

National Transportation Safety Board

Office of Aviation Safety
Central Region



CEN21FA220

WRECKAGE EXAMINATION SUMMARY

ACCIDENT

Location: St. Louis, Michigan
Date: May 17, 2021
Time: 1308 eastern daylight time
Airplane: Cessna 182H, Registration No. N2430X

PARTICIPANTS

Investigator-In-Charge	Andrew Todd Fox National Transportation Safety Board Denver, Colorado
Investigator	David Shaun Williams National Transportation Safety Board Denver, Colorado
Group Member	Ricardo J. Asensio Textron Aviation Wichita, Kansas

ACCIDENT SYNOPSIS

On May 17, 2021, about 1308 eastern daylight time, a Cessna 182H airplane, N2430X, was destroyed when it was involved in an accident near St. Louis, Michigan. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 pipeline patrol flight.

WRECKAGE EXAMINATION TIMELINE

On May 18, 2021, National Transportation Safety Board (NTSB) Investigator Williams documented the accident site and wreckage with the assistance of a Textron Aviation investigator. The wreckage was subsequently recovered by AMF Aviation, LLC, Springfield, Tennessee, and stored until NTSB Investigator Fox completed an engine examination on June 8, 2021. On December 14, 2021, NTSB Investigator Fox released the wreckage to an individual representing the insurance company.

AIRPLANE DESCRIPTION

The airplane was a 1965 Cessna 182H (Skylane), serial number (s/n) 18256330, registration number N2430X. The Continental O-470-R engine, s/n 131361-5-R, was

normally aspirated, carbureted, and rated at 230 horsepower at 2,600 rpm. The engine provided thrust through a two-blade, constant speed, McCauley 2A34C series propeller, s/n 912099. The high-wing airplane was of conventional aluminum construction with a fixed tricycle landing gear and wing flaps. The airplane's empty and maximum takeoff weights were 1,689 lbs and 2,800 lbs, respectively. Fuel was supplied to the engine from two tanks, one in each wing, and the total fuel capacity was 65 gallons (60 gallons usable). The fuel selector valve positions include left, right, and off.

MAINTENANCE SUMMARY

Recent Maintenance

According to maintenance documentation, on March 30, 2021, the last annual inspection of the airplane was completed at 6,744.29 total airframe hours, and the engine had accumulated 2,174.39 since it was overhauled on December 21, 2015.

On May 1, 2021, at 6,785.7 total airframe hours, the last maintenance logbook entry was for an engine oil change, oil filter replacement, and new spark plug installation. A review of available logbook documentation did not reveal any unresolved maintenance issues for the airplane.

The airplane's tachometer was destroyed during the postaccident fire and, as such, the airplane's total airframe and engine times at the time of the accident could not be determined.

Recent Fueling

According to fueling documentation, the airplane received 48.19 gallons of 100 low-lead aviation fuel at Romeo State Airport (D98), Romeo, Michigan, before it departed on the accident flight.

WRECKAGE EXAMINATION AT ACCIDENT SITE (MAY 18, 2021)

The wreckage debris path began in the vicinity of a 1,049-foot-tall tower, as depicted in figure 1. The tower was identified as Federal Communications Commission (FCC) Tower Registration No. 1007986. The location of the tower is depicted on a visual flight rules (VFR) sectional chart, as shown in figure 2. According to the VFR Sectional Chart, the top of the tower is at 1,739 ft mean sea level (msl). The tower base is at 690 ft msl. The tower design is depicted in figure 3. Photos of the tower are shown in figures 4-5.

