanics and one inspector was scheduled to perform a 100-hour inspection on the accident helicopter at Sundance Helicopters, Las Vegas, NV. Two of the mechanics and the inspector were contacted

³ For additional information about the pilot's personal background and recent activities see the interview summary of the next of kin.

⁴ For additional information about the maintenance personnel see the Maintenance Group Chairman's Factual Report.

on the day before to report to work on their off duty day to perform this task. The maintenance required for the accident helicopter included a 100-hour inspection, 2 servo replacements, and an engine swap with a leased engine.

The mechanics were normally scheduled to work 4 days of 11 hour shifts followed by 3 days off duty. The schedule then continued with 3 days of 12 hour shifts followed by 4 days off duty. The mechanics' normal schedule and actual shift are shown in the following table:

Mechanic	Normal Shift	Original Schedule 12/6	Actual Shift on 12/06
Tail Rotor Mechanic	1200 to 2300	Off duty	0537 to 1658
Engine Mechanic	0730 to 1630	0730 to 1630	0708 to 1704
Fore/Aft Servo Mechanic	1200 to 2300	Off duty	0550 to 1846
Lead Mechanic/Inspector	1200 to 2300	Off duty	0531 to 1855

1.2.1 The Tail Rotor Servo Mechanic

The mechanic replacing the tail rotor servo held an A & P certificate and was also a licensed commercial instrument rotorcraft and private fixed wing pilot. On Monday, December 5, he was contacted on his off duty day to report to work the next day for the 100-hour inspection of the accident helicopter. On Tuesday, December 6, he reported to work at about 0530 and was assigned the tail rotor servo replacement on the helicopter. He reported having no difficulty replacing the servo and its parts. He also reported to have performed this task approximately 20 times in the past and felt comfortable performing the maintenance. He did not feel rushed, nor was he under any time pressure to complete the task.

The mechanic reported that he maintained a fairly routine rest and work schedule of retiring to bed about midnight every night (including weekends) and reporting to work about noon on his duty days. He did not report any trouble sleeping. On Monday, December 5, he awoke about 0930 and learned about the change in his schedule later that afternoon. About 2200, he went to bed and awoke the next morning about 0430 for work, feeling rested. He characterized company morale, workload, and pay to be good. He was satisfied with the training, equipment, working conditions, and the facility at Sundance Helicopters.

1.2.2 The Engine Mechanic

The mechanic who replaced the engine on the accident helicopter held an A & P certificate. Approximately a month before the accident, he was promoted from mechanic to the engine supervisor position. At 0730 on December 6, he reported to work on his regularly scheduled duty day for the 100-hour inspection. He reported having no trouble performing the engine swap. He did ask for assistance from another mechanic when replacing the engine. He recalled that the process of the engine swap took approximately 6.5 hours and that he used the Turbomeca manual to complete the work.

He reported that because his shift changed after he became the engine supervisor, he had begun going to bed earlier than before and would normally go to bed between 2100-2200 and awake about 0500. He normally worked 5 days straight from 0730 to 1630 followed by 2 off duty days. He did not report any trouble sleeping and felt rested on the day he reported for the engine swap. He felt the morale of the company was great and equipment, parts, and working conditions were adequate.

1.2.3 The Fore/Aft Servo Mechanic

The mechanic who replaced the Fore/Aft servo was interviewed twice. The first interview was conducted during the field phase of the investigation. The second interview was conducted on January 11, 2012 for further clarification on some of the procedural issues.⁵

The mechanic received his A & P certificate in December 2008 from WyoTech. He then worked for approximately a year, as a mechanic at a small shop in Chino, California working on a variety of airplanes, varying from home-built to turbo commanders. He was later contracted with NetJets in San Francisco, California for a year, working on Citation Encore, Excels, Citation 10s, Sovereigns, Falcon 2000s, and Gulfstream. In June 2011, he moved to Las Vegas, NV, to begin work at Sundance Helicopters. Prior to working for Sundance Helicopters, he had not performed any helicopter maintenance tasks. He received some training at Sundance through the company's quality control program. The training included proper record keeping, maintenance procedures, and understanding Eurocopter manuals. He stated that most of his training was on-the-job from more experienced mechanics at the company.

