

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23FA323

EXAMINATION

8/6/2023

A. ACCIDENT

Location: North Perry Airport, Hollywood, Florida (HWO)
Date: August 4, 2023
Time: 1201 pm local
1601 (UTC)
Airplane: Cessna 172
Reg Num: N697FL
Operator: ICARO AVIATION ACADEMY,

B. EXAMINATION

NTSB IIC	Aaron McCarter NTSB Washington DC
Cessna/Textron	Ernest Hall Cessna Wichita, Kansas
Lycoming	David Harsanyi Lycoming Engines Williamsport, Pennsylvania
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C. SUMMARY

During a/sightseeing flight with a flight instructor and 2 passengers, the airplane attempted to take off; during the subsequent initial climb, shortly after reaching an altitude of about 50 ft, the airplane transitioned to a steep climb before leveling off the climb. At the apex of the climb, about 100-125 feet above ground level, the airplane began a left turning descent until the left wing dropped and the airplane impacted the grounds between the runway (10R; 3255 x 100 ft.) and the

taxiway. The instructor in the right seat and the passenger in the left seat were fatally injured. The passenger in the aft seat was critically injured.

DETAILS OF THE EXAMINATION

1.0 Accident Site

Pembroke Pines (North Perry Airport) Florida, (HWO), USA 650 ft NW of the runway 10 right departure end. Level terrain and sandy turf. Accident site was compact with a ground impact gouge about 30 feet from the main wreckage along with a leading edge left wing impact mark on the ground. The left wing struck the ground first, followed by the airplane fuselage impacting on the engine compartment and belly before coming to rest. coming to rest on its belly. Both wings collapsed downwards, and the cockpit was crumpled and compressed leaving only about 50% occupiable space. Both front seats had broken and were partially separated from their respective seat rail/track. The right seat collapsed forward pushing the occupant into the instrument panel. The pilot seat passenger was found in the aft section of the cockpit near the back seat. The accident site elevation was 16 feet. Lat/log 26.000005° / -80.233421° (figure 1)



Figure 1 Accident site with location/ direction details.

2.0 Airframe Examination

2.1 Fuselage

Fuselage buckled and crumpled/compressed through about 50% of the cockpit area with the most severe damage in the front seat area and floorboards. The most severe damage to the right (instructors) side of the forward cockpit. The engine compartment was significantly compromised by impact forces, displacing the engine and propeller upwards and slightly aft into the firewall which also displaced the

instrument panel. The empennage remained relatively free of damage from about 2 feet aft of the cockpit area.

2.2 Empennage

All tail control surfaces were intact and installed in their respective locations and moved manually with corresponding cable movement. Movement was limited due to binding of the control cables in the cockpit floorboard area that was severely crushed, however the lines were traced to their respective control locations and were not compromised/fractured. A hole was cut into the fuselage to observe all cables. No anomalies or other irregularities were discovered. Rudder continuity was established from the rudder-to-rudder pedals. Elevator continuity was established from both elevators to the cockpit controls. The elevator trim was found in a 20° tab up position. (Max is 25°). The elevator trim wheel in the was impact damaged.



Figure 2 View of empennage looking forward.

2.3 Wings

The left wing was severely compromised during the accident. It struck the ground first and was bent upwards and crumpled along the outboard span. The corresponding ground impact mark matched the left wing. The left wing nav light was found in the debris field between the ground impact and the aircraft. The left wing remained attached to the fuselage and bent downwards during the impact sequence. The left wing strut remained attached to the wing and the fuselage, but it was also bent aft and down. The left aileron and flap remained attached to their respective locations and moved manually with corresponding cable movement being observed through holes cut into the top of the wing(s). The aileron primary flight control cables were continuous from the cockpit to each aileron/flight control surface except for the

right aileron drive cable being separated at the pilot's aft door post. The cable separation exhibited splayed ends (broom straw) that were consistent with signatures of tensile overload. The right wing remained attached to the fuselage and was bent downwards during ground impact and was dented and crumpled in several locations but remained largely intact.

The left and right flaps were in their stowed positions and the flap actuator confirmed they were stowed at the time of impact. The cockpit flap control level was in the full up (stowed) position.



Figure 3: Instrument panel showing the flap control handle and indicator position.

