

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23LA094

AIRFRAME AND ENGINE EXAM

March 1, 2023

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A. CAACIDENT

Location: Carlsbad, California
Date: January 19, 2023
Time: 0800 Pacific standard time
Airplane: Piper PA-28R-200, N57355

B. AIRFRAME AND ENGINE EXAM

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C. SUMMARY

On January 19, about 0800 Pacific standard time, a Piper PA-28R-200, N57355, was substantially damaged when it was involved in an accident near Carlsbad, California. The flight instructor, pilot receiving instruction, and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations Part 91* instructional flight.

The flight instructor stated that they planned a flight to Santa Ana, California for the pilot receiving instruction to accumulate time in the accident airplane. The preflight inspection was normal and showed that the oil sump contained about 6 quarts of oil. After an uneventful engine run-up, they departed the airport and turned right to a northerly heading after they climbed to about 2,500 ft mean sea level (msl). As the airplane reached about 3,200 ft msl, the instructor observed that the oil pressure gauge indicated a pressure below "0 psi", while the oil temperature remained in the normal range. The instructor notified air traffic control (ATC) to terminate the flight and informed them that they were deviating to a nearby airport.

While the pilot receiving instruction (pilot flying) attempted to maintain 3,000 ft msl, the instructor observed the propeller default to maximum rpm and anticipated that the engine would soon fail. A few minutes later, the instructor observed smoke coming into the cockpit through the defrosters accompanied by a faint oil smell. He then heard a loud sound from the engine compartment and observed the propeller stop turning, which was accompanied by smoke coming from the engine cowling.

After a brief discussion between the instructor and pilot receiving instruction, they decided to perform a water landing. The pilot receiving instruction flew the airplane to the surface. The instructor notified ATC of the engine failure and proposed landing site. They subsequently touched down about 50 yards from the shoreline with the landing gear up.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

Manufacturer: Piper

Model Number: PA-28R-200

Serial Number: 28R-7435084

Recent Inspection: September 17, 2022 - Annual inspection

Examination of the recovered wreckage revealed that the nose landing gear remained attached to the fuselage, was extended and the airplane was placed on a metal stand to facilitate the examination. The fuselage exhibited crushing and scraping to the undercarriage. A large amount of sand and rounded stones were observed within the cabin, empennage, and wings. Corrosion, consistent with saltwater immersion, was noted throughout the airplane's structure.

The instrument panel remained attached to cabin structure; no visible damage was observed. Some instruments contained water and were corroded. The magneto switch was found in the off position, and the key had been removed. 4177.5 was observed on the Datcon meter. The landing gear switch was observed in the up position. The fuel selector lever was observed in the L tank position. The flap handle was stowed, correlating to flaps retracted/0°. The engine control levers were observed in about the mid-range position. The alternate air lever was in the off (closed) position.

The left wing had been cut/separated from the fuselage near the wing root by recovery personnel to facilitate recovery. The outboard wing was impact separated. The aileron and flap were impact damaged.

The right wing had been cut/separated from the fuselage near the wing root by recovery personnel to facilitate recovery. The outboard wing was impact separated. The aileron and flap were impact damaged.



Figure 1: Front view of airplane during exam.

The vertical stabilizer and rudder remained attached to the empennage. No visible damage was observed. The left and right side of the stabilator and been cut about 1 ft from the attachment fittings by recovery personnel to facilitate recovery. The stabilator trim tab remained attached to the stabilator.



Figure 2: Left, rear view of accident airplane.



Figure 3: Right, rear view of accident airplane.

The airframe fuel strainer (gascolator) contained blue in color liquid, consistent in color and odor to 100LL. The gascolator screen contained brittle, white deposits that covered about 20% or less of the screen's surface. Some sand was present on the bottom of the gascolator bowl.

2.0 Engine Examination

Engine Manufacturer: Lycoming
Engine Model Number: IO-360-C1C
Engine Serial Number: L-26081-51A

Examination of the recovered engine revealed that it remained attached to the engine mounts. The engine was exposed to salt water during the accident and contained rock debris from its impact with terrain. All of the engine accessories remained attached to their respective mounting pads and no loose wiring or fluid leakage was observed throughout the engine. The engine case was breached between the push tubes of the no. 2 cylinder, showing a visible puncture along the push rod tube channel at cylinder. A mixture of oil, water, and sand was observed on the engine oil dipstick.



Figure 4: Left side view of the engine during the exam.



Figure 5: View of engine case breach.

The spark plugs were removed from the engine, and they were the massive electrode type. The sparkplugs exhibited rust and gray deposits within the electrode area, consistent corrosion resulting from salt water immersion. All spark plugs exhibited signatures consistent with WORN NORMAL when compared to the Champion Check-A-Plug comparison chart. No mechanical damage was observed to the electrode area of any sparkplug.



Figure 6: View of spark plugs.

The fuel injection servo remained attached to the engine at the mounting pad of the plenum. The throttle/mixture controls were found securely attached at their respective control arm of the servo. The castellated nut and cotter pin remained secure and the serrated interface at the throttle and mixture arm remained securely mated.

The fuel flow divider (spider) remained attached at the mounting bracket situated at the top of the engine. The fuel lines remained secure at each flow divider fitting and fuel injector at each cylinder.

The fuel injection nozzles remained attached at each cylinder with the respective fuel line attached.

The fuel pump was attached to the engine at the mounting pad. The fuel lines remained secure at their respective fittings.

The oil system components were intact and the oil lines were all secured at their respective locations. The oil pump return line coupling was secured at both house clamps.