The mechanic stated that he was on the 4 day on, 4 day off and 3 day on 3 day

⁵ For additional information about the maintenance procedures performed see the Maintenance Group Chairman's Factual Report.

off schedule. His work hours on the duty days varied between 11 to 12 hours depending on the schedule. He normally went to bed around 0200 and awoke around 1030. On work days, he would typically report about 1200 and work an 11 or 12 hour shift. He maintained the same rest schedule on his days off for consistency.

On the night of Saturday, December 3, the mechanic was up late and did not go to bed until about 0300 or 0400. He awoke on Sunday between 1200 and 1400. On Sunday, December 4, he went to bed between 0000 and 0200.

On Monday, December 5, he reported he awoke around 1000; however, since he was informed later that afternoon about his schedule change for an earlier show time on Tuesday, he went to bed around 2200 that night, but reported not falling asleep until close to 0000. On Tuesday, December 6, he awoke about 0500. He reported to work at about 0550 and was assigned the fore/aft servo replacement on the accident helicopter. He stated he had no difficulty performing the task since he had done a servo replacement about 6 times in the past. He also adjusted the tension on the hydraulic belt. He used the AS350 Maintenance Manual as a reference guide. After he completed his tasks, his work was inspected and signed off by the lead mechanic. There were no issues detected. He clocked out around 1830.

Generally, he reported having no difficulty sleeping and he felt well on the day he performed the fore/aft servo replacement. He said the workload was normal and he was able to work on the task at a slower pace. He was satisfied with the overall conditions of work and pleased with the quality of his co-workers. He had not been involved in any aviation accidents or been disciplined for his work in the past.

1.2.4 Lead Mechanic

The lead mechanic was the inspector for work completed on the accident helicopter. The first interview with the lead mechanic was conducted during the field phase of the investigation on December 10, 2011. On January 11, 2012, he was re-interviewed for further clarification on some of the procedural issues.

The lead mechanic began his aviation career in the Army. He worked on Black Hawk helicopters for 8 years. After separating from the Army, he earned his A & P certificate. From 2001 to 2005, he worked for Papillon except for a period from 2003 to 2004 when he was in Iraq. From 2005 to 2008 he was employed by Mercy Air and worked on Bell aircraft. From about 2008 to 2009, he worked for Allegiant Air in Nevada. Following his work at Allegiant Air, he worked at TriState CareFlight from 2009 to 2010.

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In November 2010, he was employed by Sundance Helicopters. Through his 19 years of aviation experience, he had worked on a variety of aircraft including Bells, Apaches, Black Hawks, Chinooks, MD80 series, Agusta, Beechcraft 200 series, and C90s. At Sundance, he received in-house maintenance training for approximately 2 weeks. About 6 months before the accident, he assumed the position of the lead mechanic. To prepare for this position he attended the in-house inspector training conducted by the quality assurance group. The training included review of FARs, requirements for inspections, building packets, inspection of packets, and sign off requirements. His job entailed directing the maintenance performed in the hangar for the second night shift. Due to nature of the schedule, he typically worked with the same group of mechanics since he became an inspector.

He completed the accident helicopter inspection and the ground run by 1800, and found a few "typical" discrepancies which needed to be repaired or replaced; however, he found nothing unusual for a 100-hour inspection. For the inspection of the servo, he stated that he would "look for the two safeties on both the rod ends, the two cotter pins on the mount hardware, and the safety holding the two bolts that held the accumulator assembly to the servo."

In the days before the accident, the lead mechanic had Sunday and Monday off. He stated that he was on the 4 day on, 4 day off and 3 day on 3 day off schedule. His work hours on the duty days varied between 11 to 12 hours depending on the schedule. His normal workday schedule was from 1200 until about 2300 or 0000. On the Sunday before the accident, he went to bed about 0000 and awoke about 0800 the next morning. On Monday afternoon he was informed about his schedule change for Tuesday. About 2100 he went to bed and awoke about 0400 on Tuesday morning. He reported to work at 0530. He reported to have no trouble sleeping and felt rested on that Tuesday. He stated that the morale and pay at the company were very good. He was satisfied with the workload, company training, tools, and working conditions of the hangar.