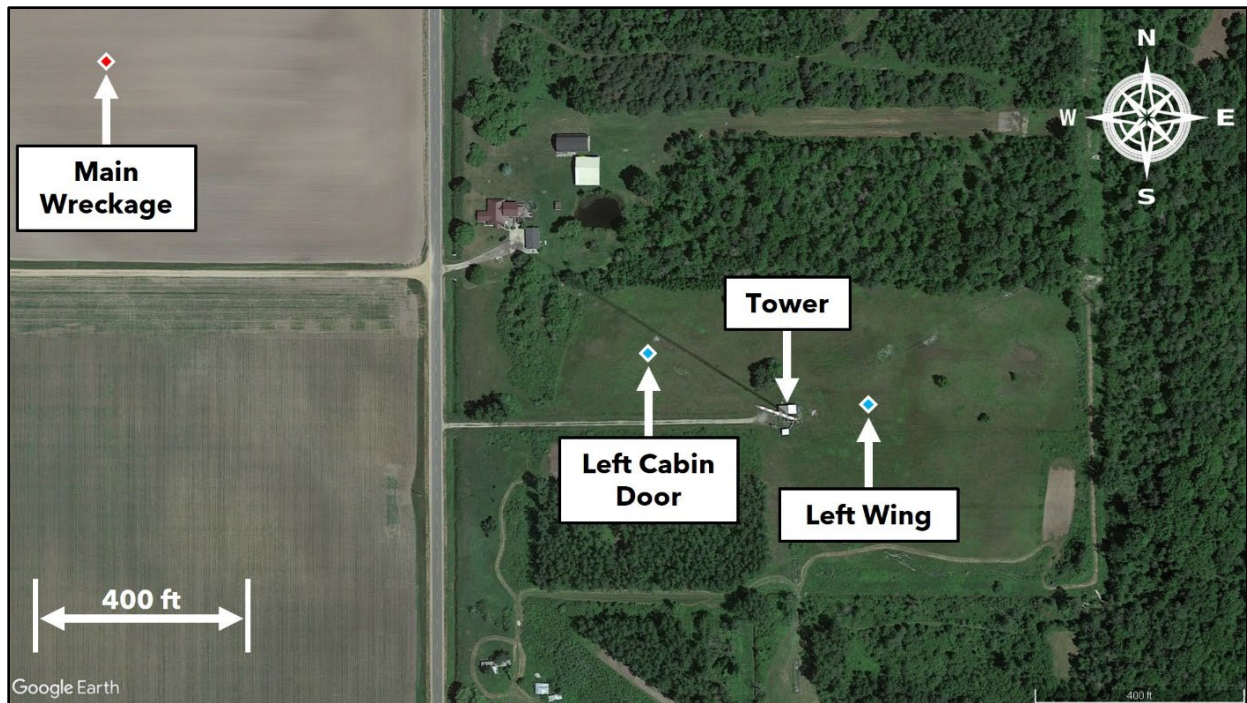


Figure 1 - Wreckage Debris Path



Figure 2 - Location of Tower on VFR Sectional Chart

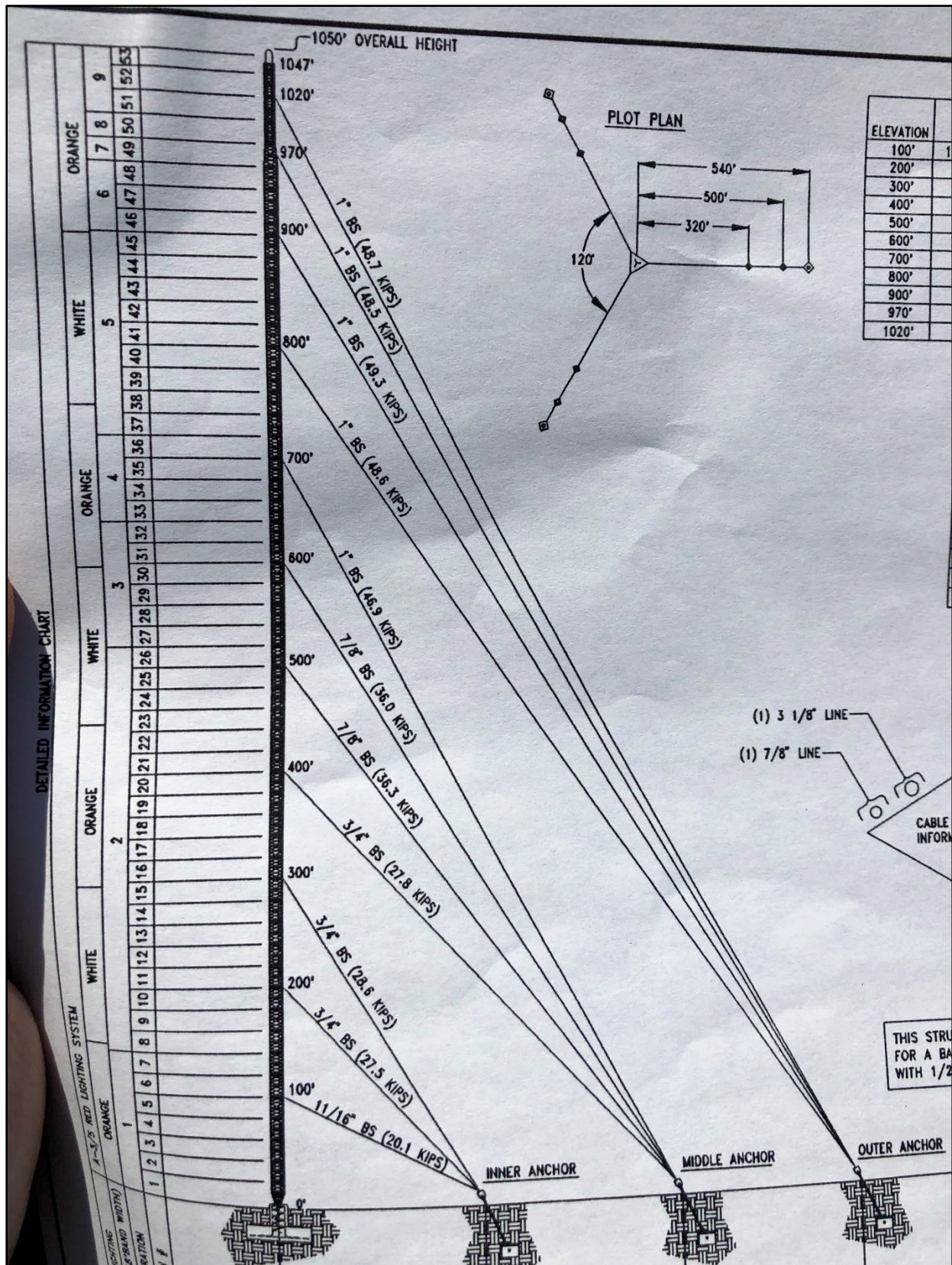


Figure 3 - Tower Components and Dimensions



Figure 4 - Tower (Photo Courtesy of Midland County Sheriff's Office)



Figure 5 - Tower (Photo Courtesy of Textron Aviation)

The airplane's left wing collided with a tower guy wire on the northeast side of the tower. The left wing separated from the fuselage at the wing root, as shown in figure 6. The fresh air tube located in the leading edge of the left wing, between WS23.62 and WS56.53, exhibited a U-shape compression that was consistent with the diameter of the outermost guy wires, as shown in figure 7. There were wire impact marks on the left lift strut about 4 ft from the wing attach point, which severed the strut in two portions, followed by the front spar. The damage to the left-wing lift strut exhibited a U-shaped compression about 1 inch in diameter, consistent with the diameter of the outermost guy wires, as shown in figure 8. The remaining section of left-wing lift strut with the door post was found in a tree near and just past the tower. The leading edge of the left wing separated from the main wing structure along the lateral rivet line from WS136.00 outboard including the wing tip cap, consistent with a guy wire fileting open the wing along the leading edge of the forward spar, as shown in figure 9. The left horizontal stabilizer and left elevator separated the fuselage during the impact sequence. The left horizontal stabilizer had leading edge damage consistent with the left wing impacting the surface, as shown in figure 10.

