

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA22FA076

ACCIDENT INVESTIGATION EXAMINATION REPORT

MARCH 20, 2022

TABLE OF CONTENTS

A. ACCIDENT	3
B. ACCIDENT INVESTIGATION EXAMINATION REPORT	3
C. SUMMARY	3
D. DETAILS OF THE EXAMINATION.....	4
1.0 ACCIDENT SITE	4
2.0 AIRFRAME EXAMINATION.....	4
2.1 Empennage	5
2.2 Wings.....	5
2.3 Landing Gear.....	5
2.4 Cockpit.....	5
2.5 Survivability.....	5
2.6 Fuel/Fuel System.....	5
2.7 Other Systems	5
3.0 ENGINE EXAMINATION	6
4.0 PROPELLER EXAMINATION	8
5.0 PILOT INFORMATION	9
6.0 AIRCRAFT INFORMATION	9
7.0 METEOROLOGICAL INFORMATION	10

A. ACCIDENT

Location: Grove City, Pennsylvania
Date: November 24, 2021
Time: 1746 EST
2244 UTC
Airplane: 1985 Cessna T210R; N6209U

B. ACCIDENT INVESTIGATION EXAMINATION REPORT

IIC Aaron McCarter
NTSB IIC
Eastern Region

Party Coordinator Henry J. Soderlund
Textron
Wichita, Kansas

C. SUMMARY

On November 24, 2021, at 1746 eastern standard time, a Cessna T210R, N6209U, was destroyed when it was involved in an accident near Grove City, Pennsylvania. The private pilot and a pilot-rated passenger were fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

About 2 hours into the flight, the pilot, who was also the owner of the airplane, diverted to the Clarion County Airport (AXQ), Clarion, Pennsylvania for a reported oil pressure issue.

The airplane was covered in oil and the pilot reported that he had left the dip stick unsecured. Pilot and pilot rated passenger who was also a mechanic cleaned off the airplane and added 6 additional quarts of oil before resuming their flight. The pilot declared an emergency about 15 minutes after takeoff and reported a loss of engine power before colliding with trees and terrain. Witnesses heard the airplane during engine start and taxi and stated the engine was “cracking and popping.”

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane impacted trees and steep terrain at an elevation of about 1,200 ft, about 1.5 miles from the approach end of runway 28 at 29D. (Figure 1&2) The initial tree impact was about 200 ft and on a heading of about 230° to the main wreckage which came to rest on a 35° incline against several trees, about 40 feet up from level terrain that bordered a stream. The post-impact fire consumed most of the fuselage. Oil was observed on the belly of the aircraft and the bottom of the left horizontal stabilizer.



Figure 1 Main wreckage smoldering in foreground and empennage up hill about 30 ft away.



Figure 2 Wide view of wreckage on hill.

2.0 Airframe Examination

The instrument panel and all associated instrumentation, gauges and electronic devices were destroyed by fire. The flight control cables exhibited breaks consistent with overload. The aileron control cables were traced to the cockpit through breaks in the cables that were consistent with overload however flight control cable continuity could not be fully confirmed due to wreckage disposition and terrain conditions.

2.1 Empennage

The empennage separated during impact; the vertical and horizontal stabilizers, and their respective rudder and elevators, remained attached to their respective attachment points. The empennage was discovered about 30 ft up the side of the hill from the main wreckage. There was leading edge to aft oil residue on the underside of the stabilizer and elevator consistent with an air slipstream pattern.

2.2 Wings

Several portions of the left wing were fragmented and crushed and were discovered located along the wreckage path and near the main wreckage. The left wing tip was found approximately 180' before the main wreckage. The right wing was damaged by impact forces and post impact fire.

2.3 Landing Gear

The landing gear was in the retracted position (all three) The landing gear handle was destroyed by impact forces and post impact fire.