The lead mechanic's employment records contained documentation of an incident involving a left-hand chin bubble separation during transition from hovering to taxi. On June 16, 2011, the chin bubble on the pilot's side of a tour helicopter separated. As noted in his records, the helicopter was hovering on the Sundance ramp with the intent to depart on the tour flight. It immediately landed without further incident. After an interview with the lead mechanic which was conducted by the maintenance QA manager and the director of safety, it was concluded that the lead mechanic failed to properly re-install the chin bubble upon completion of his diagnostic task the prior evening. A formal root cause analysis of the event conducted by the company identified

that the lead mechanic's perception of the need to expedite the repair to avoid aircraft downtime was a contributing factor leading to this failure. It was also noted that in his attempt to expedite the repair process, the lead mechanic failed to reference the appropriate aircraft maintenance documents that detail the task of installing the chin bubble. The lead mechanic relied on past experience and memory for completing the task. The supporting documents for this incident and the Final Report from the director of safety at Sundance Helicopters may be found in the attachment 2 of this report.

The human performance specialist also reviewed the lead mechanic's previous inspections. Eight maintenance log sheets covering a period of about 4 months before the accident were randomly selected and reviewed for any discrepancies or overlooked items. In addition, all inspections completed by the lead mechanic within the 30 days prior to the accident were reviewed for any discrepancies or overlooked items. The reviews did not identify repeated instances of discrepancies or overlooked items for the periods examined.

1.3 Other personnel

1.3.1 Ops Check Pilot

The ops check pilot conducted the December 7 maintenance operations check flight on the accident helicopter and a revenue flight afterwards. Subsequently, he flew a revenue trip in another helicopter when the accident occurred and he was an eyewitness. This report summarizes the ops check pilot's initial NTSB interview with the human performance group and a copy of his written statement. At the request of the NTSB, he returned the following day for a joint interview with the maintenance/human performance groups that focused on the details of his maintenance ops check. The content of this second interview are discussed in the maintenance group chairman's factual report.

The ops check pilot was hired by Sundance Helicopters in February 2010. He had about 2,400 flight hours, of which about 900 hours were in airplanes and the remainder in rotorcraft. He was also a licensed helicopter mechanic, who worked for 6 years as a professional helicopter mechanic for companies that included Silver State Helicopters prior to joining Sundance as pilot.

The ops check pilot was returning to LAS from a tour when he heard a brief call of distress on the radio, as he flew over the Narrows. He described the call to be from a male voice and a source close to the microphone (such as a pilot rather than a passenger). Within 30 seconds, he observed intense smoke rising from the ground in an undeveloped desert area ahead. He contacted another pilot returning from a tour on a discrete company frequency and asked if he had seen any smoke which was

confirmed. A third pilot who was also returning from a tour advised them that one of the company helicopters (flown by the accident pilot) was unaccounted for. They tried to contact the missing aircraft on the local traffic frequency of 120.65, however, there was no response. The ops check pilot switched his radio frequency to 131.65 to contact Sundance operations and asked them to inform Metro. Weather at the time was clear with unrestricted visibility. There were light winds from the south, shown by motion of the smoke column. The sun had set and it was beginning to get dark, with light in one part of the sky and another part of the sky showing increasing darkness.

On the morning of December 7, the ops check pilot was responsible for the maintenance operations check of the accident helicopter. Prior to the flight test, he noticed 3 issues with the aircraft:

- 1) The tension on the belt for the hydraulic pump was loose. The mechanic on duty was called to tighten the belt. The ops check pilot re-examined it for proper tension.
- 2) Batteries for the flashlight needed to be replaced.
- 3) Window cleaner was missing.

