



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	ROUND TOP, TX	<b>Accident Number:</b>	FTW98FA167
<b>Date &amp; Time:</b>	04/02/1998, 0817 CST	<b>Registration:</b>	N7734A
<b>Aircraft:</b>	Bell 206B	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The non-instrument rated private helicopter pilot encountered fog and low ceilings while en route on a 132 mile VFR cross country flight. Witnesses near the accident site reported observing the helicopter in a nose down attitude and hearing the sound of impact with trees. Visibility in the vicinity of the accident site was reported by several witnesses to be as low as 100 feet and as high as 1/4 of a mile. The ceiling was obscured due to fog. Residents in the area reported that fog has a tendency to form that time of the year around sunrise. Physical evidence and signatures at the accident site indicate that the helicopter impacted the trees and terrain in a 45 degree nose low attitude in a slight right turn. The accident occurred at 0807 local time and sunrise occurred at 0619. The pilot had accumulated a total of 187 flight hours. No evidence of pre-impact mechanical failure or malfunction was observed at the accident site. No anomalies were found during the investigation that could have prevented normal flight operation.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's attempted VFR flight into instrument meteorological conditions. Contributing factors were fog, low ceilings, and trees.

## Findings

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Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER  
Phase of Operation: UNKNOWN

### Findings

1. (F) WEATHER CONDITION - LOW CEILING
  2. (F) WEATHER CONDITION - FOG
  3. (C) VFR FLIGHT INTO IMC - ATTEMPTED - PILOT IN COMMAND
  4. LACK OF TOTAL INSTRUMENT TIME - PILOT IN COMMAND
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Occurrence #2: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: UNKNOWN

### Findings

5. (F) OBJECT - TREE(S)
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

## Factual Information

### HISTORY OF FLIGHT

On April 2, 1998, at 0817 central standard time, a Bell 206B helicopter, N7734A, was destroyed upon impact with terrain while maneuvering near Round Top, Texas. The non-instrument rated private pilot, sole occupant of the helicopter, was fatally injured. The helicopter was owned and operated by Autorotate, Inc., of Austin, Texas. Instrument meteorological conditions prevailed in the vicinity of the accident site. No flight plan was filed for the 132 mile cross country flight which originated from the Robert Mueller Municipal Airport (AUS) near Austin, Texas, at approximately 0730. The Title 14 CFR Part 91 flight's destination was the Houston Hobby Airport (HOU), near Houston, Texas.

The helicopter was last topped off with 50 gallons of Jet-A fuel by Austin Aero, a fixed base operator at AUS prior to its departure from Austin on the morning of the accident.

Witnesses near the accident site reported the accident at 0824 on the 911 emergency line, after observing the helicopter in a nose down attitude and hearing the sound of impact with trees.

### PERSONNEL INFORMATION

The 42-year-old private pilot was an executive with an oil exploration company in Austin, Texas. At the time he obtained his private pilot certificate, on July 9, 1997, he had accumulated a total of 93.4 hours of flight time. All of his flight experience was obtained in the Bell 206 helicopter. At the time of the accident, he had accumulated a total of 187.4 flight hours. According to the pilot's log book, which was found at the accident site, the pilot completed 6.1 hours of flight training at the Bell Helicopter Flight Training Center on February 26 and 27, 1998. Of the 6.1 hours of flight training received, 1.2 hours were obtained in a flight simulator.

The pilot's last FAA Third Class medical certificate was issued on May 28, 1997, without any waivers or limitations. At the time of his physical examination, the pilot reported occasional periods in which he suffered from hay fever and allergies. A friend of the pilot stated that the pilot was in excellent shape and took very good care of his health. The friend added that he was neither a smoker nor a drinker, and further testified that the pilot "exercised on a daily basis by swimming at least a couple of miles a day."

The 140 pound pilot, who was occupying the right seat, was reported to carry "approximately 40 pounds of buck shots in a bag that he normally strapped to the copilot seat" to keep the helicopter within CG limits. .

### AIRCRAFT INFORMATION

The 1975 Bell 206B helicopter, serial number 1768, was issued an export certificate on June 27, 1975, when the airframe and engine had accumulated a total of 4.3 hours. The helicopter was partially disassembled and exported to Japan, where it was issued the registration number JA9139. The helicopter was imported back to the United States in early 1997.

The helicopter's last annual inspection was completed on April 11, 1997, at 6,436.5 airframe hours. At the time of the accident, the total time on the airframe was 6,577.0 hours. The 425 horsepower Allison 250C20 engine, serial number AE-835023, had accumulated a total of 4,141 hours. The engine's "cycle counter" was found to be reading 1,745 cycles at the accident site.

The helicopter was not equipped with a VOR or an ADF receiver. A panel mounted Apollo GPS was used for navigation. The helicopter was equipped with dual controls, which were installed at the time of the accident. The helicopter was not equipped with an auto pilot system.

