Aviation Investigation Final Report

Location:	Camp Verde, Arizona	**Accident Number:**	WPR12FA282
Date & Time:	June 30, 2012, 12:07 Local	**Registration:**	N729DP
Aircraft:	Aerospatiale AS350B	**Aircraft Damage:**	Substantial
Defining Event:	Low altitude operation/event	**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The helicopter was reported missing by family members, and the wreckage was found the next day in a deep river canyon abutted by 200-foot vertical cliffs. Before the accident, a U.S. Geological Survey (USGS) cableway system had spanned the river about 300 feet north of the wreckage and had been elevated about 39 feet above the river's center. Examination of the cable, its landing platforms, the helicopter, and the wreckage location revealed evidence consistent with the helicopter impacting the cable while traveling in level-forward flight. A photo of the cableway taken by the USGS before the accident showed that the cable suspended over the river was not visible against the terrain background; however, the cableway did not meet the Federal Aviation Administration (FAA) aerial marker requirement criteria. The USGS has replaced the cableway with aerial markers. In addition, the accident occurred within a designated Special Conservation Area, which the FAA recommends avoiding, if practical, or if flown through, it recommends that pilots should make every effort to fly not less than 2,000 feet above ground level.

The pilot's postaccident ethanol levels were indicative of the ethanol being produced postmortem; if any of the ethanol was due to ingestion, it was well below the FAA regulatory limit, and it is unlikely to have contributed to the accident. The pilot's postaccident diphenhydramine level suggests that he had taken it within an hour of taking off. Diphenhydramine causes marked sedation, is a central nervous system depressant, and it has been observed to alter mood and impair cognitive and psychomotor performance. It is likely that diphenhydramine led to cognitive and psychomotor impairment to the pilot and contributed to his decision to fly at an insufficient altitude in a river canyon.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's improper decision to fly at a low altitude through a river canyon, contrary to voluntary guidance within the Special Conservation Area, which led to collision with a cable. Contributing to the pilot's decision were his cognitive and psychomotor impairment from his use of an antihistamine medication.

Findings

Personnel issues	Incorrect action selection - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	Altitude - Not attained/maintained
Personnel issues	OTC medication - Pilot
Environmental issues	Wire - Contributed to outcome
Personnel issues	Knowledge of regulatory reqs - Pilot

Factual Information

History of Flight

Maneuvering-low-alt flying	Low altitude operation/event (Defining event)
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On June 30, 2012, at 1207 Pacific daylight time, a Eurocopter AS350BA, N729DP, was flying low through the Verde River canyon approximately 8.6 miles south of Camp Verde, Arizona, and struck a cable that spanned the river at a narrow portion of the canyon/gorge. The helicopter was registered to Chopper II LLC, and operated by the private pilot under the provisions of Title 14 Code of Federal Regulations, Part 91. The pilot and three passengers were fatally injured, and the helicopter was substantially damaged. Visual meteorological conditions prevailed, and no flight plan had been filed. The flight originated from Scottsdale Airport, Scottsdale, Arizona, around 0825.

The helicopter was reported missing on June 30th by concerned family members and the wreckage was located July 1st. The helicopter was laying on its right side in 4-5 feet of water in the center of the Verde River. Vertical cliffs extend up from the river bed about 200 feet on both the eastern and western sides of the river. Approximately 300 feet north of the wreckage was a USGS streamgaging cableway system that spanned the river, and was elevated 39 feet above the river. The steel cable was found severed and the cable carriage located on the landing platform deformed. The cable ends were flayed consistent with overload, and the cable end located on the eastern shore had grey paint that matched the color of the rotor blades and composite rotor blade fibers were imbedded in the cable strands at the severed cable end.

Radar records indicate that the helicopter departed Scottsdale Airport, around 0830. A mobile phone location search was conducted by the Civil Air Patrol (CAP) while searching for the helicopter. One of the phones serviced by Verizon that was in the possession of one of the helicopter's occupants provided a significant amount of recorded location activity. The phone record indicated that between 0912 and 1101 location activity was concentrated in the vicinity of the Sedona Airport and the town of Sedona. Between 1110 and 1142, there was location activity recorded 7 miles north of Sedona. Between 1152 and 1158, there was location activity near Montezuma Castle National Monument. Finally, between 1200 and 1207 there was location activity south of Camp Verde, near the accident location. There was no activity recorded after 1207. A Park Ranger at the Montezuma Castle National Monument reported that at 1155 she observed a helicopter with the numbers N729DP on the tail orbit the castle at a low altitude then depart towards Camp Verde.

