

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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WRECKAGE EXAMINATION SUMMARY

December 22, 2024

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A. ACCIDENT

Location: Cintrona, Puerto Rico
Date: December 20, 2024
Time: 1400 AST
1800 UTC
Airplane: N22088; Cessna 172S

B. WRECKAGE EXAMINATION SUMMARY

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C. SUMMARY

On December 20, 2024, at 1400 Atlantic standard time, a Cessna 172S, N22088, was substantially damaged when it was involved in an accident near Cintrona, Puerto Rico. The private pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF THE INVESTIGATION

1.0 Accident Site

The accident site was located in a mango orchard about 1.8 nautical miles (nm) from the departure end of runway 12 at Mercedita Airport (TJPS), Ponce, Puerto Rico. There was debris strewn along about a 360ft path oriented on a magnetic heading of 345° at an elevation of 46ft mean sea level. The initial impact point was about 15ft up a mango tree. The initial ground impact scar was about 140 ft from the tree impact and contained pieces of wheel fairing imbedded in the scar. The main impact crater which contained the propeller was about 30 ft from the initial ground impact scar. The tree next to the main impact crater contained pieces of wing leading edge and

about a 6 inch branch was impact separated. The left wing including left door post were wrapped around a tree about 48 ft past the main impact crater. About a 1ft branch was impact separated, and the tree contained pieces of fuselage and cabin in the canopy. The mixture control cable was wrapped around a branch of the same tree. The right wing and engine were located about 75 ft past the left wing and the path was strewn with engine and airframe components. The inboard portion of the left wing to include the flap was about 10 ft to the left of the right wing and engine. The fuselage and empennage were located about 70 ft past the right wing and engine.



Photo 1: Wreckage path.



Photo 2: View of the initial tree impact.



Photo 3: View of the wreckage path from the initial tree.



Photo 4: View of the main impact crater.

2.0 Airframe Examination

2.1 Fuselage

The fuselage was twisted and exhibited extreme impact damage. Multiple pieces of fuselage were scattered along the debris path.



Photo 5: View of the fuselage right side.



Photo 6: View of the fuselage from the front.



Photo 7: View of the fuselage, left side.



Photo 8: View of the fuselage, rear.

2.2 Empennage

The empennage remained attached to the fuselage. The vertical stabilizer and rudder were impact separated. The rudder control cables remained attached to the rudder flight control horn and were continuous to the rudder pedals. The left horizontal stabilizer and elevator remained as one piece and attached only through the control cables. The right horizontal stabilizer, elevator and elevator trim remained

as one piece and were impact separated from the empennage. The elevator control was continuous from the flight control surface bellcrank to the cockpit bellcrank. The elevator push pull tube from the control Y was impact separated. The elevator trim cable was impact fractured and exhibited broomstraw and unraveling, a portion of the cable was sent to the NTSB materials laboratory for further examination. The trim tab actuator was measured and equated to 5° tab trailing edge up.



Photo 9: View of the empennage and left horizontal stabilizer with elevator attached.



Photo 10: View of the right horizontal stabilizer, elevator, and elevator trim tab.



Photo 11: View of the vertical stabilizer and rudder.

2.3 Aircraft Wings

The left wing was impact separated, wrapped around a tree, and exhibited extreme impact damage. The left wing strut remained attached to the wing. The left aileron remained partially attached to the wing with pieces of it impact separated and strewn in the debris path. The inboard aft portion of the left wing including the fuel tank and flap were impact separated and found about 75 ft past the left wing. Left aileron continuity was confirmed from the control surface bellcrank to the flight control in the cockpit through multiple impact overload fractures. The overload fractures exhibited broomstraw appearance and unraveling of the control cable.



Photo 12: View of a tree with the left wing wrapped around the trunk.



Photo 13: View of the left wing wrapped around a tree.



Photo 14: View of the left wing.



Photo 15: View of the inboard portion of the left wing and flap.



Photo 16: View of the left aileron control cables.

The right wing was impact separated and exhibited impact crushing. The right wing strut remained attached to the wing. The right aileron remained partially attached with pieces of aileron strewn along the debris path. The right flap remained attached to the wing and was in the UP position. The flap motor was examined and when measured the jackscrew was consistent with the flaps being in the UP position. Right aileron continuity was confirmed from the control surface bellcrank to the flight control in the cockpit through multiple impact overload fractures. The overload fractures exhibited broomstraw appearance and unraveling of the control cable.



Photo 17: View of the right wing.



Photo 18: View of the right wing.