2.4 Cockpit

Compass, airspeed, altitude, attitude, altimeter, alt/setting, turn coordinator, heading indicator and vertical speed indicator were all destroyed by fire. All engine instrumentation: fuel, oil pressure, oil temp, EGT, RPM, MP were all destroyed by impact forces and post impact fire.

2.5 Survivability

One latched seat belt was found in the wreckage. The pilot rated passenger/mechanic was ejected from the wreckage. The pilot was discovered in the left pilot seat which rested up against a mature tree. Both seats were significantly compromised. All of the seat belts and shoulder harnesses were destroyed by fire.

2.6 Fuel/Fuel System

The fuel system was destroyed by post impact fire. The fuel system components: fuel selector handle, valve and boost pump were destroyed by impact forces and post impact fire.

2.7 Other Systems

Left and Right Magnetos and all associated leads and terminals were significantly damaged by impact and post impact fire. The internal components of the magnetos were damaged. No spark could be generated.

3.0 Engine Examination

The engine partially separated from the main wreckage but remained attached to the engine mounts and firewall. No engine compression or valve train continuity could be attained on site.

The engine showed evidence of significant heat exposure but was relatively intact from impact damage. All 6 cylinder valves, rocker arms and springs remained intact.

A borescope was conducted on the engine cylinders. The No. 1 cylinder was not examined, The No. 2 showed deposits on the piston. The No. 3 revealed an intact connecting rod. The No. 4 revealed that the connecting rod had separated at the crankshaft; the piston end was intact. The No. 5 the piston was fractured into multiple small pieces; the piston pin was still in the connecting rod. The No. 6 showed a clean piston with metal debris located on the air intake side of the valve.

The turbocharger was examined and static impact impressions consistent with contact from the compressor wheel. There was no rotational damage to the blades or housing. (Figure 3)



Figure 3 Turbo and compressor wheel showing static impact marks.

The top spark plugs were removed and revealed that the No. 5 sparkplug had damage to the electrode and was covered with oil. The No. 3 and No. 2 sparkplugs were covered with oil. The remaining sparkplugs remained intact, and they had minimal wear when compared to the Champion Check-A-Plug chart.

Two holes were observed in the top of the engine crankcase. (Figure 4) One hole was located forward of the No. 5 cylinder and was about 2 inches in diameter. The second hole was located adjacent to the No. 4 cylinder and was about 3 inches in diameter. The No. 4 cylinder connecting rod was separated from the crankshaft. The No. 5 cylinder piston was fragmented with the piston pin still installed in the connecting rod.

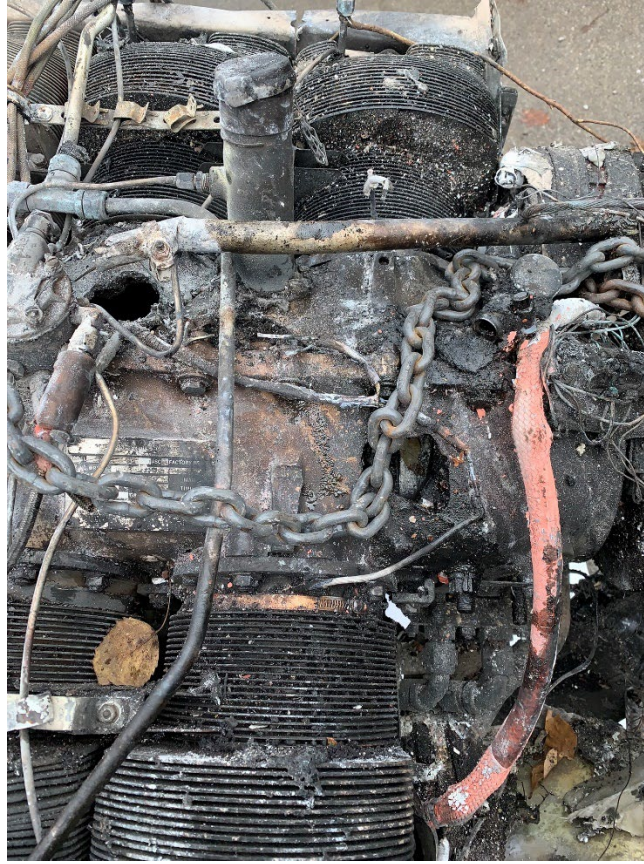


Figure 4 Holes on top of engine case.

