Aviation Investigation Final Report

Location:	Renfrew, Pennsylvania	**Accident Number:**	NYC02LA184
Date & Time:	September 7, 2002, 14:00 Local	**Registration:**	N373TG
Aircraft:	Graham Mini-500	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The amateur built helicopter was reported missing, and then located the following day. No information regarding the en route portion of the flight was available. No witnesses reported seeing the accident, and the pilot was not in radio contact with any air traffic control facilities, or automated flight service stations. The helicopter had a total of 25.6 hours of operation since construction. Examination of the wreckage revealed minor damage to both main rotor blades. Flight control continuity was confirmed from the cockpit to the main rotor and tailrotor. The transmission chip detector had metal fragments on it, the transmission oil contained suspended metal particles, and small pieces of metal were retrieved, with a magnet, from within the transmission. Examination of the engine revealed no preimpact failures or malfunctions.

Probable Cause and Findings

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

Findings

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

Findings
1. (C) ROTOR DRIVE SYSTEM,MAIN GEARBOX/TRANSMISSION - FAILURE

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. TERRAIN CONDITION - GRASS

Factual Information

On September 7, 2002, about 1400 eastern daylight time, a Mini-500 homebuilt helicopter, N373TG, was substantially damaged when it impacted terrain near Renfrew, Pennsylvania. The certificated private pilot was fatally injured. Visual meteorological conditions prevailed for the personal flight that departed the Butler Farm Show Airport (3G9), Butler, Pennsylvania, destined for the Zelienople Municipal Airport (8G7), Zelienople, Pennsylvania. A flight plan was not filed, and the flight was conducted under 14 CFR Part 91.

The helicopter was reported missing on September 7, 2002, and was located on September 8, 2002. No information regarding the en route portion of the flight was available. No witnesses reported seeing the accident, and the pilot was not in radio contact with any air traffic control facilities, or automated flight service stations. The accident time was approximated by using the time of departure, the distance from the departure airport to the accident site, and the amount of fuel estimated to be at the accident site.

The pilot held a private pilot certificate with an airplane single engine land rating, and a helicopter rating. On his last Federal Aviation Administration (FAA) third-class medical certificate, which was dated June 7, 2001, he reported a total flight experience of 520 hours. The pilot's logbook was not located at the accident site and follow on attempts to find it were unsuccessful.

According to an FAA inspector, the helicopter had a total of 25.6 hours of operation since construction. Examination of the wreckage revealed minor damage to both main rotor blades. The No. 1 tailrotor blade was bent and broken mid span, and opposite the direction of rotation. The No. 2 tailrotor blade displayed minor impact damage. Flight control continuity was confirmed from the cockpit to the main rotor and tailrotor. The transmission chip detector was removed, and metal fragments were observed. The transmission oil contained suspended metal particles, and small pieces of metal were retrieved, with a magnet, from within the transmission. Examination of the engine revealed no preimpact failures or malfunctions. The only entry in the maintenance records was date April 4, 1998, and was for certification.

An autopsy was performed on the pilot at the Butler Memorial Hospital, Butler, Pennsylvania, on September 8, 2002. The FAA Toxicology and Accident Research Laboratory in Oklahoma City, Oklahoma, performed a toxicological test on the pilot on October 15, 2002.

A weather observation was taken about 10 minutes before the accident at the Beaver County Airport (BVI), Beaver Falls, Pennsylvania, which was located approximately 21 miles to the west of the accident site. According to the observation, the wind was 360 degrees at 8 knots, visibility was 10 miles, ceiling was 4,000 feet broken, temperature was 73 degrees Fahrenheit, dew point was 50 degrees Fahrenheit, and the altimeter setting was 30.23 inches of mercury.

According to FAA Advisory Circular AC 20-27D, Certification and Operation of Amateur-Built Aircraft, "the amateur-built program was designed to permit person(s) to build an aircraft solely for educational or recreational purposes. The FAA has always permitted amateur builders freedom to select their own designs. The FAA does not formally approve these designs since it is not practicable to develop design standards for the multitude of unique design configurations generated by kit manufacturers and amateur builders." It also stated, "Since 1983, FAA inspections of amateur-built aircraft have been limited to ensuring the use of acceptable workmanship methods, techniques, practices, and issuing operating limitations necessary to protect persons and property not involved in this activity."

Pilot Information

Certificate:	Private	**Age:**	51,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 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 1, 2001
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	520 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Graham	**Registration:**	N373TG
Model/Series:	Mini-500	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	373
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	840 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	25.6 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	Not installed	**Engine Model/Series:**	582
Registered Owner:	Thomas Graham	**Rated Power:**	67 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BVI,1253 ft msl	**Distance from Accident Site:**	21 Nautical Miles
Observation Time:	13:50 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 4000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.22 inches Hg	**Temperature/Dew Point:**	23°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Butler, PA (3GN)	**Type of Flight Plan Filed:**	None
Destination:	Zelienople, PA (8G7)	**Type of Clearance:**	None
Departure Time:	13:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.806388,-79.964447

Administrative Information

Investigator In Charge (IIC):	Muzio, David
Additional Participating Persons:	Henry Vejlstrup; FAA\FSDO; Allegheny, PA
Original Publish Date:	July 23, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=55645