Tower:	43.516011 N, -84.545815 W, Base 690 ft msl; Top 1,739 ft msl
Left Wing:	43.516111 N, -84.545278 W, 689 ft msl
Left Cabin Door:	43.516389 N, -84.546944 W, 690 ft msl
Main Wreckage:	43.517980 N, -84.551030 W, 696 ft msl



Figure 6 - Left Wing at Accident Site



Figure 7 - Left Wing Fresh Air Tube with U-Shape Bend



Figure 8 - Left Wing Lift Strut Damage



Figure 9 - Left Wing Leading Edge and Forward Spar Damage



Figure 10 - Left Elevator and Portion of Left Stabilizer

The main wreckage was located about 0.26 nautical mile (nm) on a 297° true bearing from the tower. The wreckage came to rest inverted on a 245° magnetic heading. The fuselage was consumed by the postimpact fire, as shown in figure 11. All major airframe structural components and flight control surfaces were identified along the wreckage debris path.

The right wing was located with the main wreckage, as shown in figure 12. The right wing exhibited thermal damage near the wing root from the postimpact ground fire. The right wingtip was present. The right-wing lift strut remained intact between the fuselage and wing attach points. The right-wing forward spar exhibited a slight S-shaped bend.



Figure 11 - Main Wreckage

Flight control cable continuity was established from all the control surfaces to the cockpit with overload separation on the left-wing cables. The left aileron remained attached to its respective hinge points and exhibited minor impact related damage. The right aileron remained attached to its respective hinge points but exhibited significant thermal damage from the postimpact fire. The left horizontal stabilizer and elevator separated inflight and were located near the tower. The right horizontal stabilizer, right elevator, vertical stabilizer, and rudder remained attached to the aft

fuselage with the main wreckage, as shown in figure 13. The right elevator and rudder remained attached to their respective attach points.



Figure 12 - Right Wing



Figure 13 - Right Stabilizer, Right Elevator, Vertical Stabilizer, and Rudder

A measurement of the flap jackscrew extension was consistent with the flaps fully retracted at impact. A majority of the right flap was destroyed by the postimpact fire. The elevator trim tab measured 1.25 inches, consistent with a neutral pitch-trim position.

The fuselage, cabin, and cockpit were destroyed by the postimpact fire, as shown in figure 14. Both main landing gear were located with the main wreckage and remained attached to the structural gear box. The nose landing gear strut was located with the main wreckage. The airframe fuel system could not be examined due to post impact damage.



Figure 14 - Fuselage, Cabin, and Cockpit

The engine remained partially attached to the airframe through control cables and exhibited significant thermal and impact damage from the postimpact fire, as shown in figure 15.

The two-bladed propeller separated from the propeller hub and was found in an impact crater about 25 ft before the main wreckage. The pitch change spring was at the bottom of the impact crater. Both propeller blades were observed with leading edge damage, bending and polishing, as shown in figure 16 and figure 17.

Postaccident examination of the airplane wreckage did not reveal any evidence of a mechanical malfunction or failure that would have prevented normal operation of the airplane before it collided with the radio tower guy wire. All physical damage to the airframe, flight controls, engine, and propeller was consistent with impact with the tower guy wire, impact with the ground, or the postaccident fire.



Figure 15 - Engine at Accident Site



Figure 16 - Propeller Blades, Cambered Side



Figure 17 - Propeller Blades, Flat Side

FOLLOW-UP ENGINE EXAMINATION (JUNE 8, 2021)

The engine was separated from the firewall before the examination, as shown in figure 18. Both propeller blades separated from the hub during impact. The spinner bulkhead was crushed aft around the engine crankcase. The exterior surface of the engine crankcase and the externally mounted engine components exhibited significant thermal damage, as shown in figures 18-21. The engine crankcase did not exhibit any holes or cracks. Engine cylinder No. 6 exhibited impact damage to the cooling fins. The rocker box covers for cylinder Nos. 1 and 3 are burned. The rocker box cover for cylinder Nos. 2, 4, and 6 remained intact.

The ignition harness exhibited impact and thermal damage. All spark plugs were found securely installed. The left magneto remained attached to its respective crankcase mount pad. The right magneto has separated from the crankcase mount pad. The right and left magnetos exhibited thermal damage, as shown in figure 22, and did not function when tested. The top spark plugs were removed and exhibited features consistent with normal engine operation, as shown in figure 23.