2.4 Landing Gear

The fixed tricycle landing gear was impact damaged and severely deformed through impact forces. The left main landing gear separated and was discovered about 30 feet from the main wreckage. The right main landing gear remained intact and attached to the fuselage. The nose landing gear was partially attached to the nose fuselage and was canted aft. The nose wheel separated from the nose gear assembly during the impact sequence.

2.5 Cockpit

The fuel selector valve was found selected to the "both" position and after its removal, the valve was manually operated, the selector moved freely, and resistance was felt at each of the detents with corresponding air movement through the valve. The tachometer was frozen in the 300 RPM position and indicated 2055.4 hours. The Hobbs meter indicated 2,096.8 hours. The throttle, mixture was in the near full forward position but note that the engine mounts had broken, and the engine was

canted upwards and partially separated from the firewall although it remained attached to the engine mounts. The airspeed indicator was intact and indicated 0 kts/mpH. The attitude indicator was operable and indicated about 20 degrees left turn nose low. The heading indicator was functional and intact and indicated 187 degrees. The altimeter was intact and functional and indicated 3,000 ft and showed 30.00 hg in the window. The VSI was intact and indicated +1200 fpm. The turn coordinator was indicating a right 30 ° bank and the ball was full deflection right. The remaining gauges were intact and showed 0 fuel, 15 psi oil pressure, 0 temps, and 0 AMPs across all systems. The primer was in and locked. The carb heat was in the off position. Both left (pilot) and right control yokes were detached. The aileron control chains on both control yokes were intact and wrapped around each sprocket.

The pilot's (lef) and co-pilot's (right) seat tracks exhibited impact damage. Both pilot seat tracks/rails were bent up and aft. Examination of the seat tracks/rails seat latch pin holes, the pilot's outboard seat track/rail exhibited a gouge mark on the aft side of pin hole No. 4 and a circular pin gouge mark just aft and outboard of pin hole No. 5. The pilot's inboard seat track/rail exhibited a pin gouge mark just forward of pin hole No. 5 and a gouge mark just forward and inboard of pin hole No. 4 and exiting to the side.

The co-pilot's inboard track/rail exhibited a gouge mark on the aft side and outboard of pin hole No. 5. There were no signatures of aft seat slippage on either seat. Note that a secondary seat stop was not installed on either seat.



Figure 4 Pilot (l) and copilot's seat tracks

2.6 Fuel/Fuel System

Both left and right fuel tanks remained largely intact and any drips that were observed by the FAA the day of the impact was likely due to broken/severed fuel lines. About 12 gallons of fuel was drained out of the right wing with about another 2 gallons being lost to spillage during the defuel. The left wing's fuel tank was drained of fuel and contained about 10 gallons. Total fuel retrieved was about 24 gallons of blue aviation fuel as tested on site. Each wing fuel screens (2 per tank) were removed and were free of any debris. The fuel from the engine fuel sump/gascolator was drained and tested for foreign debris and water with negative results. The carburetor was removed, and the floats contained hydraulic deformation, which dented each brass float uniformly indicating fuel in the carburetor.



Figure 5 Fuel floats showing evidence of fluid deformation; The opposing side showed the same type of deformation.

2.7 Other Systems

A Garmin 750 unit was intact and pulled from the instrument panel and sent to the NTSB labs in Washington DC for download and data retrieval.

3.0 Engine Examination

The powerplant was a four-cylinder, air cooled, direct drive, horizontally opposed, carbureted, naturally aspirated engine with a rating of 180HP @ 2700RPM. The Lycoming O-320-D2J, was largely intact and there was no evidence of a post-crash

fire. Both left and right magnetos were removed and manually operated; both magnetos produced healthy spark at each of the posts.

All the spark plugs displayed normal coloration and normal electrodes as compared to the Champion Aerospace AV-27 Check-A-Plug chart.

The oil filter was severely crushed and unable to be opened however, oil was present in the oil sump and all components appeared to be adequately lubricated and the oil appeared dark brown in color.

The engine crankcase was manually rotated 720° degrees of rotation several time to check for crankshaft continuity, compression and suction via the accessory drive and vacuum port. Continuity was confirmed and all pistons, valves springs and pushrods operated as designed. There was adequate compression on each of the 4 cylinders. Continuity of the crankshaft was confirmed throughout the engine. Maintenance records indicated that the No. 1 cylinder was recently overhauled.



Figure 6 View of left and right side of engine prior to examination.

