Aviation Investigation Final Report

Location:	Burns Flat, Oklahoma	**Accident Number:**	CEN20LA292
Date & Time:	July 18, 2020, 22:45 Local	**Registration:**	N3412C
Aircraft:	Beech A23-24	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and his 3 passengers were on a personal night flight when the airplane had a gradual loss of engine power. The pilot was unable to restore engine power and a forced landing was completed to a grass field. The airplane's main landing gear collapsed when the pilot intentionally swerved the airplane to avoid a tree after landing, which resulted in substantial damage to the horizontal stabilizer and both wings.

A postaccident examination revealed that the throttle control rod-end was not connected to the fuel servo throttle linkage. Additionally, the required retaining bolt, washer, and self-locking nut were not located during the investigation. The airplane had accumulated 8.72 flight hours since the last annual inspection, during which the fuel servo had been removed from the engine and overhauled. It is likely that the mechanic who reinstalled the fuel servo did not adequately torque the self-locking nut that secured the retaining bolt, which allowed the self-locking nut to back-off the retaining bolt. The airplane had a partial loss of engine power when the throttle control rod-end disconnected from the unsecured retaining bolt. The pilot did not have the ability to control engine power after the throttle control rod-end disconnected from the fuel servo throttle linkage.

Probable Cause and Findings

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

The mechanic's improper maintenance when he reinstalled the fuel servo during the last annual inspection, which resulted in a loss of engine power during cruise flight when the throttle control rod-end disconnected from the fuel servo throttle linkage.

Findings

Aircraft	Power lever - Inoperative
Aircraft	Power lever - Incorrect service/maintenance
Aircraft	Fasteners - Incorrect service/maintenance
Personnel issues	Installation - Maintenance personnel

Factual Information

History of Flight

Prior to flight	Aircraft inspection event
Enroute-cruise	Loss of engine power (partial) (Defining event)
Landing	Off-field or emergency landing

On July 18, 2020, about 2245 central daylight time, a Beech A23-24 airplane, N3412V, was substantially damaged when it was involved in an accident near Burns Flat, Oklahoma. The pilot and his 3 passengers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that while established in cruise flight the airplane had a gradual loss of engine power. He was unable to restore engine power by switching fuel tanks, turning on the fuel boost pump, and advancing the throttle, mixture, and propeller controls full forward. The pilot made a forced landing in a grass field. After touchdown the airplane traversed over 3 large terraces, and the main landing gear collapsed when the pilot tried to swerve the airplane to avoid a tree. The horizontal stabilizer and both wings were substantially damaged during the forced landing.

The airplane was examined at the accident site by a Federal Aviation Administration airworthiness inspector. Both wing fuel tanks contained about 25 gallons of 100 low-lead aviation fuel. The throttle control was very loose when moved by hand in the cockpit. A visual examination revealed that the throttle control rod-end was not connected to the fuel servo throttle linkage. (Figure 1) The required retaining bolt, washer, and self-locking nut were not located during the investigation.


Figure 1. Throttle control rod-end found disconnected from the fuel servo throttle linkage.

The airplane had accumulated 8.72 flight hours since the last annual inspection that was completed on October 22, 2019. The inspection authorized (IA) mechanic who had completed the annual inspection stated that the fuel servo had been removed from the engine and overhauled in conjunction with the annual inspection. The IA mechanic stated that he personally reinstalled the overhauled fuel servo on the engine, while another individual moved the throttle and mixture controls in the cockpit. The IA mechanic stated that it is his standard practice to connect both the throttle and mixture controls to the fuel servo at the same time. The IA mechanic stated that he likely reused the bolt and washer to connect the throttle control rod-end to the fuel servo throttle linkage, and that it is also possible that he reused the self-locking nut. However, he would not have reused the self-locking nut if it had fully engaged the bolt threads by hand. The IA mechanic stated that he used two wrenches to secure the self-locking nut and that he did not use a torque wrench. A review of the Beech A23-24 Maintenance Manual revealed no specific assembly instructions on how to physically connect the throttle control rod-end to the fuel servo throttle linkage. The Beech A23-24 Illustrated Parts Catalog specified that the throttle control rod-end be attached to the fuel servo throttle linkage with a 169-910021 bolt, AN960-10 washer, and MS20365-1032 self-locking nut.

Pilot Information

Certificate:	Private	**Age:**	27,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	October 9, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 3, 2020
Flight Time:	309.6 hours (Total, all aircraft), 8.4 hours (Total, this make and model), 267.6 hours (Pilot In Command, all aircraft), 8.4 hours (Last 90 days, all aircraft), 8.4 hours (Last 30 days, all aircraft), 1.5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3412C
Model/Series:	A23-24	**Aircraft Category:**	Airplane
Year of Manufacture:	1969	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	MA-357
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 22, 2019 Annual	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:	8.72 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1717.76 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, not activated	**Engine Model/Series:**	IO-360-A1B
Registered Owner:	On file	**Rated Power:**	200 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	CSM,1922 ft msl	**Distance from Accident Site:**	2.5 Nautical Miles
Observation Time:	22:53 Local	**Direction from Accident Site:**	350°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	17 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	28°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elk City, OK (ELK)	**Type of Flight Plan Filed:**	None
Destination:	Elk City, OK (ELK)	**Type of Clearance:**	None
Departure Time:	21:00 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	35.381668,-99.20111

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	James L Wirt; Federal Aviation Administration, Oklahoma City; Oklahoma City, OK
Original Publish Date:	March 18, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=101629