Figure 18 - Engine, Front



Figure 19 - Engine, Left Side



Figure 20 - Engine, Right Side



Figure 21 - Engine, Rear



Figure 22 - Left and Right Magneto

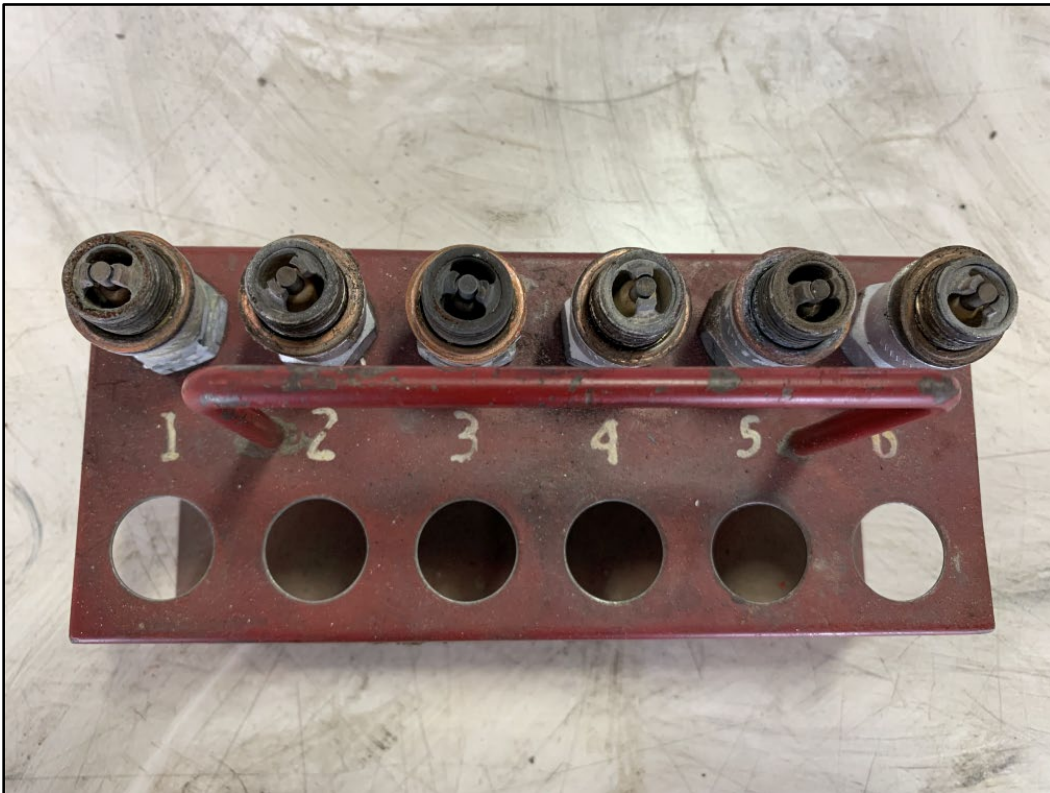


Figure 23 - Top Spark Plugs

The left intake and exhaust remained attached to each cylinder. The right intake has separated from cylinder Nos. 1, 3, and 5. The exhaust remained attached and exhibited impact-related damage.

The upper half of the carburetor remained attached to the induction plenum, as shown in figure 24. The carburetor bowl and float assembly were not present.



Figure 24 - Upper Half of Carburetor and Induction Plenum

The propeller governor remained partially attached and exhibited significant impact damage. The propeller control had separated from the propeller governor.

The vacuum pump remained attached to its respective crankcase mount pad.

The electric starter remained attached to its respective crankcase mount pad.

The alternator pulley and alternator were separated from the rear of the engine.

The F&M oil filter adapter remained attached and did not exhibit any evident of an oil leak. The screw-on oil filter remained attached to the adapter and exhibited impact and thermal damage. The oil cooler remained attached to the forward right side of the engine crankcase.

