# Aviation Investigation Final Report

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| **Location:** | Fort Gibson, Oklahoma | **Accident Number:** | FTW03FA028 |
| **Date & Time:** | November 1, 2002, 11:50 Local | **Registration:** | N8885F |
| **Aircraft:** | Hughes 269A | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | | **Injuries:** | 1 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

During cruise flight, the helicopter experienced an in-flight breakup. Witnesses observed what appeared to be tail rotor, and main rotor components separate from the helicopter as it flew overhead. One of the witnesses reported that a portion of the tail rotor separated, and as helicopter pitched to the right, the main rotor separated. Subsequently, the helicopter's main fuselage started to spin and descended vertically toward the ground. Another witness reported that he heard a "pop," and observed the main rotor slowing, wobbling, stop turning, break away from the helicopter, and travel forward of the helicopter. He reported that the helicopter pitched "nose forward and then fell almost vertical." The main rotor assembly was found approximately 450 feet east of the main wreckage site, and the tail rotor components were found with the main wreckage. Metallurgical examination revealed that the left cluster fitting lugs (P/N 269A2234), which attached to the left tail boom strut, failed due to fatigue.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The in-flight separation of the tail boom resulting from the failure of the fuselage to tail boom attachment fitting lugs, due to fatigue.

## Findings

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

Findings
1. (C) FUSELAGE,ATTACHMENT - FAILURE
2. (C) MISC ROTORCRAFT,TAIL BOOM - SEPARATION
3. (C) MISCELLANEOUS,BOLT/NUT/FASTENER/CLAMP/SPRING - FATIGUE
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE - NORMAL

Findings
4. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. TERRAIN CONDITION - GROUND

## Factual Information

HISTORY OF FLIGHT

On November 01, 2002, approximately 1150 central standard time, a Hughes 269A helicopter, N8885F, impacted the terrain following a loss of control during cruise flight near Fort Gibson, Oklahoma. The helicopter was owned and operated by Tundra Resources Corporation of Tulsa, Oklahoma. The private pilot, its sole occupant, received fatal injuries, and the helicopter was destroyed during the impact sequence and post-crash fire. Visual meteorological conditions prevailed for the planned cross-country flight, and a flight plan was not filed. The 14 Code of Federal Regulations Part 91 flight originated from Cookson, Oklahoma, at an unknown time, with a planned destination of Tulsa, Oklahoma.

A witness, who was working outside in his front yard, reported that he observed the helicopter flying overhead in a westerly direction. He stopped working, looked up, and watched the helicopter for about 8 seconds as it passed overhead. Subsequently, he "saw a piece of the tail rotor fly off," and the helicopter "pitched to the right." He added that the "entire main rotor" appeared to "break away," and the "cockpit of the helicopter began spinning very fast and fell to the ground." The witness stated that the entire sequence from "start to finish lasted about five seconds."

Another witness, who was walking along a road, reported that he heard the helicopter approaching from the east. He looked up and observed it pass overhead. He continued to walk down the road, and then heard a "pop," He then "looked back up," and observed the "main rotor slowing rapidly and wobbling". Subsequently, he observed that the main rotor appeared to "stop turning" and "broke away and forward of the windshield." The helicopter the "pitched nose forward, and then fell almost vertical." The witness observed what he described as a "red airfoil" piece of helicopter fall to the ground, approximately 70 yards from where he was standing. He then walked toward the fallen wreckage and located a tail rotor blade, the left tail boom strut, the right tabulator, and the main rotor.

PERSONNEL INFORMATION

The pilot was issued a FAA private pilot certificate on April 10, 2001. At the time of the accident the pilot held a single-engine land rating and a commercial helicopter rating. The pilot was also issued a mechanic certificate on March 22, 2001, with airframe and powerplant ratings. There were no restrictions or limitations listed on the pilot's second-class medical certificate issued on April, 10, 2001. On the application for the medical certificate, the pilot reported having accumulated a total of 1,000 flight hours, of which 50 hours were in the previous six months.

AIRCRAFT INFORMATION

The Hughes model 269A helicopter (S/N 0261) was equipped with a three-bladed main rotor, a two bladed tail rotor and powered by a single Lycoming HO-360-B1B reciprocating engine (S/N L-6272-36) rated at 180 horsepower.

A review of the maintenance records revealed that the helicopter underwent its most recent annual inspection on March 1, 2002, at a total airframe time of 1,456.9 hours and engine time since major overhaul of 627.3 hours. The most recent airframe 100-hour inspection occurred on April 27, 2000, at a total airframe time of 1,426.0 hours and the most recent engine 100-hour inspection occurred on September 19,1996, at a time since major overhaul of 543.0 hours. No evidence of uncorrected maintenance discrepancies was noted in the maintenance records.

The records indicated that the helicopter was placed in long-term storage between 1980 and 1991. The helicopter was removed from storage on October 1, 1991, at a total airframe time of 1,258.8 hours. Amongst many other inspections, the logbook stated that "AD 88-17-04 placard installed." According to the log book AD 76-18-01 (Aft cluster fitting inspection) was first complied with on February 27, 1977. AD 2001-25-52 superseded AD 76-18-01 and was listed as completed on February 28, 2002. No detailed inspection sheets or dye penetrate test details for this inspection were provided.

