

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24FA127

AIRFRAME AND ENGINE EXAM

March 4-7/2024

A. ACCIDENT

Location: Nashville, TN
Date: March 4, 2024
Time: 1945
0145 (UTC)
Airplane: PA-32RT-300T Common Name: Piper Lance II
Reg Number: C-FBWH

B. AIRFRAME AND ENGINE EXAM

NTSB IIC	Aaron McCarter NTSB Washington DC
Piper	Kris Wetherell Piper Vero Beach, Florida
Lycoming	David Harsanyi Lycoming Engines Williamsport, Pennsylvania
FAA	David S Lewis POI FAA FSDO Nashville, Tennessee Joe Kachinski ASI Flight Standards FAA FSDO Nashville, Tennessee

C. SUMMARY

- D.** On March 4, 2024, at 1945 central standard time, a Piper PA-32RT-300T, registration number C-FBWH was substantially damaged when it was involved in an accident 2.5 miles south of John C Tune Airport (JWN) Nashville, Tennessee. The private pilot, a Canadian Citizen and the four passengers were

fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

E. DETAILS OF THE EXAMINATION

1.0 History

The origin of the flight was Brampton-Caledon Airport (CNC3) in Quebec, Canada. The airplane departed Mount Sterling, KY (IOB) where it fueled with 51 gallons of aviation fuel. The destination was John Tune Airport (JWN) in Nashville, TN about 180 nm away.

The flight track of the airplane showed that it was at cruising altitude of 10,500 ft for the majority of the flight from IOB until it began a gradual (normal) descent into the JWN airport area. For reasons unknown, the airplane overflew JWN at an altitude of 2,500 mean sea level (MSL) and passed over the airport towards the south southwest; subsequently, the pilot reported engine issues. ATC declared an emergency and cleared the pilot to land on runway 2.

The occupants included the pilot (father) wife (pax) and three minor children in the cabin. Visual meteorological, night conditions prevailed at the time of the accident. Preliminary ADS-B data provided by the FAA is shown below (Figure 1)

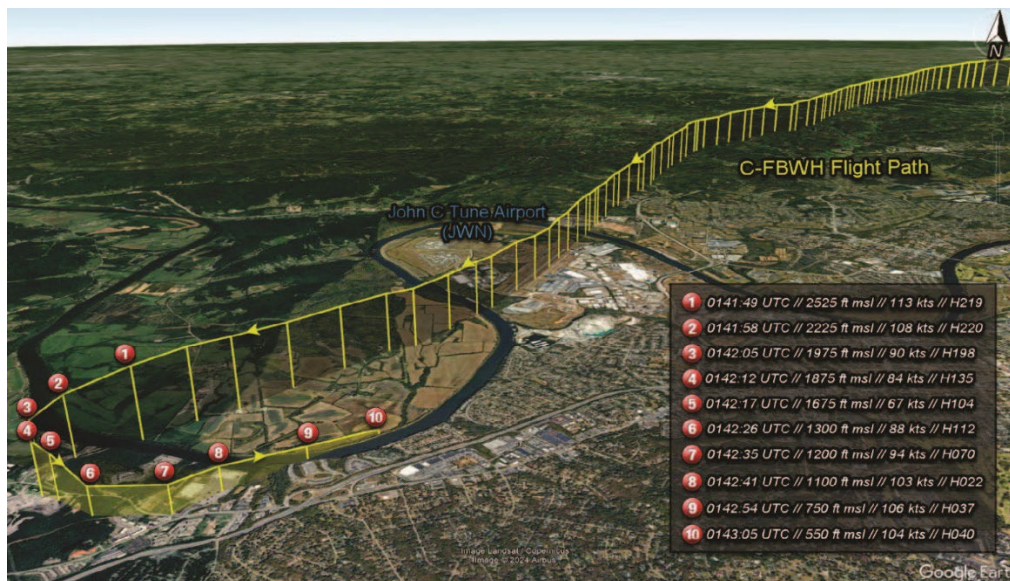


Figure 1 Prelim ADS-B flight track data.

2.0 Accident Site

The airplane impacted the grass shoulder immediately adjacent to Nashville, TN Interstate I-40 East, striking a 30 degree incline hill and coming to rest about 60 ft from the roadway on slightly inclined terrain. The accident site was compact with a ground impact gouge about 40 feet from the main wreckage. Initial ground impact contained red position light glass, and the left fiberglass wingtip separated and was discovered in the ditch next to the roadway. The engine compartment struck the ground creating a 5-inch deep and 6-foot wide crater before the airframe came to rest.