A review of the airframe and engine maintenance records by the NTSB investigator-in-charge (IIC) and an FAA inspector did not reveal evidence of any uncorrected maintenance defects prior to the flight. The owner of the helicopter reported to the IIC that there were no open maintenance discrepancies with the airframe or the engine. Additionally, the FAA inspector found the aircraft to be in compliance with applicable airworthiness directives.

#### METEOROLOGICAL INFORMATION

Visibility in the vicinity of the accident site was reported by several witnesses to be as low as 100 feet and as high as 1/4 mile. The ceiling was reported as indefinite due to the prevailing fog. Residents in the area reported that fog has a tendency to form this time of the year around sunrise, partly due to the proximity of the Colorado River, and all the surrounding lakes. An employee of the oil company that owned the property where the accident occurred, stated that this morning weather phenomena normally lasts less than one hour.

According to the U.S. Naval Observatory, sunrise occurred at 0619 CDT.

#### COMMUNICATIONS

The pilot was not in radio contact with any FAA facility at the time of the accident. No records were found to support that the pilot received an FAA weather briefing prior to the flight. The helicopter was not tracked on ATC radar by Houston Center.

No distress radio calls were reported to have been received from the helicopter pilot prior to the accident.

#### WRECKAGE AND IMPACT INFORMATION

The helicopter impacted in the northeast corner of a large wooded area on slightly rolling terrain, approximately 8 feet from the edge of an open field. The accident site was surrounded by open areas, suitable for an emergency landing in 3 of the 4 quadrants around the accident site. The forested areas consisted of mature cedar, pine, and red oak trees, averaging 15 to 25 feet tall. The clear areas consisted of slightly rolling terrain covered by short grass and small bushes.

The helicopter impacted the trees and terrain on a measured heading of 170 degrees, coming to rest on its side amidst the trunks of five mature trees on a heading of 130 degrees. The GPS coordinates for the point of impact were provided by the pilot of a news media helicopter as: North 30 degrees 01.681 minutes latitude and, West 96 degrees 39.594 minutes longitude.

A tree trunk, approximately 15 inches in diameter, was found severed at a 45 degree angle at a point approximately 5 feet above the ground. Three other smaller trees sustained similar 45 degree cuts to their trunks.

The forward section of the airframe sustained extensive crushing damage. The airframe aft of the forward bulkhead for the baggage compartment was severely damaged, but retained its integrity.

The tailboom was found buckled 90 degrees downward at a point approximately 12 inches aft of the tailboom to fuselage attaching point. The number 2 section of the tail rotor drive shaft

was found separated above the point where the tailboom was separated.

Rub marks indicating the rotating tail rotor drive shaft contacted the tail rotor drive shaft cover were found on the inside portions of the cover at the number 3, 4, and 6 hanger bearings. Continuity was established from the tail rotor blades through the 90 degree gear box and the drive shaft, up to the point of separation. The tail rotor drive shaft discs within the "Thomas couplings," were found spread; however, none were found broken.

The top portion of the vertical fin sustained minor damage, while the lower portion of the vertical fin was found crushed in an upward direction. The imprint of one of the tail rotor blades was found on the side of the crushed lower vertical fin. The right horizontal stabilizer was crushed and the left horizontal stabilizer was undamaged. The left navigation light and the rotating beacon were found undamaged.

Both tail rotor blades sustained light to moderate leading edge damage and were found bent. The blades were attached to the hub, and the hub remained attached to the gear box shaft. The tail rotor pitch change mechanism was still connected and appeared to be undamaged. The tail rotor blades were found in the full right pedal position. The black rubber "bumper" at the tail rotor static stops was found in place and undamaged. Rotational damage was found on the output shaft for the 90 degree gear box at the point where the gear box fairing envelops the shaft. The tail rotor rotated smoothly when turned by hand.

The main rotor hub remained attached to the mast. The mast appeared to be slightly bent. There was no evidence of contact between the mast and the static stops (no evidence of mast bumping). A 4-foot long by 15-inch deep ground scar was found approximately 12 feet forward of the resting place of the main rotor mast. The outer section of that blade was found buried at approximately a 40 degree angle. The blade's tip weight was not found.

No visible damage to the engine case was noted at the accident site. The bipod and tripod engine mounts were found fractured. The engine was still connected to the main transmission, and the main transmission was still connected to the mast. The main transmission remained in place; however, the transmission deck was damaged and distorted. Engine continuity was established to the mast and the tail rotor drive shaft by rotating the N2 turbine wheels by hand through the left exhaust stack. Both exhaust stacks were found bent, but no cracks were found. The inside of both exhaust stacks were found heavily sooted.

The right engine cowling was found open and resting on the right engine exhaust stack. Scorching/burnt paint and soot were found on this section of the right engine cowling that was resting on the engine stack.

