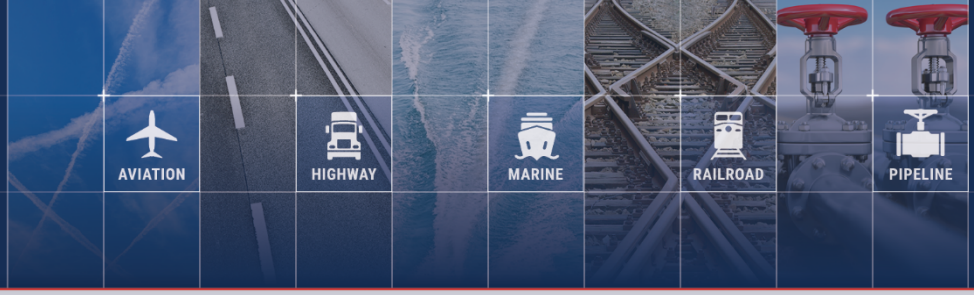

Aviation Investigation Factual Report

Location:	Ardmore, Oklahoma	**Accident Number:**	FTW03FA145
Date & Time:	May 6, 2003, 19:15 Local	**Registration:**	N1774
Aircraft:	Bell Shelby Aero 47G2	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Factual Information

HISTORY OF FLIGHT

On May 6, 2003, at 1915 central daylight time, a Bell Shelby Aero 47G2 helicopter, N1774, was destroyed when it impacted terrain during a forced landing following a loss of throttle control near Ardmore, Oklahoma. The helicopter was registered to Versatile Aviation Inc., and operated by Versatile Helicopter Inc., of Ardmore. The designated pilot examiner (DPE) and the commercial pilot were fatally injured. Visual meteorological conditions prevailed, and a flight plan was not filed for the 14 Code of Federal Regulations Part 91 instructional flight. The instrument rating flight check flight originated from the Ardmore Downtown Executive Airport (1F0), approximately one hour prior to the accident.

According to the air traffic control tower controller at the Ardmore Municipal Airport (ADM), after completing a precision instrument landing approach (ILS), the pilot of the accident helicopter requested a clearance for another ILS approach. Prior to the outer marker, the pilot broke off the ILS approach and proceeded to execute a very high frequency omni range (VOR) approach at 1F0. After completion of the VOR approach, the helicopter over flew the airport and departed the area to the south.

A pilot who recently departed 1F0, reported that he heard a radio call from the pilot of the helicopter that they were having "throttle linkage problems and were trying to make it back to the airport." A few minutes later the witness heard the pilot state "they were in the pattern and for all aircraft to clear the way." No further radio transmission calls were received.

Another witness, who was fishing at the north ramp of Lake Murray, approximately one mile east of the accident site, reported that as the helicopter flew by him in a level attitude, he heard "3 bangs," and then "the engine became silent." The witness stated that the main rotor blades were turning, and the helicopter started descending at a "slight angle." The witness lost site of the helicopter when it descended below a tree line.

A third witness, located approximately one half mile north of the accident site, reported observing the helicopter descending through approximately 200 feet, "really fast nose first." He stated "all he could hear was the [rotor]blades like they were trying to catch air."

PERSONNEL INFORMATION

The pilot being examined held a commercial airplane single-engine land pilot certificate with an instrument rating, and a commercial rotorcraft helicopter certificate. A review of the pilots logbook revealed he had accumulated a total of 2,029.9 hours of flight time, of which 1,210.3 were in helicopters. Further review indicated he had accumulated a total of 18.1 hours in the

accident make/model helicopter. The pilot was issued a second-class medical certificate on April 15, 2003 with no limitations or restrictions. The pilot most recent biannual flight review was conducted on January 8, 2002.

The pilot conducting the examination held an airline transport pilot certificate for airplane-multiengine land and rotorcraft helicopter; a commercial pilot certificate for airplane single-engine land with an instrument rating; flight instructor for airplane single-engine, airplane multiengine, and rotorcraft. The pilot's flight instructor certificate was last renewed on October 28, 2002. The pilot was issued a second-class medical certificate on March 18, 2003 with no limitations and reported on his last medical application that he had accumulated a total of 8,800 hours, with 50 hours within the previous 6 months. The pilot reported on an Airman Certificate and/or Rating Application on November 11, 2001, that he had accumulated 4,800 hours in fixed wing aircraft, 3,000 hours in helicopters, and 2.1 hours in the accident make/model helicopter. Previous experience in the accident type or non-turbine helicopter is unknown. The pilot's logbooks were not located, despite multiple attempts. At the time of the accident, the pilot was currently employed for the United States Department of Homeland Security, National Aviation Center, as a fixed wing standardization pilot.

AIRCRAFT INFORMATION

The three-seat Bell Shelby Aero 47G-2 helicopter was built from spare and/or surplus parts on July 25, 1969 in Shelby, North Carolina, and was powered by a Lycoming V0-435-A1D engine. A review of the aircraft maintenance logs revealed that the helicopter underwent its most recent annual inspection on December 8, 2002 with an approximate airframe total time of 10,000 hours. The most recent inspection of the helicopter was a 100-hour inspection, conducted on n April 23, 2003. The airframe had accumulated a total of 10,206 hours of flight time, and the engine had accumulated a total of 200 hours since major overhaul at the time of this inspection.

METEOROLOGICAL INFORMATION

At 1910, the automated weather observation system at 1F0 reported the wind from 350 degrees at 6 knots, visibility 10 statue miles, sky clear, temperature 31 degrees Celsius, dew point 11 degrees Celsius, and an altimeter setting of 29.71 inches of Mercury.