The two through-bolts that connected cylinders No. 4 and No. 5 were missing nuts on the right side of the engine and the bolt threads exhibited significant thermal damage. The two through-bolts that connected cylinders No. 2 and No. 3 were missing nuts on the left side of the engine and the bolts showed signs of thermal damage. Half of a nut was discovered in debris under the No. 3 cylinder and showed signs of thermal damage and was brittle when handled.

In addition, a 1/16-inch gap was observed between the two through-bolt nuts on the aft side of the No.1 cylinder.

Engine crankshaft removal/disassembly revealed the crankshaft main journal bearings showed evidence of polishing and metal to metal contact. The crankshaft and camshaft were intact, although exposed to significant heat.

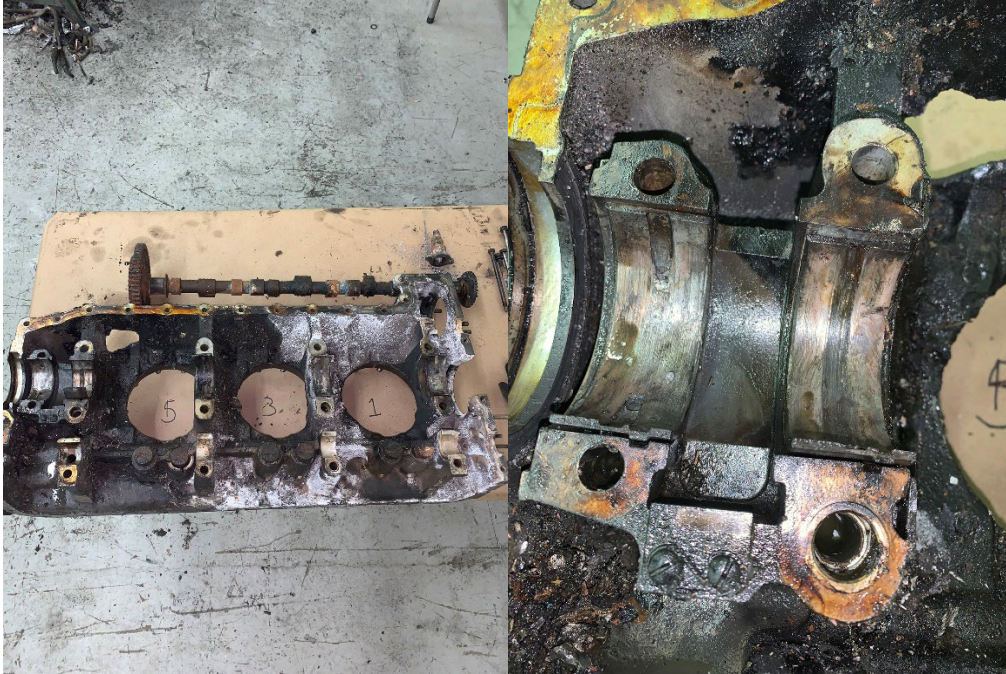


Figure 5: No. 5, 3, 1 Engine case half interior and forward bearings.

The oil dip stick was in the seated and secured position.

4.0 Propeller Examination

The three-bladed propeller and spinner remained attached to the crankshaft flange. Two of the three propeller blades were bent aft in a uniform manor. The third blade was bent aft and exhibited severe gouges and scrapes on the upper surface and leading edge of the blade tip, but little chordwise scraping was observed on all three blades. The propeller spinner was crushed uniformly from the front to aft and exhibited no evidence of rotational damage.