The left wing separated aft. The left fuel tank breached during impact, resulting in the post impact fire, which consumed the left wing, instrument panel, cockpit, and cabin. The ground scars were oriented on a heading of 083° magnetic and the nose of the airplane was oriented on a magnetic heading of about 309°. The elevation was 446 feet. Lat/long 36.139976° / -86.886983° (figure 2/3)



Figure 2 Accident Site Overview



Figure 3 Accident Site Overview and Ground Scars

3.0 Airframe Examination

3.1 Fuselage

The fuselage came to rest lying on the right side. The remaining fuselage was consumed by fire. The empennage remained partially attached to the fuselage by the flight control cables.. The engine and firewall came to rest inverted and remained attached to the fuselage by the engine control cables. The landing gear selector was found in the retracted position. The nose landing gear appeared retracted. The instrument panel was fragmented and severely damaged by fire.

3.2 Empennage

The empennage remained partially attached to the fuselage (Figure 4) The rudder and stabilator remained attached to the empennage at their respective hinges. The right side of the stabilator was bent down by impact forces. The stabilator trim control surface remained attached. The rudder and stabilator control cables remained intact and continuous from the control column to their respective control attachments. The rudder and stab cables were cut by emergency personnel about 1-foot from their attachments at the control column. The rudder cables remained attached to the rudder bar. The stabilator control cables remained attached to the base of the control column. The trim actuator was found with 0 threads exposed at

the front of the actuator drum which equates to a full nose down trim condition. Rudder, stabilator and stabilator trim continuity was confirmed.



Figure 4 View of empennage looking forward.

3.3 Wings and Flight Controls

The left wing came to rest on the left side of the fuselage and was 90% destroyed by post-impact fire. The left aileron and flap were consumed. Partial remains of a left fuel tank remained but were deformed and melted. The aileron control cables remained attached to the bellcrank. The aileron balance cable was separated at approximately mid fuselage. The left side primary aileron cable was separated at the turnbuckle. Aileron cable separations were consistent with overload.

The right wing (Figure 5) came to rest on the right side of the fuselage with the root end underneath the fuselage. The right flap and aileron remained attached to the wing at their hinges. The right flap appeared to be approximately in the 10 degree position. The right flap control rod was broken from the flap torque tube and remained attached to the flap. The right aileron was manually manipulated with the control cables and operated normally through its up/down stops.



Figure 5 Right wing on site.

3.4 Landing Gear

The retractable tricycle landing gear remained at their stowed/retracted positions. The left landing gear was destroyed by heat.

3.5 Cockpit

All cockpit instrumentation, gauges and switches were exposed to post-impact fire and impact forces.

The vertical speed indicator -400 FPM.

The airspeed zero.

The altimeter indicated about 8,700 feet with a setting of 30.00 InHg.

The manifold pressure gauge was heavily sooted and impact damaged and the needles/pointers could not be confirmed.

The engine monitor electronic unit which likely contained EGT and Fuel Flow was located and retained. The unit was severely damaged by thermal forces, however, when opened, the chips, while damaged appeared whole. The unit was sent to the NTSB labs for possible download and retrieval.

The control column (2 Yokes) was deformed by impact forces and post-impact fire. The aileron drive chain was fractured about 17 inches from the center turnbuckle on the left side and the fractured ends of the chain displayed features consistent with overload. Both aileron primary cables remained attached to the drive chain and had

been cut by fire/emergency personnel about 1-foot from the attachments to the drive chain.

3.6 Fuel/Fuel System

About 5 gallons of fuel was observed through a dip stick in the right wing tank which remained intact; however, fuel was discovered to be leaking out of the fuel lines where the wing connected to the fuselage; estimate that the disposition of the wing combined with the time until we arrived on scene, the wing had been leaking fuel for about 8 hours. The left wing's fuel tanks were completely compromised and contained zero fuel. The fuel tank ruptured during impact and fed the fire.

Water paste was applied to the fuel sample, and it indicated negative for water and no contaminants were discovered in the fuel. The fuel has the color and appearance of AVGAS.

The fuel selector, fuel selector valve/fuel strainer were damaged and deformed by impact forces and heat as observed on site. Care was taken not to manipulate or move the selector until it was removed from the wreckage. The unit had separated from the fuselage. The unit was secured for additional examination and testing. The fuel selector valve was found selected to a position between off and left main tank, slightly favoring the left tank position but still in between the 2 ports. (Figure 6/7)

The unit was opened for examination during the hanger exam; the fuel selector valve/fuel strainer fuel screen was burned away. The ports inside the fuel selector valve were not open.