AIRCRAFT INFORMATION

The five seat, conventionally configured, single-engine helicopter, serial number 2338, was manufactured in 1990. It was powered by a Turbomeca Arriel 1B 478 KW engine. Review of airframe

and engine maintenance logbook showed that an annual inspection was completed on February 10, 2012, at a total aircraft time of 7,342.4 hours; engine total time of 10,658.4 hours; hobbs meter reading of 7,342.4 hours. Installation of 2 Data Toys DT-CAM-WDR600 cameras and recording system was completed on April 26, 2012. The most recent maintenance on the helicopter consisted of air conditioning system maintenance, and tail boom to fuselage junction torque check (AD 2001-04-14) completed on June 25, 2012.

PERSONNEL INFORMATION

The pilot, age 70, held a private pilot certificate with ratings for airplane single-engine and multiengine land, instrument airplane, and rotorcraft-helicopter issued on February 22, 2008, and a third-class, special issuance medical certificate with the limitation that he must have glasses for near vision, issued June 9, 2011, and not valid for any class after December 31, 2012. The pilot reported a total flight time of 4,500 hours on his medical application. The pilot's logbook that was examined by investigators recorded the pilot's helicopter flight time starting in August 2006. The logbook indicated that the pilot had 1,734.2 hours of helicopter time, 416.9 hours in the AS350 model of helicopter, and his most recent logbook entry was on February 19, 2012, where he listed the helicopter hobbs time as 7,347.3 hours. The pilot's most recent flight review was conducted on March 28, 2011. Flight time for the 90 days preceding the accident was zero.

WRECKAGE AND IMPACT INFORMATION

The helicopter was located in the center of the Verde River, on its right side in about 4-5 feet of water. The main rotor and transmission had separated as a single unit, and was located approximately 70 feet to the east of the fuselage. The tail boom had separated at the fuselage-tail splice, and rotated downward relative to the helicopter, but remained adjacent to the fuselage. The engine remained with the fuselage. The rear passenger and front passenger seats had separated from the cabin, however, the pilot's seat remained attached to the cabin deck. The oil cooler fairing and fuselage belly fairing were located approximately 500-600 feet north of the main fuselage.

The main rotor blades remained attached to the starflex rotor hub. The tips of the red and yellow rotor blades had separated about 3 feet inboard from the blade tips. The blade tip separation occurred along the chord line for both blades. Both blades had witness marks on their leading edges at the point of separation consistent with that of a steel cable. The transmission had separated from its support mounts, and the fracture surfaces contained 45-degree shear lips with a bright granular surface consistent with overload. Transmission drive train continuity was established by moving the rotor head and observing movement of the engine to transmission drive coupling. The engine to transmission drive shaft was not located.

Helicopter flight control rods were continuous from the cockpit cyclic and collective controls up to the transmission deck. Control pitch change links and servos remained attached to the swash plate and transmission structure. Control rod ends were attached to the control servos. The blue pitch change link was separated in overload at the lower rod end, and the yellow pitch change link exhibited a cable witness mark at mid length. The tail rotor drive shaft had separated aft of the number 2 hanger bearing near the tail boom splice, and was continuous to the tail rotor gear box. The tail rotor control rods were continuous from the tail rotor servo aft to the tail rotor. The tail rotor hub, pitch links, and paddles were present and connected on the hub.

The engine was attached to the engine deck mounts. The gas generator turned freely by hand. The throttle and anticipator cables were securely connected, as were all the fuel and oil lines. Both electric chip detectors were clean. The free turbine rotated by hand, no blade shedding had occurred, and continuity was confirmed from the tower gear and accessory gear train, and from the turbine to the reduction gearbox and the power shaft. Both the Ng (gas producer turbine) and NTL (free turbine) drives were intact and could be moved by hand on the fuel control unit (FCU). Fuel was observed in the main fuel line. The Module 5 (reduction gearbox) was removed and approximately 1 mm of misalignment on the input pinion nut was observed, an indication of an over torque condition, which is consistent with engine being driven during an impact of the main rotor.

The cable that spanned the river was approximately 1 inch in diameter, and determined by the USGS to be 286 feet in length. The cable ends where the cable had separated were flayed, and the cable stands ends were bright and shiny consistent with recent damage. The cable length that remained on the eastern shore line was approximately 130 feet long, and the cable that remained on the western shore line was approximately 140 feet long. A steel platform with an aluminum carriage was located on the western side. The aluminum carriage was bent and deformed.

FLIGHT RECORDERS

The helicopter was equipped with a DataToys, Ultimate Digital Video Platform (UDVP) video recorder and two lipstick style DT-CAM-WDR600 cameras. An SD memory card was removed from the UDVP recorder and sent to the NTSB Vehicle Recorder Laboratory for data extraction. The Vehicle Recorder Laboratory reported that the video imagery that was downloaded from the SD card did not match the terrain that was in the vicinity of the accident.

