



National Transportation Safety Board Aviation Accident Final Report

Location:	LA GLORIA, Texas	Accident Number:	FTW98FA256
Date & Time:	June 5, 1998, 05:49 Local	Registration:	N911VA
Aircraft:	Eurocopter AS350BA	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The 2,905-hour instrument rated commercial helicopter pilot encountered an area of limited visibility during a dark night flight over an unlit, very sparsely populated, rural area while en route to evacuate a truck driver injured in a highway accident. The helicopter crashed 19 miles west of the truck accident site, indicating that the pilot failed to recognize his intended destination and flew past it. The helicopter impacted trees and terrain in a left turn in a 85 to 95 degrees nose down attitude. The pilot had accumulated a total of 4 hours of actual and 45 hours of simulated instrument flight time, none of it within the 90 days preceding the accident. The pilot was reported to have been concerned about night flights in the area due to the lack of lights on the ground to maintain visual reference. Another helicopter pilot stated that 'at night the area west of the highway is a big black hole.' No discrepancies were found that could have prevented normal flight operations. The pilot who flew the helicopter prior to the accident flight stated that 'the aircraft flew well and responded normally.' The visibility had been severely restricted by thick smoke from fires in Mexico. No distress calls were received from the helicopter. There were no reported eyewitnesses to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's continued flight into adverse weather conditions resulting in a loss of control due to spatial disorientation. Contributing factors were the dark night illumination, the lack of visual cues, the pilot's lack of total instrument time, and the pressure induced by the medical emergency to complete the medical evacuation.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER

Phase of Operation: CRUISE

Findings

1. (F) LIGHT CONDITION - DARK NIGHT
2. (F) WEATHER CONDITION - HAZE/SMOKE
3. FLIGHT INTO KNOWN ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND
4. (F) VISUAL/AURAL PERCEPTION - PILOT IN COMMAND
5. (F) PRESSURE INDUCED BY CONDITIONS/EVENTS

Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: MANEUVERING

Findings

6. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
7. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND
8. (F) LACK OF TOTAL INSTRUMENT TIME - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

9. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On June 5, 1998, at 0549 central daylight time, a Eurocopter AS350BA medical ambulance helicopter, N911VA, was destroyed upon impact with trees and terrain near La Gloria, Texas. The instrument rated commercial pilot and two medical technicians on board the helicopter were fatally injured. The helicopter was owned by Metro Aviation of Shreveport, Louisiana, and operated by Tex-Air Helicopters of Houston, Texas. Dark night visual meteorological conditions prevailed for the 14 Code of Federal Regulations Part 91 positioning flight for which a company VFR flight plan was filed. The flight departed from a heliport near Harlingen, Texas, at 0514, with a location known as Humble Kelsey, located approximately 8 nautical miles to the northeast of La Gloria along Highway 755, as its intended destination.

The helicopter was dispatched to pick up and transport the driver of an 18-wheeler tanker truck, who had been seriously injured when he lost control of his truck while driving in reduced visibility on Highway 755. The pilot was not provided the coordinates of the truck accident site; however, he was familiar with the town of La Gloria, Texas, which he planned to use as the initial point for locating Highway 755 prior to proceeding northeast bound towards Humble Kelsey to pick up the injured truck driver. The helicopter, operating under the call sign "Air Care One," departed its home base heliport with 1 hour and 55 minutes of fuel on board. At 0529, the pilot reported to his dispatcher that the flight was en route over the Edinburg Airport, estimating arrival at the accident site in 16 minutes. In the last position report to his home base at 0539, the pilot reported that he was "5 minutes out" from his destination and announced that he was "switching to ground."

The helicopter was assigned a mode C transponder code of 5377. Air Traffic Control (ATC) radar tracked the helicopter from 05:19:56 to 05:34:15 flying on a west northwest heading from Harlingen toward La Gloria. During this time period, the helicopter's altitude remained between 700 feet and 1,100 feet MSL. Radar contact was then lost until 05:47:06 when one radar return was recorded which indicated the helicopter was at 1,800 feet, approximately 2 miles southeast of the site where it crashed. Two-way radio communication was not established between the helicopter and any ATC facility in the area. The helicopter failed to arrive at its destination and a search was initiated.

The wreckage of the helicopter was located 30 hours after the accident in a mesquite covered sparsely populated rural area of Starr County, Texas. The accident site was approximately 19.0 nautical miles west of the flight's intended destination, the truck accident location.

