

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN23LA145

N56793 - AIRFRAME AND ENGINE EXAMINATION REPORT

October 10, 2023

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. N56793 - AIRFRAME AND ENGINE EXAMINATION REPORT.....	3
C. DETAILS OF THE EXAMINATION.....	3
1.0 EXAMINATION FACILITY	3
2.0 AIRFRAME EXAMINATION (PIPER PA-32-260, SERIAL NUMBER 32-7400009).....	4
3.0 ENGINE EXAMINATION (LYCOMING O-540-E4B5, SERIAL NUMBER L-22541-40)	6
4.0 PROPELLER EXAMINATION (HARTZELL HC-C2YK-1BF/F8477-2, SERIAL NUMBER CH34771B).....	8
5.0 MAINTENANCE RECORDS REVIEW.....	8

A. ACCIDENT

Location: Lincoln, Illinois
Date: March 29, 2023
Time: 1927 Central Time
Airplane: N56793, Piper PA-32-260 (Cherokee Six)

B. N56793 - AIRFRAME AND ENGINE EXAMINATION REPORT

IIC	Mike Hodges, aviation accident investigator National Transportation Safety Board Aurora, Colorado
Party Coordinator	Tom Miller, aviation safety inspector (airworthiness) Federal Aviation Administration Springfield, Illinois
Party Coordinator	Jon Hirsch, senior air safety investigator Piper Aircraft Vero Beach, Florida
Party Coordinator	Mike Childers, senior air safety investigator Lycoming Engines Williamsport, Pennsylvania
Party Coordinator	Les Doud, senior air safety investigator Hartzell Propeller Piqua, Ohio

C. DETAILS OF THE EXAMINATION

1.0 Examination Facility

The wreckage was recovered by AMF Aviation and was transported to their facilities in Springfield, Tennessee. The wreckage was examined on May 17, 2023. Oversight of the examination was provided by Jason Aguilera, senior air safety investigator, National Transportation Safety Board. Also present during the examination was staff members from AMF Aviation.

2.0 Airframe Examination (Piper PA-32-260, serial number 32-7400009)

The marketing name for the airplane is a Cherokee Six.

Fuselage

The fuselage had been cut into segments during recovery, with separations noted at Fuselage Stations (FS) 33, 58, 138, and 228 (approx.).

The fuselage segment from FS 33-58 included the forward baggage compartment. The engine and engine mount had been removed during recovery. The baggage door remained attached to the baggage door frame and the latch was in the closed position.

The forward cabin segment, FS 58-138, displayed impact and recovery cuts. The instrument panel appeared undamaged. The tachometer recording window showed 4,144.11 hours. The engine control levers were found positioned fully forward. The primer knob was in and secured. The carb heat lever was found positioned off. The magneto switch was found positioned off, and the key was absent.

The fuel selector handle was found in the off position. The fuel sample door was found closed and would spring closed when opened. The fuel selector remained in place within the cabin floor and was found positioned off. The fuel line from the left wingtip fuel tank had been impact separated from the valve at the "B" nut. The ball valve to the left main fuel tank had impact separated from the fuel selector valve. The fuel selector assembly was removed from the aircraft for examination; it appeared to function as intended, and each set position featured a tactile detent. During removal of the fuel valve, fuel drained from the lines from the right wing fuel tanks. The fuel bowl and filter contained fuel, which did not cause a reaction with water finding paste. The fuel filter was free from blockages.

The electric fuel pump remained within its housing; the inlet line remained attached, however the outlet line to the engine compartment had been torn away and was destroyed. When electrical power was applied, the fuel pump was able to pump water from a bottle. The filter was removed from the pump and no blockage was noted.

Low air pressure was applied to the fuel line ends at the fuel selector. The fuel lines to the right wing fuel tanks were free from blockages. The fuel lines to the left wingtip tank were crushed and fragmented, precluding any testing. The fuel line to the left main fuel tank was free from blockages. The fuel line to the electric fuel pump was free of blockage; however, the fuel line between the electric pump and FS 58 was crushed and destroyed, precluding testing.

The forward left #1 seat remained mounted to the floor. The #1 lap belt remained anchored to structure and was unbuckled. The shoulder harness remained looped onto the lap belt; when tested, the harness could not be pulled out from the inertia reel.

The forward right (#2) seat remained mounted to the floor and displayed impact deformation. The #2 lap belt remained anchored to structure and was unbuckled. The shoulder harness remained looped onto the lap belt; when tested, the inertia reel functioned as intended.

The center row of seats was unremarkable.

Other than the recovery cuts noted in the preceding paragraphs, the aft cabin section (FS 138-228) was not unremarkable.

Left Wing

The left wing was impact damaged and displayed several breaks near the wing root. The left main landing gear was impact separated. The wing displayed a chordwise separation adjacent to the inboard end of the main fuel tank. The inboard leading edge and forward wing attach point remained attached to the fuselage. The inboard trailing edge, with the main wing spar and a piece of wing flap, were impact separated from the fuselage.

The outboard wing section was buckled. The main fuel tank was impact damaged. The main fuel tank cap remained in place within the filler neck. The main fuel tank fuel line was impact separated from the tank and remained attached to the fuselage; the tank outlet screen was free of blockage. The wingtip fuel tank remained mounted to the wing and was unremarkable. The wingtip fuel tank outlet screen could be seen from the filler neck and appeared free from blockage. During inspection, no foreign objects were seen within the tanks.