Figure 6 Fuel selector on site.



Figure 7 Fuel selector during examination.

4.0 Engine and Component Examination

The powerplant, a Lycoming TIO-540-S1AD (# L-5554-61A) is a six-cylinder, air cooled, direct drive, horizontally opposed, fuel injected, turbocharged engine with a rating of 300HP @ 2700RPM.

The engine was slightly impact damaged and had thermal damage to about 30% of the engine, but otherwise remained remarkably intact. Impact damage was limited to several of the accessories and most thermal damage was on the aft.

At the secured facility, both left and right magnetos which are dual self-contained Hartzell units were removed and manually operated with a drill at low a RMP setting for several seconds through a high RPM. (Figure 8) Video recording was taken of the test. Both magnetos produced healthy blue/purple spark at all of the posts and at every RPM.



Figure 8 Dual magneto during operational test.

All the spark plugs displayed normal coloration and normal electrodes as compared to the Champion Aerospace AV-27 Check-A-Plug chart. (Figure 9)

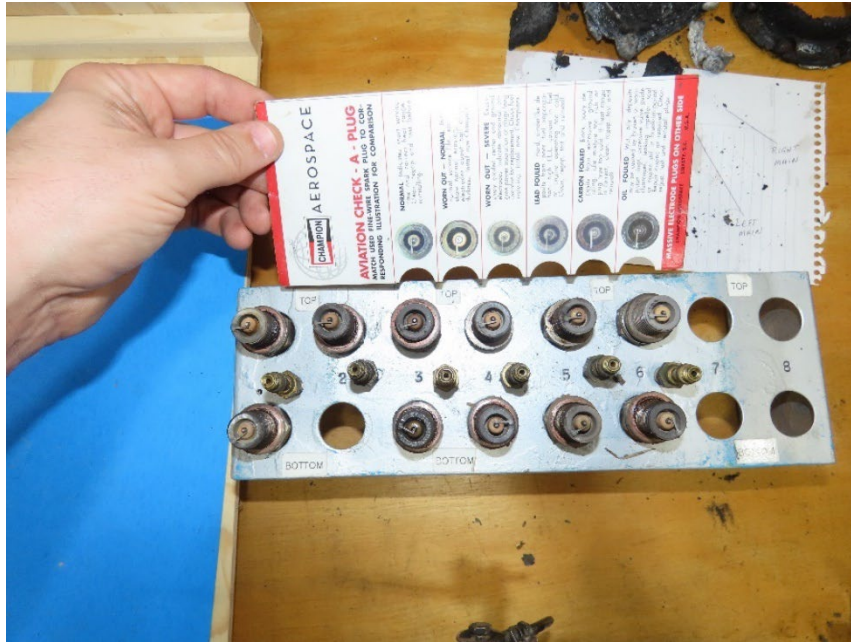


Figure 9 Spark plugs.

The oil filter was opened, and the pleats contained no foreign debris or ferrous material but several pieces of carbon from the burned pleats. The oil appeared dark brown in color and all lubricated components appeared to be well lubricated. (Figure 10)



Figure 10 Oil pleats.

The engine crankcase was manually rotated 720° degrees of rotation several time to check for crankshaft continuity and compression and suction. Continuity was confirmed and all pistons, valves, springs, and pushrods operated as designed. There was adequate suction and compression on each of the six cylinders. (Figure 11)



Figure 11 Both sides of engine with valve covers removed.

Continuity of the crankshaft to the camshaft was confirmed throughout the engine. A subsequent borescope of all six cylinders, pistons and valves revealed no anomalies were noted on the piston faces, valve faces and interior of the cylinders. The engine case was drilled to facilitate utilization of a borescope to examine internal portions of the engine. No anomalies were noted on the camshaft lobes and no anomalies were noted up through the bottom of the engine.

The engine driven fuel pump (Figure 12) was actuated by hand and produced fuel when rotated by hand. Suction and compression were confirmed on the pump. An electric drill test was conducted and resulted in significant pump pressure; it pumped water successfully.



Figure 12 Fuel pump operational test.