The six fuel primer lines remained attached to the primer manifold and all six cylinders. The impact damaged primer supply line remained attached to the primer manifold.

The oil sump remained intact and exhibited impact related crushing, but there was no evidence of an oil leak. The oil dip stick remained installed, and when removed it exhibited impact and thermal damage. The oil dip stick was not wetted with oil.

The engine crankshaft could not be rotated due to extensive thermal damage. A borescope examination of each cylinder confirmed no anomalies with the cylinders, pistons, valves, or valve seats. A full engine disassembly did not reveal any mechanical malfunctions or failures that would have prevented normal operation, as shown in figures 25-29.

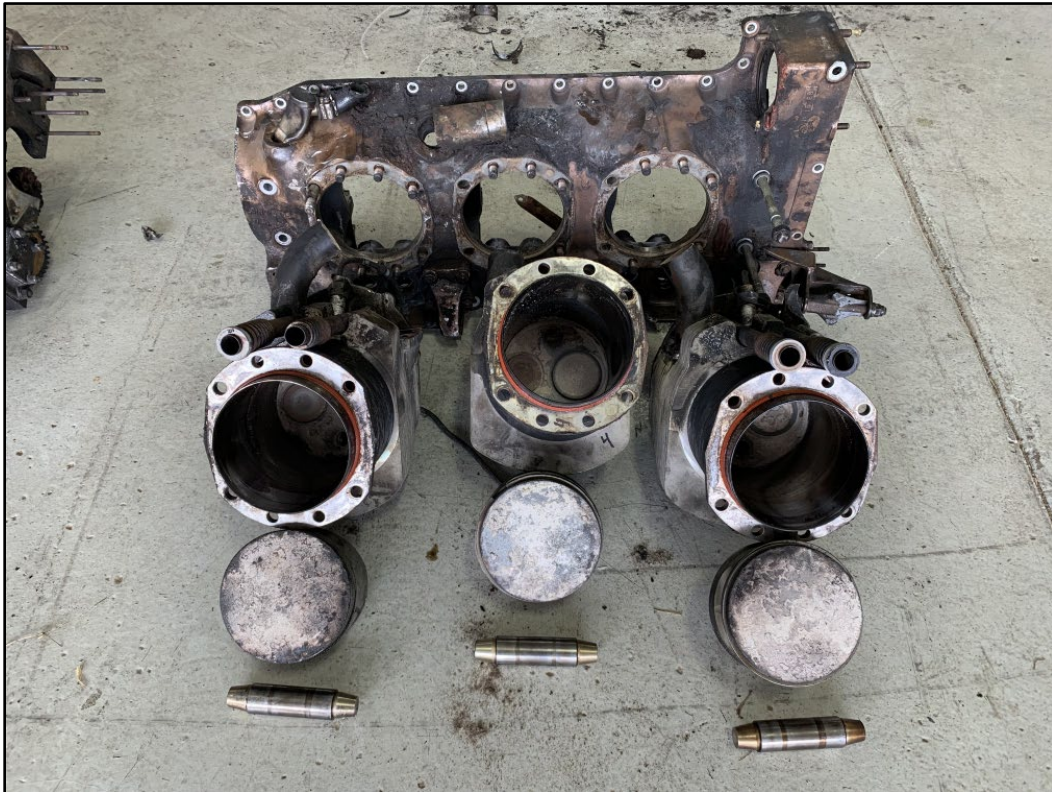


Figure 25 - Crankcase, Cylinders, Pistons, and Piston Pins (Left Side)