There were no reported eyewitnesses to the accident.

PERSONNEL INFORMATION

The 46-year old commercial pilot, who was occupying the right seat of the helicopter, had been employed by the operator since January 1998. He received his commercial pilot certificate on December 13, 1996. According to the operator, the pilot had accumulated a total of 2,950 flight

hours, of which 54 hours were in the same make and model as the accident helicopter. The pilot had accumulated a total of 4 hours of actual and 45 hours of simulated instrument flight time. The pilot logged no actual or simulated instrument time in the 90 days preceding the accident. The pilot had accumulated a total of 30 hours of night flight, of which 20 hours were accumulated during the preceding 90 days.

The pilot received a helicopter instrument rating on January 5, 1998, prior to his employment with Tex-Air Helicopters. During his training in preparation for his instrument rating, the pilot received a total of 15.4 hours of ground instrument training and a total of 5.0 hours of instrument flight training prior to taking his instrument check ride. The operator of the training facility that provided the instrument training reported that the pilot failed his first instrument check ride due to deficiencies in basic instrument proficiency and ADF navigation. This check ride was 1.2 hours in duration. The pilot was provided an additional hour of remedial ground school and an additional 1.3 hours of remedial flight training. The pilot was reported to have satisfactorily completed the second check ride, which was given two days after the first check ride and lasted 0.9 hours. Including the two check rides, the pilot accumulated a total of 8.4 hours of instrument flight time during this training.

Interviews of the pilot's co-workers revealed that the pilot was very concerned about night flights in the sparsely populated areas north of the Rio Grande Valley in southwest Texas due to the lack of lights on the ground to maintain visual reference. One of the other pilots told the FAA inspector that "at night the area west of the Interstate highway is a big black hole."

AIRCRAFT INFORMATION

The 1981 model helicopter, serial number 1446, had accumulated a total of 4,752.7 flight hours (1,565.0 Hobbs meter hours) at the time of the accident. The helicopter was manufactured in France and re-assembled in Grand Prairie, Texas, on February 25, 1982. The helicopter was being maintained under the manufacturer's maintenance program. The last scheduled maintenance performed on the helicopter was a 100-hour inspection, which was completed on April 17, 1998, at 4,706.2 hours, 46.5 hours prior to the accident. The aircraft logbook was recovered at the accident site. According to the operator, and as confirmed by examination of the aircraft logbook, there were no open deferred maintenance items on the helicopter at the time of the accident.

The 641-horsepower Turbomeca Arriel 1B turboshaft engine, serial number 801, was manufactured in France, on August 24, 1984. The engine had accumulated a total of 4,156.9 hours since new. The last overhaul was completed on June 16, 1994, at 2,997.8 hours. The last engine inspection was completed at 4,062.0 hours, on April 17, 1998.

The basic empty weight of the helicopter was 3,079 pounds, and the maximum gross weight was 4,630 pounds. Weight and balance calculations were performed using figures provided by the operator. The aircraft was found to be within its weight and balance limits at the time of the accident.

The pilot who flew the helicopter prior to the accident flight on the day before the accident was asked by the NTSB investigator-in-charge (IIC) to provide a statement regarding the condition

of the aircraft. The pilot stated that "the aircraft flew well and responded normally." The pilot further stated that "no discrepancies were noted during the flight."

The maintenance records for the helicopter were initially reviewed by the FAA inspector who responded to the accident site. The records were later forwarded to the NTSB IIC for further examination. Review of the maintenance records for the helicopter and powerplant did not reveal any evidence of overdue inspections or uncorrected discrepancies that could have contributed to the accident.

The helicopter was equipped for night flights. Besides the on-board medical equipment installed, the following optional equipment was installed in the helicopter: a 3-axis (pitch, roll, yaw) auto pilot system, a strobe light system, a radar altimeter, an EMS lighting system, a GPS with moving map display, and an air conditioner.

METEOROLOGICAL INFORMATION

McAllen, Texas, located 46 nautical miles southeast (132 degrees) of the accident site, was the nearest weather reporting station to the accident site. At 0553, McAllen was reporting a broken ceiling at 1,400 feet, with a visibility of 5 statute miles. The temperature to dew point spread was reported as 1 degree.

A farm worker residing at the Diamond O Ranch, approximately 11 miles southeast of the accident site, reported that visibility on the day of the accident, as well as on the previous day, was "severely restricted by thick smoke from fires in Mexico." The witness stated that a wind mill located approximately 1.25 miles northeast of his house was not visible due to the prevailing smoke. The witness added that a strong wind from the south prevailed on the day of the accident.