4.0 Propeller Examination

The propeller (McCauley Model # DTM7457; Serial # 735283) hub remained attached to the engine crankshaft flange and both blades were damaged. Both propeller blades showed evidence of abrasive polishing on the outer 12-inches of blade tip. Blade 1 contained a compound S-bend and twist and bending in the opposite direction of rotation. There was also a buckling wave bend on the trailing edge. The opposing blade 2 was bent aft mid span and did not have any twisting or S-bend but did have chordwise scraping.



Figure 7 McCauley propeller exhibiting signs of s bending and polishing.

5.0 Meteorological Information

Location.....: HWO

Day of month.....: 04

Time.....: 16:04 UTC

Report is a correction over a METAR or SPECI report.

Wind.....: true direction = 210 degrees; speed = 9 knots

Visibility.....: 10 Statute Miles

Weather.....: thunderstorm

Cloud coverage.....: broken (5 to 7 oktas) at 3500 feet above aerodrome level

Cloud coverage.....: broken (5 to 7 oktas) at 4300 feet above aerodrome level

Cloud coverage.....: broken (5 to 7 oktas) at 11000 feet above aerodrome level

Temperature.....: 30 degrees Celsius

Dewpoint.....: 25 degrees Celsius

QNH.....: 30.00 inHg

Remarks

site is automated and has a precipitation sensor

TS

B1558

undefined

EXAMINATION

Temperature.....: 30 degrees Celsius
Dew Point.....: 25 degrees Celsius
Unknown Remark token: AIRCRAFT
Unknown Remark token: EMERGENCY

6.0 Documentation

A/C REG: N697FL
A/C MOD: C-172P
ENG MOD: 0-320-D2G
PROP MOD: 1C160DTM7553
TACH: 2038.4 Hrs
DATE: 07/08/2023

A/C S/N: 17276100
S/N: L-9967-39A
S/N: 725283
HOBS: 2070.6

ACTT: 20373.0 Hrs
TTE: 18907.8 Hrs
TTP: 8779.4 Hrs

TACH: 2038.4 Hrs
TSMOH: 4405 Hrs
SPOH: 8779.4 Hrs
TSTOH: 1499.4 Hrs

Performed a 100 Hour inspection in accordance with CESSNA C172 maintenance manual on file and FAR Part 43 Appendix D

- Open all panels. Inspect and lubricate all pulleys and cables with LES 2 & 3, and checked cable tensions.
- Service all bearings
- Serviced Battery.
- Complied with FAR 91-207 (d) ELT Inspection and test ok. Next due 10-30-2023. ELT battery due on Feb 2025.
- Complied with AD.04-26-2 AIR FILTER. NEXT DUE 2140.6 Hrs
- Complied with AD. 2001-23-03 Map light insulation and chaffing inspection.
- Complied with AD 2011-10-9 seat track inspection. Next due 2140.6 Hrs Ops checked good.
- All AD's are complied

I certify that THIS AIRFRAME HAS BEEN INSPECTED in accordance with a 100HR INSPECTION and has been determined to be in AIRWORTHY condition.

Jorge A. Yen
A&P

Figure 8 Maintenance documentation Airframe.

A/C REG: N697FL
A/C MOD: C-172P
ENG MOD: 0-320-D2G
TACH: 2038.4 Hrs
DATE: 07/08/2023

A/C S/N: 17276100
S/N: L-9967-39A
HOBS: 2070.6

ACTT: 20373.0 Hrs
TTE: 18907.8 Hrs

TACH: 2038.4 Hrs
TSMOH: 4405 Hrs
TSTOH: 1499.4 Hrs

Performed a 100 Hour inspection in accordance with CESSNA C172 maintenance manual on file and FAR Part 43 Appendix D

- Changed oil and Serviced with 7 Qts. of AEROSHELL 100PLUS/ADDITIVE
- Replaced air filter element P/N BA-6108
- Found low compression on Cyl #1. Found BER, replaced cylinder with OH unit attached 8130. Supplier CEU
- Next Inspection Due 1990.6 Hrs
- Run-up engine all parameters smooth and within limits. No leaks.
- Compression 1 78/80 2 74/80 3 78/80 4 78/80
- All AD's are complied

I certify that THIS ENGINE HAS BEEN INSPECTED in accordance with a 100HR INSPECTION and has been determined to be in AIRWORTHY condition.

Jorge A. Yen
A&P

Figure 9 Engine.

9.0 Other/Video

Video surveillance from two (2) nearby businesses provided the takeoff and crash of the airplane.

Submitted by:

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