Aviation Investigation Final Report

Location:	LYNCHBURGH, Virginia	**Accident Number:**	NYC98LA074
Date & Time:	March 5, 1998, 16:00 Local	**Registration:**	N1559X
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after takeoff, the pilot heard a loud bang, felt a thump, and saw the engine cowling deflect upward. He reduced engine power, and turned towards the departure airport. After a second loud bang, followed by severe vibration the pilot shut down the engine, and performed a forced landing to a field. Examination of the wreckage revealed two holes in the top of the engine crank case which were over 8 inches in diameter. One of the engine's number six cylinder connecting rod bolts showed signs of a catastrophic failure, the other number six connecting rod bolt was intact and did not contain a nut. Examination of the number six connecting rod, and connecting rod bolts revealed severe mechanical impact damage to the threads of the intact bolt. The broken bolt had three different fracture features. One was consistent with failure in shear, a second was consistent with a tensile overstress separation, and the majority of the third had a rubbed appearance. The connecting rod bolts and nuts had been replaced 375 hours before the accident flight. The last annual inspection of the airplane was performed about 16 months prior to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Failure of the number six connecting rod bolt due to improper maintenance.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) ENGINE ASSEMBLY,CONNECTING ROD BOLT - FAILURE,TOTAL
2. (C) MAINTENANCE - IMPROPER - OTHER MAINTENANCE PERSONNEL
3. MAINTENANCE,ANNUAL INSPECTION - NOT PERFORMED - OWNER/BUILDER

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

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

Findings
4. TERRAIN CONDITION - GROUND

Factual Information

On March 5, 1998, about 1600 eastern standard time, a Beech A36, N1559X, was substantially damaged during a forced landing after takeoff from the Lynchburg Regional/Preston Glenn Field Airport (LYH), Lynchburg, Virginia. The certificated airline transport pilot and two passengers were not injured. Visual meteorological conditions prevailed, and no flight plan had been filed for the flight destined for Winston Salem, North Carolina. The personal flight was conducted under 14 CFR Part 91.

In a telephone interview, the pilot said the airplane was climbing through 2,500 feet, when he heard a loud bang, felt a "thump", and saw the engine cowling deflect upward. He reduced engine power and initiated a turn back toward LYH. The pilot determined the airplane would not reach the airport at his current rate of decent and he applied some power. He then heard a second loud bang, followed by severe vibration. He feathered the propeller, shut down the engine and performed a forced landing to a field, about 1 mile from LYH.

Examination of the wreckage performed by a Federal Aviation Administration Inspector revealed two holes in the top of the engine crank case which were over 8 inches in diameter. Three of the six connecting rods separated from the crankshaft throws. Two connecting rod throws exhibited signs of lack of lubrication and high temperature. The number six cylinder connecting rod throw was clean, polished, and exhibited signs of adequate oil. One of the number six cylinder connecting rod bolts showed signs of a catastrophic failure. The other number six connecting rod bolt was intact and did not contain a nut. The number six cylinder connecting rod, number six cylinder connecting rod cap with bolts, and material found in the crank case bay of cylinders three and four, were sent to the NTSB Materials Laboratory for examination.

The NTSB Materials Laboratory Factual Report stated:

"...One of the bolts from the # 6 connecting rod cap was fractured. The head of this bolt was trapped in the cap when received. The other bolt was intact but was also trapped within the cap. This intact bolt showed severe mechanical impact damage (mushroom deformation) to the threads. The connecting rod cap had multiple impact damage areas and deformation in the vicinity of the intact bolt...The material found in the crank case bay of cylinder #3 and # 4 showed signs of exposure to heat....All crack surfaces on these parts were damaged either by exposure to heat or by rubbing...."

Scanning electron microscope (SEM) examination of the broken bolt revealed three different fracture features. One feature was consistent with a failure in shear, one feature was consistent with a tensile overstress separation, and the majority of the other feature had a rubbed appearance.

A review of the airplane's engine log book revealed that on March 10, 1998, about 375 hours prior to the accident, work was performed on the engine which included the replacement of the connecting rod bolts, and nuts. The last annual inspection of the airplane was performed on November 12, 1996, at 263.1 total engine hours.

At the time of the accident, the airplane's engine had accumulated a total of 465 hours.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor; Private	**Age:**	51,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	March 18, 1997
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	3500 hours (Total, all aircraft), 500 hours (Total, this make and model), 3300 hours (Pilot In Command, all aircraft), 45 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N1559X
Model/Series:	A36 A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E2476
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	November 12, 1996 Annual	**Certified Max Gross Wt.:**	3650 lbs
Time Since Last Inspection:	202 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	325 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550B
Registered Owner:	E B K CORPORATION	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LYH ,938 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	15:54 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 15 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	11°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(LYH)	**Type of Flight Plan Filed:**	IFR
Destination:	WINSTON SALEM , NC (INT)	**Type of Clearance:**	None
Departure Time:	16:00 Local	**Type of Airspace:**	Class D

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	Soft
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	37.399219,-79.190223(est)

Administrative Information

Investigator In Charge (IIC):	Schiada, Luke
Additional Participating Persons:	JOHN WAGER; RICHMOND , VA GEORGE HOLLINGSWORTH; RESTON , VA
Original Publish Date:	June 21, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=39539