Right Wing

The right wing remained attached to the fuselage and was impact damaged. The right main landing gear was impact separated. The main fuel tank was unremarkable. The main fuel tank cap remained in place within the filler neck. The fuel tank outlet screen could be seen from the filler neck and appeared free from blockage. The wingtip fuel tank was impact separated; the fuel cap remained in place within the filler. The wingtip fuel tank outlet screen could be seen from the filler neck and appeared free from blockage. During inspection, no foreign objects were seen within the tanks.

Empennage

Other than the recovery cuts noted in the preceding paragraphs, the empennage was unremarkable.

There were no signs of any preimpact mechanical malfunctions or failures with the airframe that would have precluded normal operation.

3.0 Engine Examination (Lycoming O-540-E4B5, serial number L-22541-40)

As first viewed, the engine remained attached to the firewall through the tubular mount. The engine was suspended from a lift, the mount tubes cut, and the engine separated from the firewall. The exhaust tailpipe was partially crushed. The engine was partially disassembled to facilitate the examination.

The engine crankshaft was rotated using a tool inserted in the vacuum pump drive pad and continuity of the crankshaft to the rear gears and to the valve train confirmed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were observed using a lighted borescope and no anomalies noted.

The exhaust tubing and muffler assembly was removed, and no obstructions observed.

A review of copies of maintenance logbooks provided indicated the most recent annual inspection was completed on 02/15/2023. The most recent engine overhaul was completed on 05/15/2011. The engine had accumulated 629.8 hours of time-in-service since the overhaul.

The propeller remained attached to the engine crankshaft flange. The propeller spinner was partially crushed. The propeller hub dome and piston were impact separated. Both propeller blades were turned in the hub so that the blade leading edges were forward. One blade exhibited "S" bending. The other blade was unremarkable.

The propeller governor remained attached to the engine and no damage was noted. The propeller governor control cable had been cut by recovery personnel but remained attached to the governor control arm. The arm was positioned about 1/8 inch from the low pitch/high RPM stop. The cockpit propeller control knob was positioned full forward. The propeller governor gasket was not equipped with an oil screen.

The carburetor was fractured across the throttle bore and partially separated from the engine. The throttle and mixture control cables remained attached to the carburetor throttle and mixture control arms. The throttle and mixture control knobs in the cockpit were positioned full forward. The carburetor was partially disassembled and no damage to the floats or other internal components was noted. No liquid was observed in the carburetor float bowl.

The carburetor fuel inlet screen was absent of debris.

The engine driven fuel pump remained attached to the engine and no damage was noted. The pump was removed from the engine. Liquid with and odor consistent with aviation gasoline drained from the pump fuel fittings when the pump was tilted. The pump produced air at the outlet port when actuated by hand. The pump was partially disassembled and no damage to the rubber diaphragms or internal check valves was noted.

The induction airbox was partially crushed and the position of the carburetor heat valve undetermined. The induction air filter was unobstructed.

A photograph of the airplane as it came to rest at the accident site were provided by the FAA inspector. A photograph depicted the fuel tank selector positioned between the left tip and left main tank positions.

Both magnetos remained attached to the engine and no damage was noted. Both produced spark from all ignition towers when the magneto drive assemblies were rotated by hand.

Manufacturer: Tempest		Type: UREM40E		SI 1042 Approved? ☒ Yes ☐ No	
Spark Plug Condition (per Champion Aviation Check-A-Plug Card AV-27)					
1 Top	Undamaged Electrode/Normal	1 Bottom	Undamaged Electrode/Normal		
2 Top	Undamaged Electrode/Normal	2 Bottom	Undamaged Electrode/Normal		
3 Top	Undamaged Electrode/Normal	3 Bottom	Undamaged Electrode/Normal		
4 Top	Undamaged Electrode/Normal	4 Bottom	Undamaged Electrode/Normal		
5 Top	Undamaged Electrode/Normal	5 Bottom	Undamaged Electrode/Normal		
6 Top	Undamaged Electrode/Normal	6 Bottom	Undamaged Electrode/Normal		
7 Top		7 Bottom			
8 Top		8 Bottom			

The spark plug electrodes exhibited gray to dark gray coloration and worn normal condition.

No damage to the ignition harness was noted.

The starter remained attached to the engine. No damage was noted, and it was not removed.

The alternator remained attached to the engine. No damage was noted, and it was not removed. The alternator belt remained in place and was unbroken.

The vacuum pump remained attached to the engine and no damage was noted. The pump produced air at the outlet port when the pump drive assembly was rotated by hand. The pump was partially disassembled and no damage to the composite drive assembly, carbon rotor or carbon vanes.

Oil was observed in the engine. The oil suction screen and the oil filter media were absent of debris.

There were no signs of any preimpact mechanical malfunctions or failures with the engine that would have precluded normal operation.

4.0 Propeller Examination (Hartzell HC-C2YK-1BF/F8477-2, serial number CH34771B)

Refer to the Hartzell Propeller examination report for further information.

5.0 Maintenance Records Review

The airframe, engine, and propeller maintenance records were reviewed. There were no outstanding mechanical anomalies noted in the maintenance records.

The historical FAA airworthiness and registration records were retrieved.

Submitted by:

Michael J. Hodges
Investigator-In-Charge