The front cross tube was separated from the airframe while the aft cross tube remained attached. Both skids were found in the wreckage. Full length courtesy steps, which were mounted on the cross tubes on both sides of the helicopter, separated during the accident sequence.

Both cyclic levers were found separated from the airframe and were severely mangled. Both collective tubes were found broken at the base fitting. The throttle grip on the copilot's collective lever was found in the full open position.

An inventory of the helicopter revealed that all aircraft components were found within 25 feet of the resting place of the helicopter, with the exception of a 4-foot portion of main rotor blade that was found lodged in pine trees across a 60 foot open area directly in front of the wreckage.

debris path.

#### MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy and toxicology was requested and performed. The autopsy was performed by the Office of the Medical Examiner of Travis County in Austin, Texas, on April 03, 1998. Toxicological findings were negative.

#### SURVIVAL ASPECTS

The pilot was wearing the seat belt and shoulder harness. The pilot's seat belt was found separated at both ends. The metal tabs for the pilot's shoulder harnesses were found bent forward approximately 35 degrees at the point they are inserted into the seat belt buckle.

The helicopter was not equipped with an ELT. The pilot was wearing a headset, without a flight helmet.

The cockpit and cabin area of the helicopter was fully compromised during the accident sequence. The coroner stated that the accident was "not survivable" due to impact force exceeding 50 G's.

#### TEST AND RESEARCH

The helicopter's caution light panel, freewheeling clutch assembly, and two tachometer generators were removed from the wreckage by the IIC for additional examination and testing.

The segmented lights in the caution panel were examined at the Bell Laboratories in Hurst, Texas, on April 7, 1998, under the supervision of the IIC. A microscopic examination of the light bulb filaments for the "engine out" segment light revealed that the filaments for both light bulbs "showed light stretching, which indicated they may have been illuminated at impact." A representative of the aircraft manufacturer stated that under normal operations, the engine out light illuminates when the engine N1 RPM drops below 58 to 62%. The N1 tach generator provides the electrical input to the engine out light.

The housing for the N1 tach generator was fractured due to impact damage. An ohmmeter was used to perform a continuity check of the N1 tach generator. The tach generator (serial number 151012) was found to have an incomplete (open) electrical circuit. The tach generator was manufactured in Canada. According to a representative of Transport Canada, the manufacturer had not been in business for some time, and could not be tracked. No further tests were performed on the damaged tach generator.

The freewheeling clutch assembly and the N2 tach generator were also examined. The outer shaft for the freewheeling assembly was fractured as result of torsional overstress. The N2 tach generator had a complete circuit. See the enclosed reports for details of the examination.

The Allison Model 250-C20B engine, serial number CAE 835023, was examined and disassembled under the supervision of the IIC at Dallas Airmotive on April 21, 1998. According to the engine manufacturer, signatures found during the teardown examination were indicative that the engine was producing power at the time of ground impact. No internal failures of the compressor, accessory gearbox, engine shafting, or turbine were found. All engine bearings were found oiled, and free to rotate. Fuel was found at the fuel nozzle. Aluminum splatter throughout the turbine was indicative of combustion and airflow. See engine manufacturer's report for details of the examination.

## ADDITIONAL DATA

The wreckage was released the owner's representative upon completion of the investigation.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	41, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	05/28/1997
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	187 hours (Total, all aircraft), 187 hours (Total, this make and model), 13 hours (Last 90 days, all aircraft)		

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Bell	<b>Registration:</b>	N7734A
<b>Model/Series:</b>	206B 206B	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	1768
<b>Landing Gear Type:</b>	High Skid	<b>Seats:</b>	5
<b>Date/Type of Last Inspection:</b>	04/11/1997, Annual	<b>Certified Max Gross Wt.:</b>	3200 lbs
<b>Time Since Last Inspection:</b>	140 Hours	<b>Engines:</b>	1 Turbo Shaft
<b>Airframe Total Time:</b>	6577 Hours	<b>Engine Manufacturer:</b>	Allison
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	250C20
<b>Registered Owner:</b>	STEWART ASHMAN	<b>Rated Power:</b>	425 hp
<b>Operator:</b>	STEWART ASHMAN	<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>	AUTOROTATE INC.	<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	0.25 Miles
Lowest Ceiling:	Obscured / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	70°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	16° C / 16° C
Precipitation and Obscuration:			
Departure Point:	AUSTIN, TX (AUS)	Type of Flight Plan Filed:	None
Destination:	HOUSTON, TX (HOU)	Type of Clearance:	None
Departure Time:	0730 CST	Type of Airspace:	Class G

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	HECTOR R CASANOVA	Report Date:	02/16/2001
Additional Participating Persons:	MICHAEL D KNUCKEY; HOUSTON, TX		
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 <a href="mailto:pubinquiry@ntsb.gov">pubinquiry@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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](#).