Figure 6 Propeller condition

5.0 Pilot Information

BRIGGS, RICK EUGENE (Pilot/Owner)

Private Pilot

DOB: [REDACTED]

Male BLOND BLUE 69 in. 205 lbs.

SHELBURNE LN

SARASOTA, FL

34231-3026

04/11/2017

District Office FLIGHT HRS – Civilian 2,550

Medical Third (Private) 03/02/2021

Restriction Description

MUST WEAR CORRECTIVE LENSES FOR NEAR AND DISTANT VISION.

VANOVER, KEITH EDWARD (Pilot Rated Passenger)

COM, FI and Mechanic

DOB: [REDACTED]

Male BROWN BROWN 67 in. 165 lbs.

WAINSTEAD DR

PARMA, OH

44129-4838

03/01/1996

District Office FLIGHT HRS – Civilian 6,002

Medical ID First (ATP) 04/21/2021

Restriction Description

MUST WEAR CORRECTIVE LENSES.

6.0 Aircraft Information

Year: 1985

Make: Cessna

Model: T210R

Serial number: 21064922

Registration: N6209U

Continental TSIO-520-CE

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1. NATIONALITY AND REGISTRATION MARKS N6209U	2. MANUFACTURER AND MODEL Cessna T210R	3. AIRCRAFT SERIAL NUMBER 21064922	4. CATEGORY Normal
5. AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to 14 CFR 21.191 and certifies that, as of the date of issuance, the aircraft to which issued hereon is shown to conform to the type certificate therefor, to be in condition for safe operation, and to have been so equipped as to comply with the requirements of the applicable comprehensive and detailed airworthiness standards prescribed by Annex 8 to the Convention on International Civil Aviation, except as noted hereon. Exception: None			
6. TERMS AND CONDITIONS Unless noted, this certificate is issued for a period of 12 months. It is subject to the terms, conditions, and limitations established by the Administrator, and the aircraft is to be maintained in accordance with the applicable maintenance, repair, and alteration requirements, and the aircraft is to be operated in accordance with the applicable Federal Aviation Regulations.			
DATE OF ISSUANCE 5-09-85	FAA REGIONAL OFFICE ATLANTA, GA	DESIGNATION NUMBER DOA CR-1	

FAA Form 8100-2 (7-87) FORMERLY FAA FORM 1087

Annual Inspection: February 15, 2021 @ 3,545 hours TT 326.4 TTSMOH

Last non routine MX: June 7, 2021 @ 3,558 TT; INOP Deice boots due to leak. Fixed and Ops check good.

Note: On May 16, 2012, removed old engine and reinstalled a factory rebuilt zero time engine.

Note: Oil Analysis: April 24, 2017, to January 6, 2021

values in parentheses) below your results are average values from all our analysis data for the same engine model with similar engine hours and oil hours. See www.avlab.com/explain for detailed explanation of the statistical analysis used with your laboratory results.