The injured truck driver, for whom the flight was intended, was eventually transported to a hospital by ground ambulance. He fully recovered from his injuries. He reported that he was the lead driver of a 30-truck convoy traveling northeast bound on highway 755. He was very familiar with that part of the country. His company required all of the drivers in the convoy to attend a safety briefing prior to their departure. The possibility of encountering fog and restricted visibility was discussed during the safety briefing. Drivers were instructed to slow down and watch their spacing. For the previous 2 months, the area had been affected by ground fog in the early mornings. He added that on the morning of the accident, ground visibility had been restricted due to patchy ground fog and smoke; however, the fog was not as bad as it had been on previous drives. He stated that he had been operating his windshield wipers intermittently to keep the windshield clear and the surface of the highway was "very slick." The driver added that he recalls the paramedics telling him that they could hear the helicopter approaching the accident site, but later stating that it must have been another helicopter, because the one they heard kept on going.

According to the U.S. Naval Observatory, sunrise occurred at 0640 local time. Moonset occurred at 0350 local. The phase of the moon was "waxing gibbous with 82% of the Moon's visible disk illuminated."

WRECKAGE AND IMPACT INFORMATION

The GPS location of the accident site, provided by the pilot of a helicopter that transported the investigation team to the accident site, was reported as 26 degrees 46.23 minutes North latitude, and 98 degrees 46.44 minutes West longitude. The GPS altitude was reported as 586 feet msl.

The toe of the left landing gear skid tube was found at the initial point of ground impact buried 17.5 inches into the hard soil at a 50 degree nose low attitude. The toe of the right skid was found buried in a similar fashion on a 32 degree incline with a slight rotation to the left, approximately 8 feet from the toe for the left skid. Both skid toes were found aligned on a measured heading of 243 degrees. Neither of the two cross tubes for the helicopter showed major evidence of impact damage.

The manufacturer of the helicopter provided a sketch and pictures of the helicopter's landing gear installation. According to the manufacturer, the toes of the skids in this type helicopter are manufactured with a 45 degree upward bend. The fact that one of the toes was found buried at a 50 degree nose down attitude, places the helicopter in a 85 to 95 degree nose down attitude at the time of the impact.

The wreckage of the helicopter was scattered on a linear path centered on a measured heading of 315 degrees. The wreckage was confined to an area within a 93 foot radius from the initial point of ground impact.

A medical gurney being carried in the left side of the helicopter was found near the initial point of impact. The 6 foot long gurney was found compressed to a length of 3 feet, 3 inches. The left front door, the left cargo door, and the left step for the left skid tube were also found at the initial point of impact.

All three Starflex arms were found broken. The mounting bolts for the anti-vibration unit were sheared, and the anti-vibration unit separated from the mast coming to rest 3 feet to the right and forward of the Starflex assembly. The Starflex assembly was still attached to the mast and the top portion of the main transmission. The main rotor mast was bent.

Ground imprints and scars corresponding to main rotor blade strikes were found forward of the initial point of impact. All main rotor blades scars were in close proximity to each other, measuring approximately 3.5 feet from each other. All three main rotor blades were destroyed by impact damage. The yellow blade sustained the most severe damage, and the red blade sustained moderate damage. The blue blade sustained the least amount of damage. The leading edge of the blue blade was found buried in the ground at an angle of approximately 75 degrees.

A piece of the top engine cowling was found partially wrapped around the main rotor mast. Flight control continuity could not be established to either the main rotor or tail rotor due to the impact damage to the control tubes and bellcranks within the respective systems.

The tailboom and vertical fin were separated from the airframe and came to rest approximately

15 feet from the initial point of impact. The tail rotor gearbox, with the tail rotor blades still attached, came to rest to the left and aft of the tailboom. Both tail rotor blades were broken from the main spar and showed no sign of leading edge damage. The portion of the tail rotor drive shaft that remained attached to the tailboom turned smoothly. The tail rotor pitch change mechanism for both tail rotor blades was still attached and control continuity was established. The tailskid was undamaged.

The engine controls quadrant for the helicopter was found partly buried at the initial point of ground impact. The rotor brake lever was found in the released position. The fuel flow control lever was found in the flight gate position, with the fuel shutoff valve in the open (full forward) position.