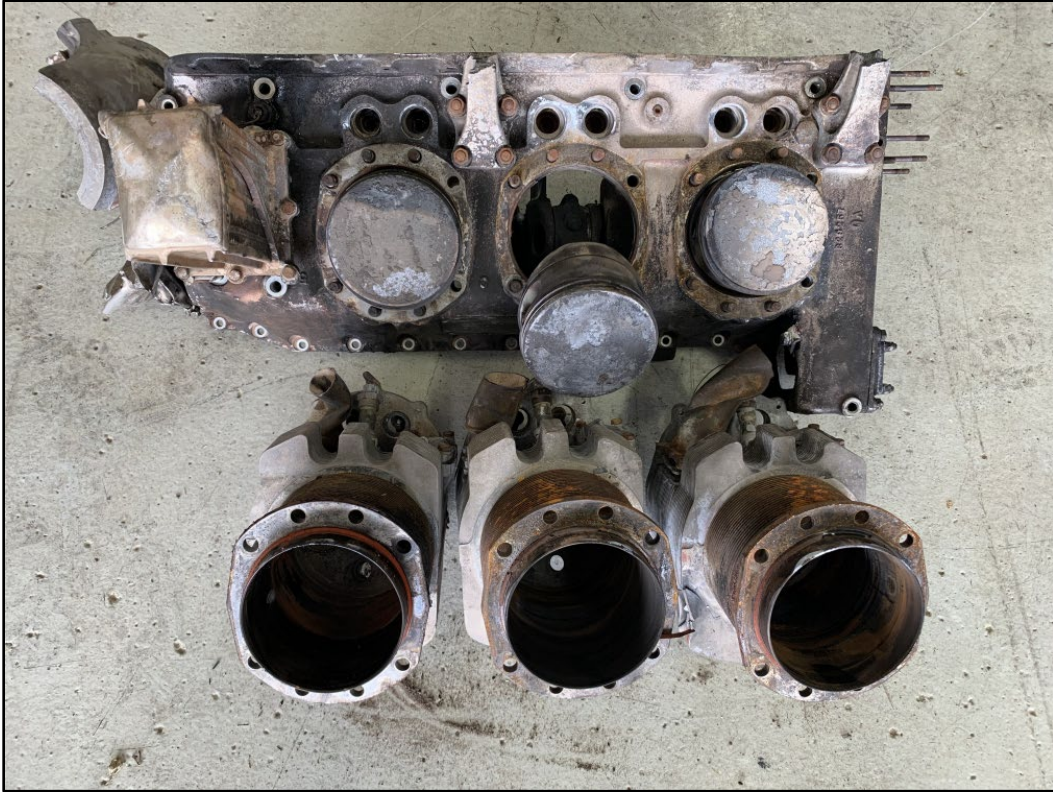


Figure 26 - Crankcase, Cylinders, and Pistons (Right Side)