METEOROLOGICAL INFORMATION

At 1153 the Davis Field automated surface observing system (ASOS) in Muskogee, Oklahoma, located 8 nautical miles north of the accident site, reported the wind from 010 degrees at 7 knots, overcast skies at 6,000 feet AGL, 7 miles visibility, temperature 43 degrees Fahrenheit, dew point 37 degrees Fahrenheit and altimeter 30.50 inches of Mercury.

WRECKAGE IMPACT INFORMATION

The main wreckage site was located using a global positioning satellite (GPS) receiver at 35 degrees, 46.59 minutes north latitude and 095 degrees, 08.19 minutes west longitude. The accident site was approximately 50 feet south of a country road in a wooded area of the Gruber State Game Management Area.

The main wreckage consisted of the cabin area, aircraft framework, engine, skids and the tail boom. The helicopter impacted several trees during its decent and came to rest inverted against a tree. The main rotor assembly was found approximately 450 feet east of the main wreckage site. The left tail boom support strut, horizontal stabilizer and one tail rotor blade were found with the main rotor assembly but had been placed there by one of the witnesses. During questioning the witness reported recovering the strut and stabilizer about 250 feet south of the main wreckage site and the blade about 420 feet south of the site. Several other pieces of the tail rotor assembly were found in the area south of the wreckage during the

onsite examination.

The wreckage was recovered and moved to a hangar for a more detailed examination. The engine had significant impact damage and would not rotate but disassembly revealed sings consistent with power generation. Control continuity could not be established due to the extensive impact damage. Two of the three main rotor blades showed major tip impact signatures and trailing edge buckling indicating lead-lag bending. The third rotor blade showed very little tip impact damage but had a major trailing edge impact about 2 feet inboard of the tip.

Both tail rotor blades and the tail rotor gearbox were fractured in numerous places. The tail boom exhibited several impact marks at the aft end near the location of the tail rotor. The left tail boom support strut was found intact south of the main wreckage with a portion of the left cluster fitting still attached to the strut. The right tail boom support strut was found attached to the fittings and fractured within the main wreckage.

A post impact fire destroyed the helicopter.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Office of the Chief Medical Examiner of Tulsa, Oklahoma on November 2, 2002. According to the report, "The cause of death...[was] multiple blunt trauma sustained during an aircraft accident." Toxicological tests performed by the Federal Aviation Administration's Civil Aero medical Institute (CAMI) were negative for ethanol and drugs. Tests for cyanide and carbon monoxide were not performed.

TEST AND RESEARCH

A portion of the tail boom with the remains of the saddle fitting, a portion of the saddle fitting with an attached portion of the left tail boom strut, the right cluster fitting with attached right tail boom strut, the left cluster fitting and the left tail boom strut were all sent to the NTSB Materials Laboratory for examination. Metallurgical examination revealed that the left cluster fitting lugs (P/N 269A2234), which attaches to the left tail boom strut, failed due to fatigue.

## Pilot Information

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| **Certificate:** | Commercial; Private | **Age:** | 45,Male |
| **Airplane Rating(s):** | Single-engine land | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | Helicopter | **Restraint Used:** | |
| **Instrument Rating(s):** | None | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | Yes |
| **Medical Certification:** | Class 2 Valid Medical--no waivers/lim. | **Last FAA Medical Exam:** | April 16, 2001 |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | April 10, 2001 |
| **Flight Time:** | 1000 hours (Total, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Hughes | **Registration:** | N8885F |
| **Model/Series:** | 269A | **Aircraft Category:** | Helicopter |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 730261 |
| **Landing Gear Type:** | Skid | **Seats:** | 2 |
| **Date/Type of Last Inspection:** | March 1, 2002 Annual | **Certified Max Gross Wt.:** | |
| **Time Since Last Inspection:** | 49 Hrs | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | 1506 Hrs at time of accident | **Engine Manufacturer:** | Lycoming |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | HO-360-B1B |
| **Registered Owner:** | Tundra Resources Corporation | **Rated Power:** | 180 Horsepower |
| **Operator:** | | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | MKO,610 ft msl | **Distance from Accident Site:** | 8 Nautical Miles |
| **Observation Time:** | 11:53 Local | **Direction from Accident Site:** | 360° |
| **Lowest Cloud Condition:** | Clear | **Visibility** | 7 miles |
| **Lowest Ceiling:** | Overcast / 6000 ft AGL | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 7 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 10° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.5 inches Hg | **Temperature/Dew Point:** | 6°C / 3°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | Cookson, OK | **Type of Flight Plan Filed:** | None |
| **Destination:** | (RVS ) | **Type of Clearance:** | Unknown |
| **Departure Time:** | 11:00 Local | **Type of Airspace:** | Class G |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | | **Aircraft Fire:** | On-ground |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 1 Fatal | **Latitude, Longitude:** | 35.77639,-95.13639 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Roach, Joyce |
| **Additional Participating Persons:** | Carl S Keesey; FAA FSDO; Oklahoma City, OK<br>Jack A Mitteer; Boeing (Hughes); Mesa, AZ<br>Steve Gleason; Schweizer Aircraft Corporation; Horseheads, NY<br>Jeffrey R Poschwatta; Lycoming; Williamsport, PA |
| **Original Publish Date:** | June 30, 2004 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | The NTSB traveled to the scene of this accident. |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=55988 |