



National Transportation Safety Board Aviation Accident Final Report

Location:	Tempe Bar, AZ	Accident Number:	LAX03LA225
Date & Time:	07/05/2003, 1550 MST	Registration:	N2273A
Aircraft:	American Eurocopter AS350BA	Aircraft Damage:	Substantial
Defining Event:		Injuries:	4 Minor, 3 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled - Sightseeing		

Analysis

The helicopter landed hard, bounced back into the air, rotated 90 degrees to the left, and struck the ground a second time before rolling onto its right side. While in cruise at 3,500 feet msl, the tour helicopter pilot experienced a "hot battery" light indication on the instrument panel. The pilot made two radio calls, but, during the response, the helicopter experienced a complete electrical failure. The pilot elected to make an immediate landing on the shoreline of Lake Mead. At 100 feet agl, the pilot reported a change in the sound of the engine. Believing that he had an unreliable engine, the pilot entered an autorotation. While in the deceleration flair, the tail rotor stinger and tail rotor blades made contact with the soft sand. The pilot leveled the helicopter, but made a hard landing. The pilot indicated that after the helicopter came to rest, he could still hear the engine operating. He activated the fuel shutoff lever to shutdown the engine. A test run of the engine revealed no abnormalities. The pilot did not follow the emergency procedures as published in the AS350BA flight manual. Paragraph 2 describes an autorotation landing; it said to resume a level attitude before touchdown, and cancel any sideslip tendency. The aircraft flight manual states that the 150 amp generator is capable of sustaining the aircraft's electrical load. The emergency checklist identifies that if the battery is isolated from the d.c. circuit, the pilot is to "keep a watch on voltage, continue flight, according to circumstances." The emergency procedures for a battery temperature light as explained in section 3.3 of the flight manual for the AS350BA is; "Isolate the battery (push button "OFF") and land as soon as possible."

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's failure to follow the published electrical system emergency procedures for a hot battery, and his misjudged landing flare during the terminal phase of the autorotation maneuver at low level.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings

1. (F) ELECTRICAL SYSTEM,BATTERY - OVERTEMPERATURE
2. (C) EMERGENCY PROCEDURE - NOT COMPLIED WITH - PILOT IN COMMAND
3. ENGINE INSTRUMENT - NOT VERIFIED - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Findings

4. AUTOROTATION - ATTEMPTED - PILOT IN COMMAND

Occurrence #3: HARD LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings

5. FLARE - MISJUDGED - PILOT IN COMMAND

Occurrence #4: ROLL OVER
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Factual Information

HISTORY OF FLIGHT

On July 5, 2003, about 1550 mountain standard time, an American Eurocopter AS350BA, N2273A, made a hard landing and rolled over while making an emergency landing near Temple Bar, Arizona. Sundance Helicopters, Inc., was operating the helicopter under the provisions of 14 CFR Part 135. The commercial pilot and two passengers were not injured, while four passengers received minor injuries. The helicopter sustained substantial damage. The on-demand air taxi, sightseeing flight departed McCarran International Airport, Las Vegas, Nevada, about 1525, en route to Quarter Master Bluff, located in Arizona's Grand Canyon. Day visual meteorological conditions prevailed, and a company flight plan had been filed. The primary wreckage was at 36 degrees 03.55 minutes north latitude and 114 degrees 27.37 minutes west longitude.

The pilot reported that while in cruise at 3,500 feet mean sea level (msl) near Bonelli Bay, Lake Mead, Arizona, the helicopter experienced a "hot battery" light indication on the instrument panel. The pilot made two radio calls; one on the local traffic frequency (120.65), and the other to Sundance Helicopters' base. Sundance answered the broadcast, but during the response, the helicopter experienced a complete electrical failure.

The pilot elected to make an immediate landing on the shoreline of Lake Mead. At 100 feet agl, the pilot reported a change in the sound of the engine. Believing that he had an unreliable engine, the pilot entered an autorotation. While in the deceleration flair, the tail rotor stinger and tail rotor blades made contact with the soft sand. The pilot leveled the helicopter; however, the helicopter landed hard and bounced back into the air. The helicopter rotated 90 degrees to the left, and struck the ground a second time before rolling onto its right side. The pilot indicated that after the helicopter came to rest, he could still hear the engine operating. He activated the fuel shutoff lever to shutdown the engine.

The pilot helped evacuate the passengers and administered first aid while awaiting assistance.

PERSONNEL INFORMATION

The pilot and operator submitted a Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2).

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a commercial pilot certificate with a helicopter rating. The pilot held a certified flight instructor (CFI) certificate with a helicopter rating.

The pilot held a second-class medical certificate that was issued on August 8, 2002, with no limitations or waivers.

The pilot reported a total flight time of 1,336 hours. He logged 153 hours in the last 90 days, and 43 in the last 30 days. He had an estimated 126 hours in this make and model. He completed a biennial flight review on May 17, 2003.

AIRCRAFT INFORMATION

The helicopter was an American Eurocopter AS350BA, serial number 2273. A review of the helicopter's logbooks revealed a total airframe time of 5,786.8 hours at the last 100-hour inspection. The helicopter's total time at the time of the accident was 5,845.8 hours.

The helicopter engine was a Turbomecca Arriel 1b engine, serial number 4545. The total time on the engine at the last 100-hour annual inspection was 6,168 hours.