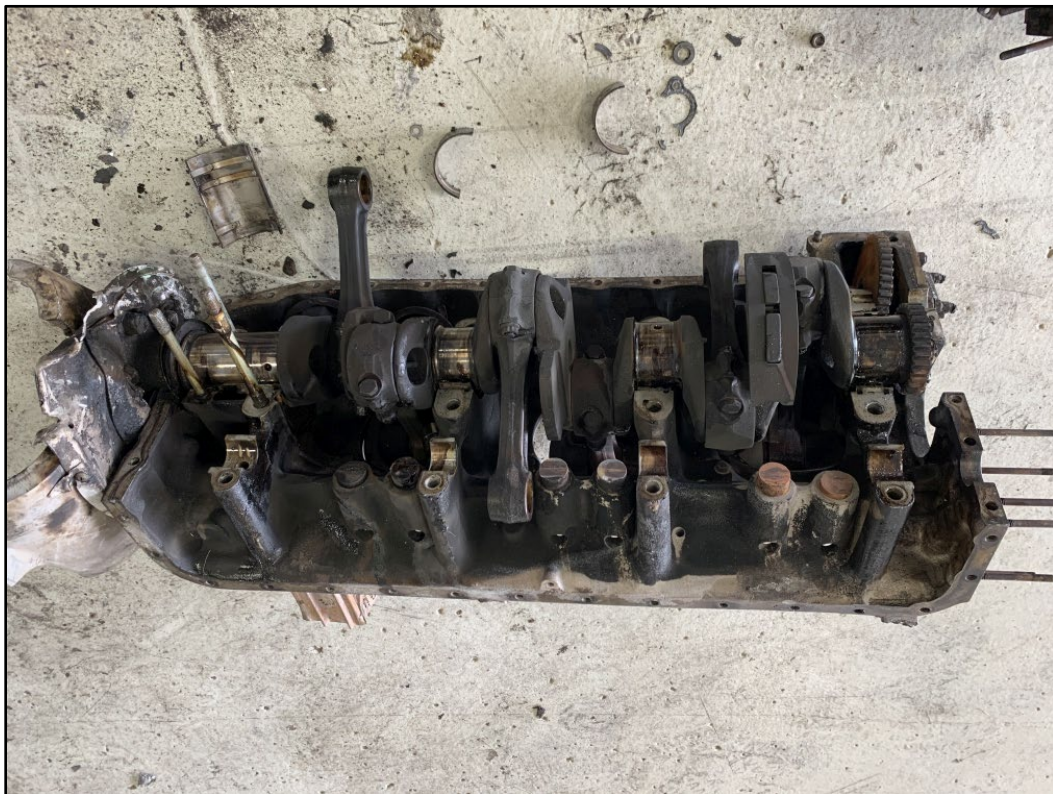


Figure 27 - Crankcase (Right Half), with Crankshaft and Connecting Rods

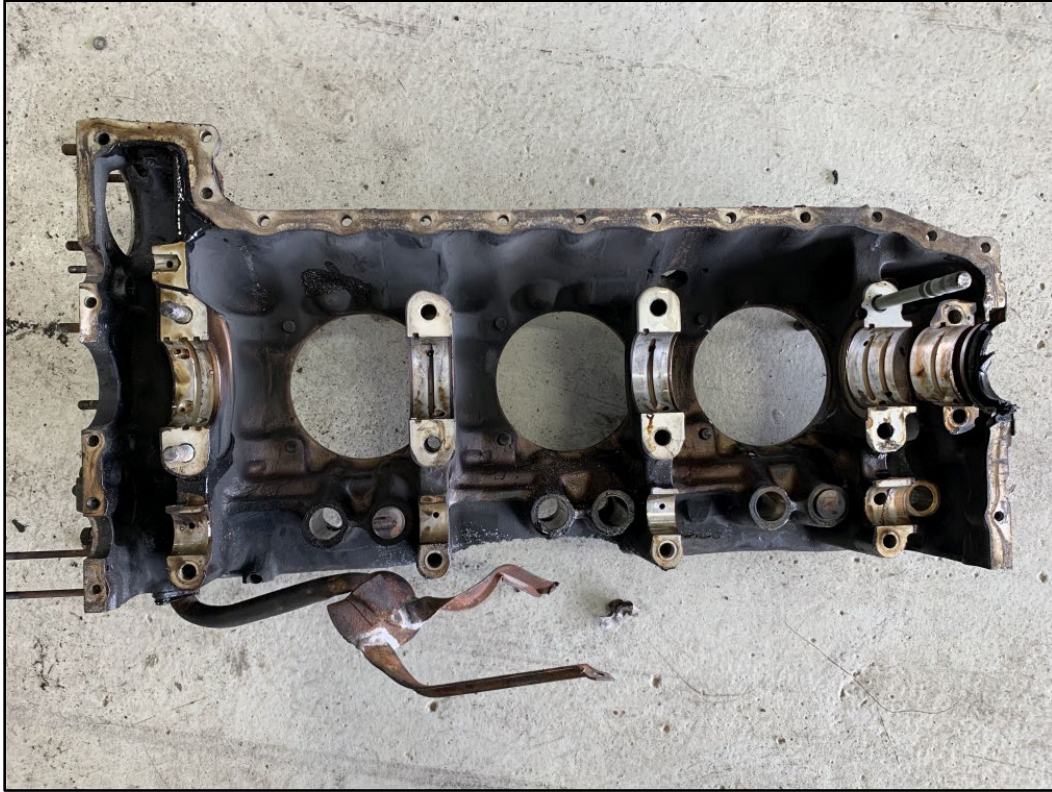


Figure 28 - Crankcase (Left Half)



Figure 29 - Camshaft