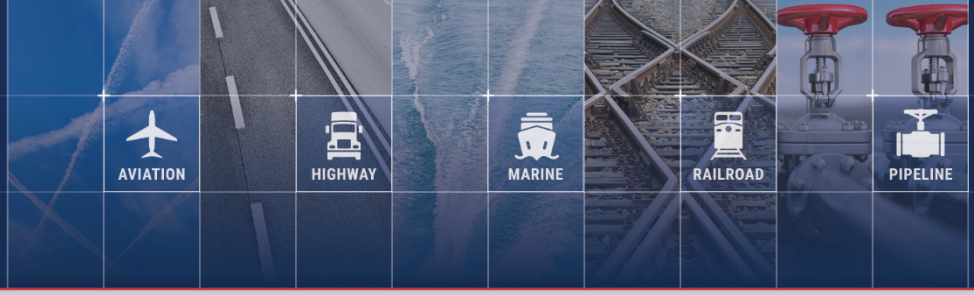

Aviation Investigation Final Report

Location:	Titusville, Florida	**Accident Number:**	ERA13LA180
Date & Time:	March 19, 2013, 18:30 Local	**Registration:**	N2099S
Aircraft:	Schweizer 269C	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

Shortly after takeoff, the student pilot notified an air traffic controller that the helicopter was vibrating and requested to return to the airport. The flight instructor reported that, about 1/2-mile east of the airport, he and the pilot heard a loud "bang." In response, the student pilot lowered the collective and then the flight instructor took over the controls and entered an autorotation. The helicopter touched down hard on a road, which resulted in substantial damage to the tailboom and diagonal strut. Postaccident examinations revealed that the engine crankcase was breached and that the No. 2 cylinder rod had failed. Further examinations of the engine revealed evidence that the center main bearing had spun in the bore and moved laterally. This movement covered the oil feed hole that supplied oil to the No. 2 connection rod and led to its failure due to oil starvation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An engine failure due to the separation of the engine crankcase, which resulted from the lateral movement of the center main bearing and the subsequent blocking of the oil feed hole that supplied oil to the No. 2 connecting rod, which then led to its failure due to oil starvation.

Findings

Aircraft	(general) - Failure

Factual Information

History of Flight

Initial climb	Powerplant sys/comp malf/fail (Defining event)
Autorotation	Off-field or emergency landing

On March 19, 2013, about 1830 eastern daylight time, a Schweizer 269C-1 helicopter, N2099S, operated by Bristow Academy, was substantially damaged when it impacted terrain during a forced landing following a loss of engine power near Titusville, Florida. The flight instructor and private pilot were not injured. The flight departed from Space Coast Regional Airport (TIX), Titusville, Florida, about 1828. Visual meteorological conditions prevailed, and no flight plan was filed. The instructional flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

The private pilot was receiving instruction towards an instrument rating, and the purpose of the flight was for the pilot to complete a "stage check" under the supervision of the flight instructor. Shortly after the helicopter departed runway 09, the pilot notified air traffic control that he was experiencing a strong vibration and requested to return to the airport. About 1/2-mile east of the airport, the flight instructor reported hearing a loud "bang" and "could see smoke". The student pilot lowered the collective and then the flight instructor took the controls and entered an autorotation. The helicopter touched down hard on a road, which resulted in substantial damage to the tailboom and diagonal strut.

According to Federal Aviation Administration (FAA) records, the pilot held a flight instructor certificate, with ratings for rotorcraft-helicopter and instrument helicopter. The pilot's most recent FAA second-class medical certificate was issued on May 4, 2012. At the time of the accident, the pilot reported a total of 626 total hours of flight experience, of which 365 hours were in the same make and model as the accident airplane.

The single-engine, single-rotor helicopter, was powered by a Lycoming HIO-360-G1A, 180-horsepower engine. Review of the helicopter's maintenance records revealed that its most recent 100 hour inspection was completed on March 13, 2013. At the time of inspection, the helicopter had accumulated 3,284 total hours in service. The engine had accumulated approximately 35 hours since the last inspection and 1,099 hours of operation since overhaul.

Postaccident examination of the engine by FAA inspectors revealed about a 3-inch diameter breach of the engine case and a number two cylinder rod failure. Examination of the number two connecting rod assembly revealed that one of the number two connecting rod bolts displayed signatures consistent with fatigue failure. The engine was sent to a certified engine overhaul facility to be disassembled and examined. The overhaul facility examination revealed that the upper portion of the crankcase was damaged by the separated number two connecting rod. The main bearing journals were intact and the center main bearing journal was fretted from the crankcase movement. The main bearing bore showed signs of bearing movement, and scoring was observed in the bore along with bearing tang damage. The number two connecting rod journal was heavily damaged, the center main journal had some minor scoring, and all the other journals showed no signs of scoring or lack of lubrication. The number two

connecting rod was severely damaged and was broken into three pieces: the upper portion of the connecting rod was intact; the journal end was bent outward on one side; and the cap was broken into two pieces. The remains of the connecting rod bearing were found throughout the engine. The connecting rod bolt on the non-numbered side of the rod was broken in half, with the bolt still in the cap, and the other half was in the sump with the rod nut on the bolt. The bolt on the numbered side was intact and the rod nut was located in the oil sump.

The 1830 recorded weather observation at TIX, included wind from 070 degrees at 6 knots, 7 miles visibility, scattered clouds at 5,000 feet, temperature 24 degrees C, dew point 17 degrees C, and a barometric altimeter setting of 29.93 inches of mercury.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	26
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	May 4, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 6, 2012
Flight Time:	626 hours (Total, all aircraft), 365 hours (Total, this make and model), 550 hours (Pilot In Command, all aircraft), 107 hours (Last 90 days, all aircraft), 41 hours (Last 30 days, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	25
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	September 28, 2012
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	June 6, 2012
Flight Time:	163 hours (Total, all aircraft), 163 hours (Total, this make and model), 115 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Schweizer	**Registration:**	N2099S
Model/Series:	269C 1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0345
Landing Gear Type:	Unknown	**Seats:**	2
Date/Type of Last Inspection:	March 13, 2013 100 hour	**Certified Max Gross Wt.:**	1750 lbs
Time Since Last Inspection:	35 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3284 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	HIO-360-G1A
Registered Owner:	BRISTOW ACADEMY INC	**Rated Power:**	180 Horsepower
Operator:	BRISTOW ACADEMY INC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TIX,34 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	18:30 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Scattered / 5000 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	24°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Titusville, FL (TIX)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Titusville, FL (TIX)	**Type of Clearance:**	VFR
Departure Time:	18:28 Local	**Type of Airspace:**	

Airport Information

Airport:	Space Coast Regional Arpt TIX	**Runway Surface Type:**	
Airport Elevation:	34 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	28.506111,-80.783889(est)

Administrative Information

Investigator In Charge (IIC):	Neylon, John
Additional Participating Persons:	James A Stenhouse; FAA Orlando FSDO; Orlando, FL
Original Publish Date:	January 30, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=86487