Aircraft maintenance records revealed that on June 28, 2003, the accident helicopter had a reported battery "over-temp," and maintenance technicians installed a reconditioned battery. They did not record the serial number of the battery that they removed on the maintenance malfunction report or in the maintenance records. On July 3, 2003, they removed the starter/generator due to a failure to start the engine, and replaced it with a serviceable reconditioned unit. They also removed the battery and installed another reconditioned battery.

The accident flight was the third flight of the day. The helicopter had accumulated a total of 3.4 hours since being released from maintenance on July 3, 2003.

The aircraft flight manual states that the 150 amp generator is capable of sustaining the aircraft's electrical load. The emergency checklist identifies that if the battery is isolated from the d.c. circuit, the pilot is to "keep a watch on voltage, Continue flight, according to circumstances." The emergency procedures for a battery temperature light as explained in section 3.3 of the flight manual for the AS350BA is; "Isolate the battery (push button "OFF") and land as soon as possible."

METEOROLOGICAL CONDITIONS

The closest official weather observation station was McCarran International Airport, Las Vegas, Nevada (LAS), which was located 40 nautical miles (nm) west of the accident site. The elevation of the weather observation station was 2,181 feet msl. An aviation routine weather report (METAR) for LAS was issued at 1556. It stated: winds from 080 degrees at 12 knots gusting to 15 knots; visibility 10 miles; skies 25,000 feet few; temperature 42/108 degrees Celsius/Fahrenheit; dew point 22/72 degrees Celsius/Fahrenheit; and altimeter 29.73 inHg.

COMMUNICATIONS

The helicopter was not in contact with any air traffic control facility. All flight following was between the operator base and the accident helicopter. The accident pilot was also making position reports on a separate air-to-air frequency.

WRECKAGE AND IMPACT INFORMATION

Investigators from the FAA examined the wreckage at the accident scene. They activated the battery switch and the voltage indicated 25 volts. They activated the audio horn and it functioned properly. They also engaged the starter and the engine spooled up.

TESTS AND RESEARCH

The FAA, American Eurocopter, Turbomecca, and Sundance Helicopters, Inc., were parties to the investigation.

Investigators examined the wreckage at Boulder City Municipal Airport, Boulder City, Nevada, on July 9, 2003.

Maintenance technicians removed the engine. They placed it in a shipping container for transport to Turbomecca for further testing.

On October 16, 2003, Turbomecca technicians examined the engine at their facilities in Grand Prairie, Texas, under the supervision of the Safety Board. They observed that a few of the compressor blades had tiny nicks and gouges on them from possible foreign object inhalation.

The freewheel shaft was bent, and needed to be removed from the engine assembly to facilitate an engine test run. They ran the engine in the test cell for about 10 minutes. The engine maintained power at multiple settings, including idle power, 100 percent power, and 130 percent power. They performed no further tests on the engine. They resealed the engine in the shipping crate for return to the owner.

ADDITIONAL INFORMATION

Section 3 of the flight manual describes emergency procedures.

Paragraph 2 describes procedures for an autorotation landing. It said to resume a level attitude before touchdown, and cancel any sideslip tendency.

The National Transportation Safety Board investigator released the wreckage to the owner's representative.

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	31, Male
Airplane Rating(s):		Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	Helicopter	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	08/08/2002
Occupational Pilot:		Last Flight Review or Equivalent:	05/17/2003
Flight Time:	1335 hours (Total, all aircraft), 126 hours (Total, this make and model), 1209 hours (Pilot In Command, all aircraft), 153 hours (Last 90 days, all aircraft), 43 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	American Eurocopter	Registration:	N2273A
Model/Series:	AS350BA	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	2273
Landing Gear Type:	High Skid	Seats:	7
Date/Type of Last Inspection:	06/16/2003, 100 Hour	Certified Max Gross Wt.:	4630 lbs
Time Since Last Inspection:	59 Hours	Engines:	1 Turbo Shaft
Airframe Total Time:	5845.8 Hours at time of accident	Engine Manufacturer:	Turbomeca
ELT:	Installed, not activated	Engine Model/Series:	Arriel 1b
Registered Owner:	SDH Capital Holdings LLC	Rated Power:	590 hp
Operator:	Sundance Helicopters Inc.	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	KBMA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	LAS, 2492 ft msl	Observation Time:	1556 PDT
Distance from Accident Site:	40 Nautical Miles	Direction from Accident Site:	270°
Lowest Cloud Condition:	Few / 25000 ft agl	Temperature/Dew Point:	42° C / 22° C
Lowest Ceiling:	None	Visibility:	10 Miles
Wind Speed/Gusts, Direction:	12 knots/ 15 knots, 80°	Visibility (RVR):	
Altimeter Setting:	29.73 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	Las Vegas, NV (LAS)	Type of Flight Plan Filed:	Company VFR
Destination:	Quarter Master, AZ	Type of Clearance:	None
Departure Time:	1525 PDT	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	4 Minor, 2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 Minor, 3 None	Latitude, Longitude:	36.065278, -114.460278

Administrative Information

Investigator In Charge (IIC): PATRICK H JONES **Adopted Date:** 09/01/2004

Additional Participating Persons: Eric Jacobo; Federal Aviation Administration; Las Vegas, NV

Publish Date:

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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