The fuel servo throttle arm remained attached to the control cable. The throttle plate was found approximately one third open. The mixture arm was found in a position about 55 to 60% rich. The fuel inlet line at the fuel screen was broken off. The interior screen (inside the venturi) at the fuel impact tube contained some unknown debris. The servo was retained and sent to the manufacturer for an examination and bench test.

The fuel injector lines were tested via using shop air applied into the fuel line coming in from the fuel servo. Fuel with the consistency of scent and color of AVGAS was pushed out of the Nos 1, 3 5 cylinders feed. No fuel was pushed out of the Nos 2,4,6 side. Air flowed freely through all lines.

The No. 5 fuel injector was partially blocked with some small trace amount of debris that appeared consistent with water and dirt; it was not solid when removed. The other fuel injectors were clear, and all six injectors appeared minor carbon sooting on the interior face of the injector.

The engine oil suction screen was removed and examined. It contained some unknown debris that had the consistency of plastic fibers (Figure 13). This debris was retained by the NTSB for further analysis. The engine oil filter was opened. The filter medium appeared clean with a few small shiny flecks present. The engine oil pan appeared free of debris. Magnet testing of oil pan revealed no metallic particles.

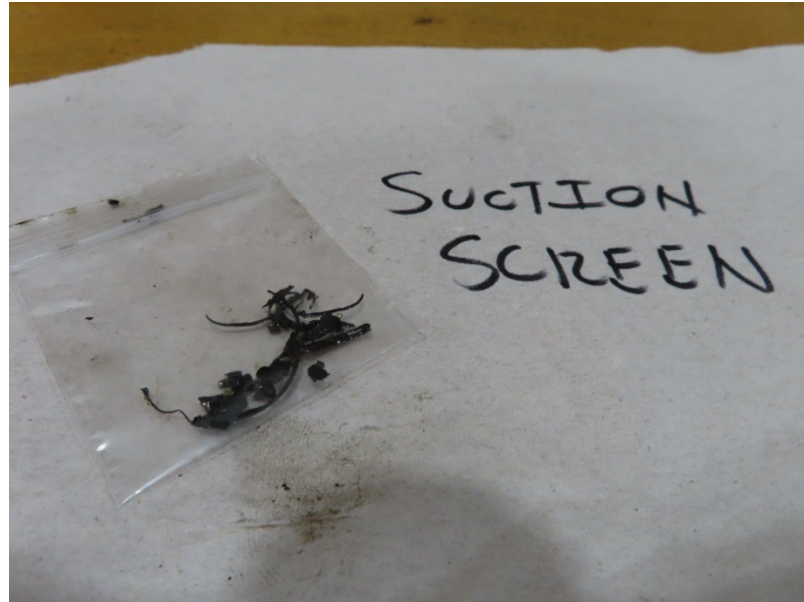


Figure 13 Debris in oil suction screen.

The turbocharger (Figure 14) rotated freely and was connected from the compressor side to the turbine side. No oil leaks noted and the system intact and outflow exhibited no anomalies.



Figure 14 View of turbo prior to removal.

5.0 Propeller Examination

The propeller (Hartzell) hub remained attached to the flange. The blades are designated as A, B, C. The A blade had a slight/minimal forward bend barely noticeable and did not have leading edge gouges or chordwise scraping. The B blade appeared normal and there was no chordwise scrapes or gouges. The C blade was bent significantly aft in a uniform manner. The bend in the blade was about 60 degrees. The spinner was crushed inwards with little rotational damage. The bends were uniform and did not have the "folded over" wave feature as normally found with propellers under power. The blades appeared in a normal range. Hartzell will come and examine the propeller assembly at a later date. The propeller governor and control linkage remained attached to its respective mount and was not damaged.



Figure 15 Propeller Assy.

6.0 Pilot & Passenger Information

Pilot / Family information.

Victor Dotsenko - Pilot/Father DOB [REDACTED]