He confirmed there were no tools left in the gearbox compartment. The remainder of the ops check went successfully. All numbers were within parameters. The ops check flight required a Hobbs meter time of 0.2 hours and was conducted between 0715 to 0730. He performed a power check at the end of the flight which confirmed the engine was operating properly. The power check was performed at 6,000 feet and it passed. The engine was operating correctly, and temperature, pressure, etc. were all normal.

He flew the accident helicopter on a 0945 picnic tour to the Grand Canyon which required landing and shut down of the engine. He flew this trip with a full load, 6 passengers in addition to himself. Helicopter handling was very normal and felt fine. There was no feedback on the cyclic and the position of the cyclic stick was not unusual. After the flight, he checked for any oil or leaks around the helicopter, its engine compartments, or gearbox.

The ops check pilot was not able to hand off the helicopter to accident pilot in person because there was a 30-minute gap until the start of the next trip. Therefore, following company practice, he left the log book on the pilot seat. He did not see the accident pilot and his only contact was hearing his voice once on the radio at about 1330 when he was returning from his Grand Canyon picnic tour. The accident pilot sounded normal, announcing altitudes.

1.3.2 Drug and Alcohol Program Manager

The human performance specialist and the maintenance group chairman conducted an interview with the manager of the Drug and Alcohol program on January 11, 2012 at Sundance Helicopters, Las Vegas, NV. The program manager also held the position of charter manager at the company. The purpose of the interview was to learn about company's drug and alcohol screening of safety sensitive personnel.

The program manager described their drug and alcohol screening program as an FAA-approved program where they conduct pre-employment testing as well as random, reasonable cause, and post-accident screening. These tests applied to all pilots and mechanics employed by Sundance Helicopters. Random screenings were conducted throughout the year, and involved testing 25 percent of the number of people employed in their program for drugs and 10 percent for alcohol. This was done four times over the year, during different parts of the quarter. On average, that added up to about four to six drug tests and two to three alcohol tests per quarter. The company had about 70 individuals in their program.

The program manager stated that the mechanics who performed the 100-hour inspection on the accident helicopter were not tested post-accident. He stated that because the accident took place about 24 hours after the maintenance was performed , and the team of mechanics who performed the maintenance was not working that day, no drug testing was requested. He, the director of maintenance, and the CEO of the company met after the accident to discuss the situation. Because maintenance was performed on the helicopter the night before, the program manager raised the question on whether the mechanics that had performed the 100-hour inspection should be tested. However, since the aircraft had flown 3 flights post-maintenance, they felt the accident was not a maintenance related issue and opted out of screening the maintenance crew.

In response to implementing any changes or new recommendations for drug testing post-accident in the future, the program manager thought the company would continue to treat it the same as they had done with this accident. They would make an evaluation at the time of the accident to see if it was necessary and then if it was possible to do the test.

2. Malmrose Heli-Services, Inc. Facility⁶

The human performance specialist joined the maintenance group chairman in

⁶ For additional information about Malmrose Heli Services facility and operations see the Maintenance Group Chairman's Factual Report.

their visit to Malmrose Heli Service facility in South Jordan, Utah on January 25, 2012. Malmrose Heli Services was responsible for overhaul of the tail rotor and fore/aft servos installed on the accident helicopter. The owner and the general manager of Malmrose Heli Services were interviewed.

Malmrose Heli Services was a two-person operation. The station had been in South Jordan, Utah since 2005. The owner of Malmrose Heli-Services, Inc was a certified repairman mechanic as was his general manger. They were only engaged in repair and overhaul of Dunlop servos. The tour of the facility revealed proper working conditions. The manuals were up to date and they received timely updates from Eurocopter on most recent changes to their manuals and service bulletins through their subscription. Their normal schedule consisted of 0900 to 1630 work hours, Monday through Friday, with a daily lunch break and shorter breaks as needed. According to the owner of Malmrose, they had never been involved in any accident-related investigations or had any FAA enforcement actions against them.