Photo 19: View of the right aileron control cable ends.

2.4 Landing Gear

The left main landing gear remained attached to the fuselage. The right main landing gear was impact separated and located in the vicinity of the left wing. The right main landing gear tire was not located. The nose landing gear strut remained attached to the firewall and exhibited impact damage. The nose landing gear tire was located about 30 ft past the main impact crater and had wood wedged between the tire and wheel rim.



Photo 20: View of the left main landing gear.



Photo 21: View of the impact separated right main landing gear.

2.5 Cockpit

The cockpit was destroyed by impact forces. The control yoke interconnect cable was found separated. The aileron cables were overload separated at the cockpit.



Photo 22: View of the control yoke.



Photo 23: View of the control cable fracture.

2.6 Survivability

The right forward seat was impact separated and found in the vicinity of the left wing. The left forward seat was impact separated and exhibited impact damage. It was found near the fuselage with the 3 point seat belt still buckled. The rear bench seat remained attached to the fuselage floor.

2.7 Fuel/Fuel System

Both wing fuel tanks were breached, and the fuel caps were not installed. One fuel cap was located in the debris field and exhibited bending consistent with it being locked in place prior to impact. The other fuel cap was not located. The fuel selector was impact separated and found in the debris field exhibiting impact damage. Examination of the fuel selector found it in the both position. The fuel strainer remained attached to the firewall.



Photo 24: View of the fuel selector as found.

2.8 Other Systems

The ELT was found in the fuselage and was attached to the antenna. When examined the ELT was armed and active.



Photo 25: View of the ELT.

3.0 Engine Examination

The engine exhibited impact damage to the case. The crankshaft flange was impact separated and remained attached to the propeller.



Photo 26: Overview of the engine.



Photo 27: View of the front of the engine.



Photo 28: View of the top of the engine.



Photo 29: View of the back of the engine.



Photo 30: View of the bottom of the engine.

3.1 Induction and Exhaust System

The induction and exhaust system were destroyed by impact forces.

3.2 Magnetos

Both magnetos were impact separated from the engine and found in the debris path. Both magnetos impulse couplings snapped when the magneto was rotated by hand.



Photo 31: View of the left magneto.



Photo 32: View of the right magneto.

3.3 Ignition System

The ignition key was found in the both position and the key was broken. The ignition leads from the magnetos to the sparkplugs were impact separated. All sparkplugs remained in their respective positions and exhibited impact damage.



Photo 33: View of the ignition key broken in the BOTH position.

3.4 Fuel System

The engine driven fuel pump remained attached to the accessory case and was not removed. The fuel injector assembly was impact separated, the mixture and throttle controls were impact separated at their respective arm heads. The fuel flow divider remained attached to the engine crankcase. All fuel injector nozzles remained in their respective positions and were not removed.



Photo 34: View of the fuel injector assembly.



Photo 35: View of the fuel injector assembly.



Photo 36: View of the fuel injector assembly.

3.5 Lubrication System

The oil dipstick was impact separated and found near the left wing. The oil cooler bypass valve was impact separated and found in the debris path. The oil filter was impact separated and found about 20 ft past the right wing.



Photo 37: View of the oil dipstick.



Photo 38: View of the oil cooler bypass valve.



Photo 39: View of the oil filter.

3.6 Vacuum Pump/System

The standby vacuum pump was impact separated and located about 30 ft past the left wing.



Photo 40: View of the vacuum pump.

4.0 Propeller Examination

The propeller exhibited S bending, leading edge polishing, and chordwise scratching. The propeller was buried about 8 inches in the dirt in the main impact crater.



Photo 41: View of the propeller as found.



Photo 42: View of the crankshaft flange attached to the propeller.



Photo 43: View of the propeller.



Photo 44: View of the propeller.



Photo 45: View of one propeller blade.



Photo 46: View of chordwise scratching and leading edge polishing/scratching.



Photo 47: View of blade tip damage.



Photo 48: View of the other propeller blade.



Photo 49: View of blade tip damage.

5.0 Aircraft Information

According to FAA airworthiness records, the airplane was manufactured in 2007 and was purchased by the flight school in 2012. It was powered by a Lycoming IO-360-L2A series, 180-horsepower engine equipped with a fixed pitch McCauley propeller. According to airplane maintenance logbooks, the most recent annual inspection was completed on 6/7/2024, at a total time of 3271 hours.

6.0 Meteorological Information

TJPS 201755Z AUTO 13016KT 9SM CLR 32/25 A2989 RMK AO2 PWINO

Submitted by:

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