PATHOLOGICAL AND TOXICOLOGICAL INFORMATION

According to the FAA certified medical file, this 70-year-old pilot first received medical certification in 1974. He continued to be routinely certified through 2004, and reported no significant medical conditions or medications to the FAA during this time. In 2004, the pilot developed chest pain, and after a medical evaluation, underwent four vessel coronary artery bypass grafting for severe coronary artery disease. At that time, hypertension and hyperlipidemia were also diagnosed. The pilot applied for medical certification in 2006; after review of his medical condition, treatment, and test results, the pilot received a special issuance medical certification. Thereafter, the pilot received annual special issuance medical certification in the third class. His last medical certification exam was performed on 6/9/2011 and his special issuance was granted through 12/31/2012. The pilot reported using Toprol (metoprolol, a beta-blocker used to treat hypertension and prevent infarction in patients with coronary artery disease) and Lipitor (atorvastatin, a cholesterol lowering agent) to the FAA beginning in 2006.

The FAA's Forensic Toxicology Research Team CAMI performed forensic toxicology on specimens from the pilot. Toxicology testing revealed several alcohols in multiple tissues. Ethanol was identified in heart (0.083 gm/dL), brain (0.046 gm/dL), and blood (0.043 gm/dL) and amounts too small to quantify of n-butanol and n-propanol were found in heart and blood. In addition, acetaminophen (an analgesic marketed under the trade name Tylenol) was detected in blood, metoprolol (a beta-blocker marketed under the trade name Toprol) was found in liver and blood, and diphenhydramine (a sedating antihistamine and sleep aid marketed over the counter under the trade names Benadryl and Unisom) was discovered in liver and blood (0.1ug/ml).

An autopsy was performed on the pilot on July 3, 2012, by the Yavapai County Medical Examiner, Prescott, Arizona. The medical examiner found the cause of death to be blunt force injuries and the manner of death to be accident. Evidence of coronary artery disease and the previous coronary artery bypass procedure was also identified. No other natural disease was described.

AIRSPACE INFORMATION

The accident occurred in a Special Conservation Area that is marked on the Phoenix Sectional Aeronautical Chart. The Special Conservation Area is depicted by a cyan line with a single row of dots on the inside of the prescribed area. Special Conservation Areas include National Parks, Wildlife Refuges, and Primitive and Wilderness Areas. FAA Advisory Circular 91-36, Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas, lists a number of voluntary practices for a pilot to exercise as a practical indication of concern for the environment. AC 91-36 recommends the avoidance of noise sensitive areas if practical, or to make every effort to fly not less than 2,000 feet above ground level (agl) defined as the highest terrain within 2,000 feet laterally of the route of flight or the uppermost rim of a canyon or valley.

ADDITIONAL INFORMATION

The USGS Bureau of Aviation provided photos of the streamgaging station that were taken to document the station and cableway, and were taken sometime well before the accident. The USGS Bureau Aviation Manager states that the photos clearly shows that the cable could not be seen against the background terrain of the river and rock canyon.

Pilot Information

Certificate:	Private	**Age:**	70
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 9, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 4500 hours (Total, all aircraft), 417 hours (Total, this make and model), 0 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aerospatiale	**Registration:**	N729DP
Model/Series:	AS350B	**Aircraft Category:**	Helicopter
Year of Manufacture:	1990	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2338
Landing Gear Type:	Skid	**Seats:**	6
Date/Type of Last Inspection:	February 10, 2012 Annual	**Certified Max Gross Wt.:**	4960 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	7359 Hrs at time of accident	**Engine Manufacturer:**	TURBOMECA
ELT:		**Engine Model/Series:**	ARRIEL 1B
Registered Owner:	CHOPPER II LLC	**Rated Power:**	641 Horsepower
Operator:	CHOPPER II LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSEZ,4830 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	12:15 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	35°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Scottsdale, AZ (KSDL)	**Type of Flight Plan Filed:**	None
Destination:	Scottsdale, AZ (KSDL)	**Type of Clearance:**	None
Departure Time:	08:25 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Scottsdale KSDL	**Runway Surface Type:**	
Airport Elevation:	1510 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	34.444442,-111.789443

Administrative Information

Investigator In Charge (IIC):	McKenny, Van
Additional Participating Persons:	Yasmin Duran; Federal Aviation Administration; Scottsdale, AZ Seth Buttner; American Eurocopter Corp; Grand Prairie, TX Bryan Larimore; Turbomeca USA; Grand Prairie, TX David Johncox; USGS; Boulder, CO Xavier Degastines; BEA; Paris
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