WRECKAGE AND IMPACT INFORMATION

The helicopter impacted a soft grass field, approximately one half mile from the approach end of runway 35 at 1F0. The wreckage energy path was measured on a magnetic heading of 240 degrees, approximately 288 feet in length. The helicopter came to rest inverted on a magnetic heading of 266 degrees at an elevation of 805 feet, approximately 82 feet from the first ground scar. Examination of the wreckage revealed the tubular structure fuselage remained intact. The bubble canopy was shattered and spread throughout the wreckage debris path. The main cabin area was destroyed. The tailboom was separated from the fuselage, and severed into

four pieces. The furthest piece extended 206 feet beyond the main wreckage. The engine was separated from its respective mounts, but remained attached to the fuselage by various cables and hoses.

The main rotor hub and blade assembly were located adjacent the fuselage. Both main rotor blades were destroyed. Both pitch change tubes were fractured at the clevis. The collective was found wedged in the full down position. The control tube from the collective jackshaft through the cabin wall was fractured at the jackshaft connection. The vertical collective tube behind the wall was fractured. The small link that attaches the collective lever assembly was also fractured at the threads at the bottom of the link. No pre-impact anomalies were observed in the collective control system.

The right seat cyclic was fractured at its base. The fracture progressed toward the right. On the fore and aft cyclic system, the control tubes from each cyclic stick to the cyclic jackshaft were flattened. The left seat left anti-torque pedal was fractured. The quadrant assembly that delivers anti-torque movements via cables to the tail rotor was found fractured throughout the web structure in the center of the quadrant. The centrifugal clutch and freewheeling units were examined with no anomalies noted. Flight control continuity was established throughout the flight control system from fracture to fracture.

Rotational continuity of the engine was established after removing the camshaft gear. Valve continuity was established. The left magneto was destroyed. The right magneto was separated from its mount, and would not spark when rotated by hand. Fuel was observed in the gascolator and the carburetor float bowl. A borescope inspection revealed that all cylinders were free of anomalies.

The engine throttle control cable was removed from the aircraft for further examination at a later date.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the examinee by the Office of the Chief Medical Examiner, of Oklahoma City, Oklahoma. No evidence was found of any preexisting disease that could have contributed to the accident

A toxicology test was performed by the Federal Aviation Administration's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma, for carbon monoxide, cyanide, volatiles, and drugs. The toxicology test was negative for all tests.

An autopsy was performed on the DPE by the Office of the Chief Medical Examiner, of Oklahoma City, Oklahoma. No evidence was found of any preexisting disease that could have contributed to the accident

A toxicology test was performed by the Federal Aviation Administration's Civil Aeromedical

Institute (CAMI) in Oklahoma City, Oklahoma, for carbon monoxide, cyanide, volatiles, and drugs. The toxicology test was negative for all tests.

TESTS AND RESEARCH

On June 20th, 2003, the engine throttle cable and tube were examined under the supervision of the NTSB investigator-in-charge at the engineering laboratories at Bell Helicopter, of Hurst, Texas. The cable was separated from the carburetor attach point rod, and lock plug. The inner strands of the cable were fractured approximately 39.81 inches from the carburetor end of the cable. At the inner strand fracture location, the outer thicker single strand of coiled wire was stretched but not fractured. All of the fractured wires from the inner strands fractured were typical of overload as evidence by cup-cone tensile features. Wear and mechanical damage was noted on the outside of the tube. Impact damage was noted on the tube adjacent to the cable inner strands fracture. Examination of the carburetor end of the cable revealed approximately .25 inches of the center bundle of wires was retracted from the carburetor end of the cable outer strands. The outer single strand of the coiled wire and internal strands were stretched out of their original coiled and meshed condition. Scrapes were found on the outer cable wrap in the direction of the end of the cable from scraping against the lock plug. The cable would go into the lock plug .210 inches. The lock plug nut was tight with the head bottomed out on the sliding end body. No anomalies were noted that would have prevented normal operation prior to the accident.

ADDITIONAL INFORMATION

On May 9, 2003, the wreckage was released to the operator's representative.

Pilot Information

Certificate:	Commercial	**Age:**	28,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	April 15, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 8, 2002
Flight Time:	2029 hours (Total, all aircraft), 18 hours (Total, this make and model), 1 hours (Last 24 hours, all aircraft)		

Check pilot Information

Certificate:	Airline transport; Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane; Instrument helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	March 18, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 28, 2002
Flight Time:	8800 hours (Total, all aircraft), 2 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell Shelby Aero	**Registration:**	N1774
Model/Series:	47G2	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	SA-52
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	April 23, 2003 100 hour	**Certified Max Gross Wt.:**	2450 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	10206 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	V0-435-A1D
Registered Owner:	Versatile Aviation Inc.	**Rated Power:**	240 Horsepower
Operator:	Versatile Helicopters Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	1F0,844 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	19:10 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / 0 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.7 inches Hg	**Temperature/Dew Point:**	31°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ardmore, OK (1F0)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	18:00 UTC	**Type of Airspace:**	Class G

Airport Information

Airport:	ARDMORE DOWNTOWN EXECUTIVE 1F0	**Runway Surface Type:**	
Airport Elevation:	844 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	34.133056,-97.127502

Administrative Information

Investigator In Charge (IIC):	Wigington, Douglas
Additional Participating Persons:	Earnest J Holdsclaw; Oklahoma City, Oklahoma; Oklahoma City, OK
Report Date:	December 31, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=56942