The oil sump was attached to the engine case, but was severely corroded due to salt water exposure/submersion. An approximately 3 inch wide hole was observed in the oil sump below the no. 2 cylinder induction tube connection. The area was white, consistent with salt water corrosion and the area was soft and was easily penetrated when pressure was applied. The low profile oil sump quick drain plug was in the closed position and operated normally when depressed by hand.



Figure 7: Hole in oil sump near the no. 2 cylinder induction tube.

The oil pump was corroded, consistent with salt water immersion and could not be rotated by hand. A trace amount of oil was observed at the mating surfaces of the oil pump housing.



Figure 8: View of oil pump and impeller.

The oil suction screen and oil filter were removed. The oil suction screen contained sand, organic material and two small flakes of ferrous metal. The full flow oil filter was cut open to expose the filter media and remained free of any pre-mishap debris.



Figure 9: View of oil suction screen.

The no. 1 cylinder was removed to facilitate internal examination of the engine crankcase. Internal examination of the engine revealed that the no. 2 connecting rod separated from the crankshaft and a small portion of the connecting rod end cap (cylinder no. 2) remained attached to the rod shank. Rotational score marks were observed along a visible portion of the camshaft at the no 2 cylinder connecting rod. A heat gradient was observed along the shank of the no. 2 cylinder connecting rod, consistent with thermal stress. The no. 2 connecting rod bearing had separated from the journal, which was mechanically damaged. A remaining section of the no. 2 connecting rod end cap displayed score marks consistent with interfacing at the no. 2 crankshaft journal. Metallic remnants recovered from the bottom of the engine case included fragments from a no. 1 cylinder tappet, the cylinder no. 2 connecting rod end cap, a portion of the cylinder no. 1 combustion chamber, and other metallic debris.



Figure 10: View of internal damage to the connecting rod and crankshaft journal.

The engine was retained for an additional examination.

3.0 Propeller Examination

The airplane was equipped with a three blade constant speed Hartzell propeller. The propeller and propeller hub propeller remained attached at the crankshaft flange. One propeller blade exhibited aft bending near the propeller tip. No visible damage was observed to the remaining propeller blades.



Figure 11: Front view of propeller.

4.0 Aircraft Information

TOTAL brought forward from previous page

September 15th, 2022 N57355 PA-28R-200 S/N: 28R-74435084 Tach: 9616.6 Hobbs: 4146.80

Complied with an annual inspection per the Piper PA-28R-200 MM section 3, table 111-2.

Lubricated and serviced aircraft per the Piper PA-28R-200 MM section 2, pages 1E19-1F4.

Inspected ELT in accordance with FAR 91.207 (d), next due September 2023.

ELT BATTERY DUE OCT 2023.

Inspected pneumatic filters RA-B3-5-1 and RA-D9-18-1 and found acceptable.

Placed aircraft on jacks and lubricated landing gear. Gear operated on main and emergency systems. No abnormalities noted. Serviced brakes and wheel bearings and replenished hydraulic system with MIL-H-5606.

INOP items inspected and verified items do not interfere with the normal operation of the aircraft as per FAR 91.405.

All applicable AD's complied with to date. All work was performed in accordance to all current service manuals. ATP Navigator revision date: 09-15-2022. I certify this airframe has been inspected in accordance to an annual inspection under current Federal Aviation Regulations and has been found airworthy for return to service.

George Oesterreicher [Redacted Signature] A/P [Redacted Signature]

Figure 12: View of airframe annual inspection.

September 15th, 2022 N57355 Lycoming IO-360-C1C S/N: L-26081-51A Tach: 9616.61 Hobbs: 4146.80

Complied with an annual inspection per the Piper PA-28R-200 MM section 3, table 111-2.

Lubricated and serviced engine per the Piper PA-28R-200 MM section 2, pages 1E19-1F4.

Additionally, referenced the Lycoming IO-360-C1C service manual, section 5-20-03.

Drained oil. Removed, inspected and replaced oil filter CH-48110-1 with new. Cleaned and inspected oil suction screen. Inspected magnetos for timing, security of installation and oil leaks.

Compression checks as follows: #1 68/80, #2 70/80, #3 72/80, #4 70/80.

Removed and replaced with new Brackett Air Filter BA-10. Cleaned gascolator and fuel screens.

Solvent washed engine. Lubricated engine controls and verified full range of motion.

Operational check performed. No abnormalities noted at this time.

All applicable AD's complied with to date. All work was performed in accordance to all current service manuals. ATP Navigator revision date: 09-15-2022. I certify this engine has been inspected in accordance to an annual inspection under current Federal Aviation Regulations and has been found airworthy for return to service.

George Oesterreicher [Redacted Signature] A/P [Redacted Signature]

Figure 13: View of engine annual inspection.

5.0 Meteorological Information

ARCHIVED METAR OF: 20230119 // FROM: 0 TO: 23 UTC
AIRPORTS REQUESTED: KCRQ

KCRQ 191453Z AUTO 07003KT 10SM CLR 06/02 A3014 RMK AO2 SLP206
T00610022 53001
KCRQ 191553Z 07003KT 10SM CLR 08/02 A3014 RMK AO2 SLP208 T00780022
KCRQ 191653Z 08003KT 10SM CLR 10/04 A3015 RMK AO2 SLP210 T01000039
KCRQ 191753Z 00000KT 10SM CLR 12/04 A3016 RMK AO2 SLP211 T01220039
10122 20050
51006
KCRQ 191853Z 29005KT 10SM CLR 13/08 A3015 RMK AO2 SLP208 T01280078

Submitted by:

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