** CURRENT ** ** SEE LAB COMMENTS **		A.L.A.R.M. Meter: Normal Elevated High																																																						
Sample Date: 1/6/2021 Analysis Date: 1/26/2021 Sample Number: P70 Cylinder Type: STEEL TSN/TSO: 326.4 Oil Hours: 19.6 Filter Hours: Oil Added: Filter Wt. (mgs): Flashpoint(deg. F): H2O (ppm): Total Acid No.:		*** OIL ANALYSIS RESULTS IN PARTS PER MILLION *** <table> <tr> <th>Iron</th> <th>Copper</th> <th>Nickel</th> <th>Chromium</th> <th>Silver</th> <th>Magn.</th> <th>Alum.</th> <th>Lead</th> <th>Silicon</th> <th>Titanium</th> <th>Tin</th> <th>Moly.</th> </tr> <tr> <td>112 (46.1)</td> <td>2.6 (5.0)</td> <td>6.1 (12.4)</td> <td>8.7 (7.7)</td> <td>N/A</td> <td>N/A</td> <td>29.5 (9.5)</td> <td>3214 (3,430)</td> <td>5.2 (6.6)</td> <td>N/A</td> <td>< 0.1 (0.4)</td> <td>N/A</td> </tr> </table>											Iron	Copper	Nickel	Chromium	Silver	Magn.	Alum.	Lead	Silicon	Titanium	Tin	Moly.	112 (46.1)	2.6 (5.0)	6.1 (12.4)	8.7 (7.7)	N/A	N/A	29.5 (9.5)	3214 (3,430)	5.2 (6.6)	N/A	< 0.1 (0.4)	N/A																				
		Iron	Copper	Nickel	Chromium	Silver	Magn.	Alum.	Lead	Silicon	Titanium	Tin	Moly.																																											
		112 (46.1)	2.6 (5.0)	6.1 (12.4)	8.7 (7.7)	N/A	N/A	29.5 (9.5)	3214 (3,430)	5.2 (6.6)	N/A	< 0.1 (0.4)	N/A																																											
		*** FILTER ANALYSIS RESULTS *** <table> <tr> <th>Material:</th> <th>Stainless Steel</th> <th>Carbon Steel</th> <th>Alloy Steel</th> <th>Bearing Alloy</th> <th>Copper</th> <th>Silver</th> <th>Magn.</th> <th>Alum.</th> <th>Grit</th> <th>Misc.</th> </tr> <tr> <td>Amount:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Type:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Form:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>											Material:	Stainless Steel	Carbon Steel	Alloy Steel	Bearing Alloy	Copper	Silver	Magn.	Alum.	Grit	Misc.	Amount:											Type:											Form:										
		Material:	Stainless Steel	Carbon Steel	Alloy Steel	Bearing Alloy	Copper	Silver	Magn.	Alum.	Grit	Misc.																																												
Amount:																																																								
Type:																																																								
Form:																																																								
Comments: IRON AND ALUMINUM SEEM ELEVATED FOR A 19.6 HOUR SAMPLE. IRON CAN TYPICALLY BE FROM CORROSION FROM AIRCRAFT INACTIVITY, WEAR FROM CYLINDERS, ROTATING SHAFTS OR THE VALVE TRAIN. COMMON SOURCES OF ALUMINUM WEAR INCLUDE CORROSION, PISTONS, PISTON PIN CAPS OR PLUGS, BEARING OVERLAY, OR SHAVINGS FROM EITHER A HEAD OR THE CRANKCASE. ALL OTHER OIL VALUES SEEM FINE. WE WILL CONTINUE TO MONITOR THIS ENGINE WITH YOUR NEXT SAMPLE. PLEASE CONTACT THE ENGINE MANUFACTURER'S SERVICE REP IF FURTHER ASSISTANCE IS NEEDED.																																																								

Note: Pilot/owner averages about 24 hours a year flight time based on last few years of maintenance records.

7.0 Meteorological Information

Location.....: KUCP

Day of month.....: 25

Time.....: 02:56 UTC

Report is fully automated, with no human intervention or oversight

Wind.....: true direction = 160 degrees; speed = 3 knots

Visibility.....: 10 Statute Miles

Cloud coverage.....: overcast (8 oktas) at 11000 feet above aerodrome level

Temperature.....: 06 degrees Celsius

Dewpoint.....: -06 degrees Celsius

QNH.....: 30.18 inHg

Remarks

site is automated and has a precipitation sensor

Sea Level Pressure...: 1024.4 Mb

Temperature.....: 5.6 degrees Celsius

Dew Point.....: -6.1 degrees Celsius

3-hour pressure tendency: steady or increasing then decreasing OR decreasing then decreasing more rapidly 1 Mb

Submitted by:

Aaron McCarter
NTSB Aviation Accident Investigator (IIC)