Aviation Investigation Final Report

Location:	Morgan, Texas	**Accident Number:**	CEN22LA227
Date & Time:	May 29, 2022, 15:27 Local	**Registration:**	N2148J
Aircraft:	Piper PA-28RT-201T	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

While in cruise flight, the pilot observed the manifold pressure drop, followed by a loud rattling engine noise with strong vibrations. The pilot shut down the engine and diverted toward a nearby airport. The pilot reported that he thought the airplane was too high on the downwind leg; however, after he turned the airplane onto the final leg, he realized that the headwind would prevent him from making it to the runway. The pilot performed a forced landing into rough terrain short of the runway, which resulted in substantial damage to the right wing.

Postaccident examination of the No. 3 cylinder revealed the cylinder barrel was fractured between the cooling fins and the threaded section used for mounting the cylinder head. A metallurgical examination revealed a fatigue crack that originated at a corrosion pit on the outer diameter surface of the cylinder barrel.

The inboard-facing side of the first cylinder cooling fin was tinted black for a 180° arc, with the center of the arc in line with the fatigue crack. Manufacturer guidance includes inspection of cylinder fins for any signs of oil or soot leakage that might indicate a cylinder or head-to-barrel junction structural integrity breach. The engine was operated about 30 hours since the last annual inspection.

Probable Cause and Findings

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

A partial loss of engine power due to a corrosion-related fatigue crack of the No. 3 cylinder barrel.

Findings

Aircraft	Recip eng cyl section - Fatigue/wear/corrosion
Aircraft	Recip engine power section - Inadequate inspection
Aircraft	(general) - Failure
Personnel issues	Aircraft control - Pilot
Environmental issues	Rough terrain - Contributed to outcome

Factual Information

History of Flight

Enroute	Powerplant sys/comp malf/fail (Defining event)

On May 29, 2022, about 1527 mountain daylight time, a Piper PA-28RT-201T, N2148J, was substantially damaged when it was involved in an accident near Morgan, Texas. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that, while in cruise flight at 9,500 ft mean sea level (msl), he observed the throttle lever creep back and a drop in manifold pressure. The pilot descended to about 5,500 ft msl and then observed a loud rattling engine noise with strong vibrations.

The pilot shut down the engine, located a nearby airport, and executed a forced landing to runway 17 at W4 Ranch Airport, Morgan, Texas. The pilot reported that he thought the airplane was too high on the downwind leg; however, after turning onto the final leg, he realized that the headwind was going to prevent him from making it to the runway. During landing, the airplane touched down short of the runway in an area of rough terrain, which resulted in substantial damage to the right wing.

Examination of the No. 3 cylinder at the National Transportation Safety Board Materials Laboratory revealed the cylinder barrel had fractured in the smooth-walled region located between the cooling fins and the threaded section used for mounting the cylinder head. The fracture surface was examined with the aid of a stereomicroscope. Features were consistent with a fatigue crack that originated along the outer diameter surface of the barrel at a corrosion pit. The fracture surface near the pit exhibited radial lines and flat feathery features that were consistent with crack initiation and progression due to cyclic fatigue.

The inboard-facing side of the first cylinder cooling fin and adjoining material was tinted black for about a 180° arc. The fatigue crack was in line with the center of the black tinted arc.

The Continental Engine Standard Maintenance Practice Manual, Section 6-4.11.1, includes the following information for a cylinder visual inspection:

> *Inspect the external surfaces of the cylinder head including the fins, intake and exhaust ports, top and bottom spark plug bosses and fuel nozzle bosses for cracks, exhaust flange leakage or any signs of oil, fuel, or soot leakage indicating cylinder or the head-to-barrel junction structural integrity breach.*

A review of maintenance records revealed the compression checks of the No. 3 cylinder were lower than the other cylinders during the last 3 annual inspections. The engine was operated about 30 hours since the last annual inspection which was performed on July 19, 2021. The mechanic did not respond to requests for an interview regarding the recent maintenance of the engine.

Pilot Information

Certificate:	Private	**Age:**	58
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	July 21, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 8, 2022
Flight Time:	331 hours (Total, all aircraft), 252 hours (Total, this make and model), 15 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N2148J
Model/Series:	PA-28RT-201T	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28R-7931012
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 19, 2021 Annual	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	30 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3804 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	TSIO 360FB
Registered Owner:	On file	**Rated Power:**	200
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:	KINJ,685 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	15:35 Local	**Direction from Accident Site:**	76°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots / 24 knots	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.67 inches Hg	**Temperature/Dew Point:**	34°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pampa, TX (PPA)	**Type of Flight Plan Filed:**	None
Destination:	Houston, TX (AXH)	**Type of Clearance:**	VFR flight following
Departure Time:	13:15 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	W4 Ranch Airport 84TE	**Runway Surface Type:**	Asphalt
Airport Elevation:	833 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	17	**IFR Approach:**	None
Runway Length/Width:	4500 ft / 50 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	31.99,-97.55(est)

Administrative Information

Investigator In Charge (IIC):	Folkerts, Michael
Additional Participating Persons:	Matthew Spawn; FAA, Flight Standards District Office; Irving, TX
Original Publish Date:	January 30, 2024
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=105189