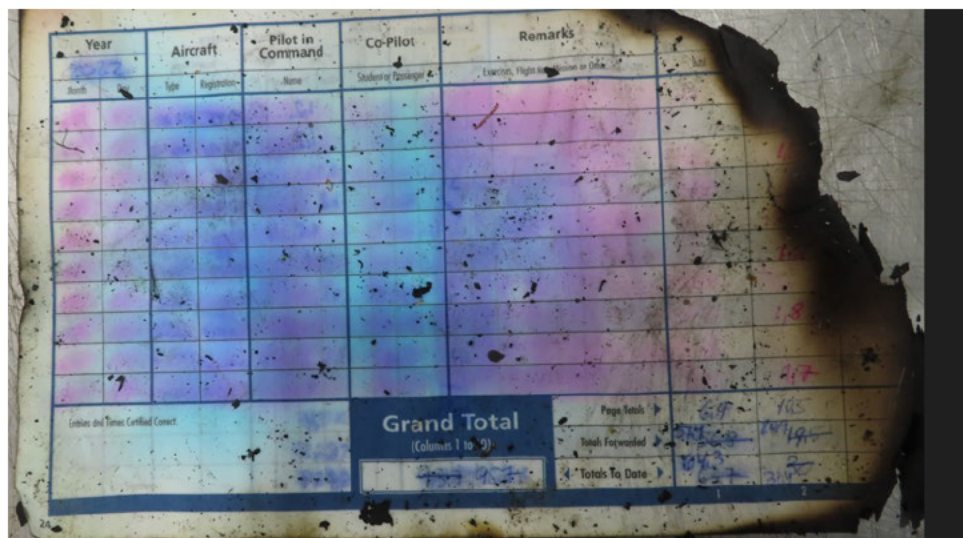
Wife - Rimma Dotsenko DOB [REDACTED]

David Dotsenko child - [REDACTED]

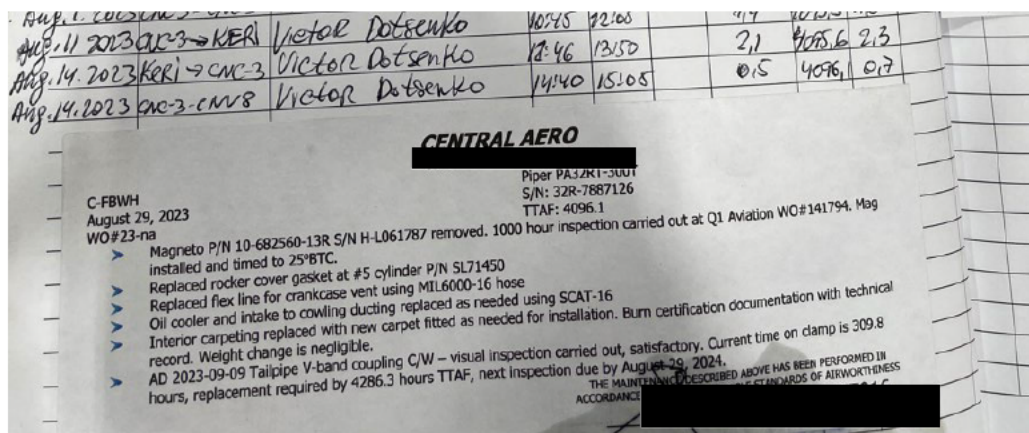
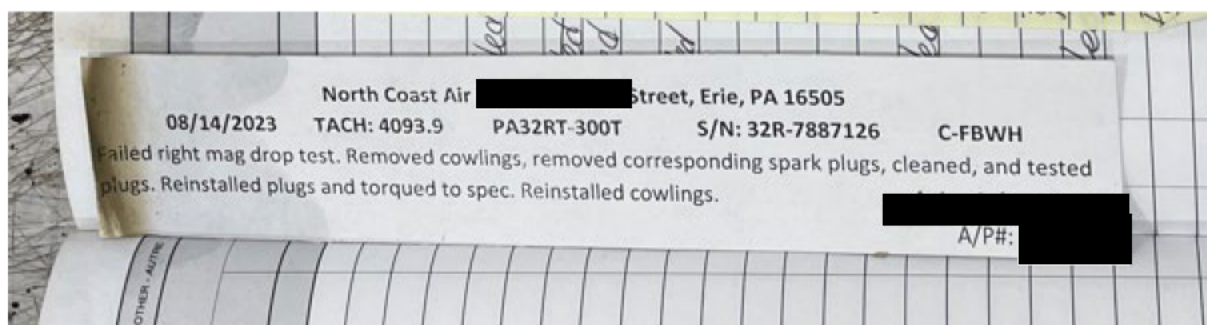
Zachary Dotsenko - child [REDACTED]

Emma C. Dotsenko - child [REDACTED]

More information requested from the Canada TSB. Limited logbook information available at the examination. Present logbook of the pilot was in hard copy format and only ran up to 2022 and showed about 100 hours total time. The maintenance record logbook revealed that the pilot purchased the airplane in June 2023 and contained some limited pilot hours information.



7.0 MX Documentation



Aviation Accident Investigator IIC