Aviation Investigation Final Report

Location:	Lampasas, Texas	**Accident Number:**	CEN22LA106
Date & Time:	January 23, 2022, 17:28 Local	**Registration:**	N5300
Aircraft:	DEHAVILLAND TIGER MOTH DH 82A	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane's engine lost partial power and the pilot was unable to maintain altitude. He executed a forced landing to a terraced farm field. During the landing, the airplane struck one of the terraced areas and nosed over. The airplane sustained substantial damage to the rudder, engine mounts, and lower right wing. Postaccident examination of the engine revealed that the ball end of the No. 2 cylinder exhaust valve rocker was not seated in the pushrod. Additionally, the head of one of the bolts securing the rocker arm bracket had fractured and the bolt head was found in the rocker cover.

Based on the available evidence it is likely that the fractured bolt head allowed enough movement of the No. 2 cylinder rocker arm bracket for the pushrod to become separated from the ball end of the rocker arm. This prevented the exhaust valve for the No.2 cylinder from opening and thereby reducing the power output of the engine.

Probable Cause and Findings

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

The failure of a bolt in the engine valve system which resulted in malfunction of the engine exhaust valve system and a partial loss of engine power. The rough terrain encountered during the forced landing contributed to the outcome.

Findings

Aircraft	Recip eng cyl section - Failure
Aircraft	Recip eng cyl section - Malfunction
Environmental issues	(general) - Effect on operation

Factual Information

History of Flight

Maneuvering	Loss of engine power (partial) (Defining event)

On January 23, 2022, about 1728 central standard time, a de Havilland Tiger Moth DH-82A, N5300, was substantially damaged when it was involved in an accident near Lampasas, Texas. The pilot and passenger received minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that about 20 minutes into the pleasure flight the engine began to run rough, and he immediately turned the airplane back toward the departure airport, checked that the fuel was on, mixture was rich, and the throttle was open. The engine continued to lose power and he decided to divert to a different private airport. The engine was producing partial power but not enough to maintain altitude.

As the airplane approached the private airport, the pilot perceived that the airplane was too high, and he turned the airplane. During the turn he realized that he had misjudged the height and decided that completing the turn was not a good idea, leveled the wings, and committed to going straight ahead. The area where the airplane landed was terraced and as it touched down the airplane hit one of the terraced areas, skipped, nosed over, and came to rest inverted. The airplane sustained substantial damage to the rudder, engine mounts, and lower right wing.

After the accident, the pilot, who is also a mechanic, performed an examination of the airplane and engine. The engine was able to rotate, and compression was confirmed on all cylinders. While examining the valve system for the No. 2 cylinder he found that the ball end of the exhaust valve rocker arm was not seated in the end of the pushrod. He also found that one of the bolts securing the rocker arm assembly had the bolt head separated from its shank. The missing bolt head was in the rocker cover.

Pilot Information

Certificate:	Commercial	**Age:**	55,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 10, 2021
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	4850 hours (Total, all aircraft), 2 hours (Total, this make and model), 3830 hours (Pilot In Command, all aircraft), 22 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	DEHAVILLAND	**Registration:**	N5300
Model/Series:	TIGER MOTH DH 82A	**Aircraft Category:**	Airplane
Year of Manufacture:	1940	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	T-5703
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	September 16, 2021 Annual	**Certified Max Gross Wt.:**	1825 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	De Havilland
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	Gipsy Major 1C
Registered Owner:	On file	**Rated Power:**	140 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLZZ,1214 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	17:35 Local	**Direction from Accident Site:**	44°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 4400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	13°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lampasas, TX (LZZ)	**Type of Flight Plan Filed:**	None
Destination:	Lampasas, TX (LZZ)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	31.072856,-98.233153

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Jason Dunn; FAA - SAT FSDO; San Antonio, TX
Original Publish Date:	June 14, 2023
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=104548