Malmrose Heli-Services had a drug and alcohol screening program in place. Their drug and alcohol screening program was regulated by Pembroke and managed by NADE. Their random screening was done by notification through the mail. The letters were marked confidential in red on the envelope. The letters were not certified parcels. They then had 30 days from the date of delivery to open the letter. Once the letter was opened, the person being screened had to report to the testing facility immediately. The last time they had a random screening at Malmrose was March of 2011 for the general manger of the facility.

3. Witnesses

3.1 Accident Eye/Ear Witnesses

3.1.1 Helicopter Tour Pilot

A statement was obtained from one of Sundance's pilots who had witnessed the accident. On the evening of Wednesday, December 7, 2011, about 1645, the Sundance helicopter tour pilot returning from the Sunset Tour heard a short distress call on the local traffic frequency 120.65. The visibility was unrestricted and the winds were at approximately 5 knots. As he descended out of the Narrows, he noticed a brown smoke rising in the River Mountain area. He flew directly to the smoke to investigate. He orbited the area 4 or 5 times. The terrain was visible and he was able to make out the wreckage of an aircraft. The fire was consuming an area of about 50 yards in a deep ravine, burning upslope. His full statement is attached to this report.

3.1.2 Southern Nevada Water Authority Employees

Two individuals employed by Southern Nevada Water Authority (SNWA) were interviewed by the National Park Service's agents. The first individual, a security guard with SNWA, stated he was on the west side of the Alfred Merritt Smith Water Plant when he heard a helicopter racing the engine. He further described the sound similar to pilot gunning its engine and the engine screaming or redlining. This was followed by a muffled thud. When he looked up, he saw a black plume of smoke near the regulating tanks by the west side access road. The time was 1638. He contacted the National Park Service and drove approximately 2 miles up the west side. Then he began walking towards the smoke but realized it was another mile and a half and too far to walk. He returned to his vehicle and used his cell phone to give directions to the dispatcher until the ranger arrived.

The second individual, also employed by SNWA was traveling on Lakeshore Road when he saw black smoke about four or five miles out to the west of the road. The sun was beginning to set; however, there was still plenty of light.

The full statements from both individuals are attached to this report.

3.2 Earlier Tour Passengers

The human performance group interviewed the 6 passengers who had flown on the accident helicopter with the accident pilot earlier that day. The six guests collectively answered the questions. They were picked up at their hotel on Wednesday December 7 for the picnic tour. They arrived at the site and registered. As part of their registration and introduction, each were weighed, were informed about security, given the safety briefing cards, and asked to watch the safety DVD in the departure lounge. They met their pilot in the departure lounge where all six were escorted to the helicopter. They then said that they were flown on a pre-determined route. Their pilot was very nice and seemed capable. During the trip, their pilot was in a good mood, happy, and chatty. On their way back, the two guests sitting in the front, swapped with two of the guests in the back for viewing pleasure. During their flight their pilot gave them a demo of the controls by telling them how an input in one area will require compensating and adjustment in another area of the controls. At no time did he make any of them feel unsafe. He seemed to have very good control over the helicopter.

When asked to further describe their experience with the pilot and the flight, they said the weather was clear, with no winds, and no bumps. Throughout the flight, they never sensed any mishandling or "misbehaving" of the helicopter. When they initially boarded the helicopter their pilot provided a safety briefing that discussed items such as

seatbelts, doors, and over water issues. Prior to landing, he reminded them not to open the doors and that he would take care of that when it was safe. He also reminded them not to be outside of the helicopter when the helicopter rotors were running. He opened the door for his passengers. He was well groomed with a white shirt, smart trousers, new epaulets, and short hair combed. He seemed fresh and in good spirits.

4. Medical and Pathological Information

The FAA Bioaeronautical Sciences Research Laboratory in Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot. The toxicology report indicated that no ethanol, carbon monoxide, cyanide, or drugs were detected in the specimens tested.

Post-accident drug testing of the maintenance crew who performed the 100-hour inspection on the accident helicopter was not done.

F. LIST OF ATTACHMENTS

Documents	Attachment #
Interview Summaries	1
Witness Statements	2
Final Report from Director of Safety	3
Final Forensic Toxicology	4

Submitted by:

Maryam Allahyar
Human Performance Investigator

Date