The flight instruments, as well as the engine instruments, were destroyed by impact damage and fire. The auto pilot control panel and the auto pilot computer were also destroyed by impact damage and fire. The four sealed beam lights from the EMS lighting system installed below the aft cross tube assembly were found undamaged. The green navigation light from the right side of the tailboom was found still attached to the tailboom. Field examination of the light bulb filaments for the navigation lights revealed that the filaments were stretched.

The engine separated from the helicopter during the accident sequence, coming to rest 25 feet beyond the initial point of ground impact. The accessory case, reduction gearbox, and the drive shaft had separated from the engine assembly. The splines on the coupling for the tail rotor drive shaft showed signatures of rotational scoring. Rotational marks were also found on the engine main oil filter. No metal chips or shavings were found in the engine chip detector for engine module number 5.

The fuel control assembly was found separated from the engine. The fuel control lever was found in the normal position for flight. Residual fuel was found within the external fuel control filter. The helicopter's 143-gallon un-baffled fuel bladder was compromised during the impact sequence. There was a heavy smell of jet fuel present throughout the accident site.

The electronic locator transmitter (ELT) was destroyed by impact forces and fire.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy and toxicological examination were requested on the pilot. They were not performed due to religious objections from the pilot's family.

FIRE

The helicopter was destroyed by fire. The fire was concentrated in the cockpit area forward of the cabin of the helicopter. The upper half of the main transmission, the remains of the main rotor system, and most of the tail rotor drive system, were damaged but not consumed by the fire. No evidence of an in-flight fire was found.

TEST AND RESEARCH

The Turbomeca Arriel 1B turboshaft engine, serial number 801, was scheduled for examination and teardown at the engine manufacturer's facility in Grand Prairie, Texas, on July 24, 1998. The examination was conducted under the supervision of the NTSB IIC. The engine disassembly revealed torsional bends on the engine drive shaft consistent with the damage created by a sudden stoppage at a high power setting.

A servo upper control tube was retained by the IIC for further examination. The 10-inch portion of tube was shipped to the NTSB Materials Laboratory for examination. The metallurgical examination revealed that the fractures were "typical of a bending overstress separation."

ADDITIONAL DATA

The helicopter was recovered from the accident site on June 10, 1998, and transported by ground vehicle to secured facilities in Lancaster, Texas. The wreckage was released to the owner's representative on February 3, 1999.

Pilot Information

Certificate:	Commercial	Age:	46, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	Last FAA Medical Exam:	August 12, 1997
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	2950 hours (Total, all aircraft), 54 hours (Total, this make and model), 2605 hours (Pilot In Command, all aircraft), 27 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Eurocopter	Registration:	N911VA
Model/Series:	AS350BA AS350BA	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	1446
Landing Gear Type:	Skid	Seats:	3
Date/Type of Last Inspection:	April 17, 1998 100 hour	Certified Max Gross Wt.:	4630 lbs
Time Since Last Inspection:	46 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	4753 Hrs	Engine Manufacturer:	Turbomeca
ELT:	Installed, not activated	Engine Model/Series:	ARRIEL 1B
Registered Owner:		Rated Power:	641 Horsepower
Operator:		Operating Certificate(s) Held:	On-demand air taxi (135)
Operator Does Business As:	TEX-AIR HELICOPTERS INC.	Operator Designator Code:	TXEA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night/dark
Observation Facility, Elevation:	MFE ,107 ft msl	Distance from Accident Site:	46 Nautical Miles
Observation Time:	05:53 Local	Direction from Accident Site:	132°
Lowest Cloud Condition:	Unknown	Visibility	5 miles
Lowest Ceiling:	Broken / 1400 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	120°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	27° C / 26° C
Precipitation and Obscuration:	N/A - None - Haze		
Departure Point:	HARLINGEN , TX (78TS)	Type of Flight Plan Filed:	Company VFR
Destination:	LA GLORIA , TX (NONE)	Type of Clearance:	None
Departure Time:	05:14 Local	Type of Airspace:	Class G

Airport Information

Airport:		Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	0	IFR Approach:	
Runway Length/Width:		VFR Approach/Landing:	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	26.580923, -98.5205(est)

Administrative Information

Investigator In Charge (IIC):	Casanova, Hector
Additional Participating Persons:	EDWARD C GREER; SAN ANTONIO , TX ARCHIE WHITTEN; GRAND PRAIRIE , TX ROBERT REULAND; GRAND PRAIRIE , TX EDWARD BEHNE; HOUSTON , TX
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Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=20424

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).