

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN23LA081

ENGINE EXAMINATION SUMMARY

May 15, 2023

A. ACCIDENT

Location: Conroe, Texas
Date: 01/14, 2023
Time: 1425 CST
Aircraft: Pitts Model 12; N512P

B. ENGINE EXAMINATION SUMMARY

IIC	Aaron Sauer NTSB Denver, CO
Participants	Rhonda Barrett-Bewley Barrett Precision Engines, Inc. Tulsa, OK Lonnie Stokes Barrett Precision Engines, Inc. Tulsa, OK Larry King Mechanic Atlanta, Georgia

C. SUMMARY

On January 14, 2023, about 1425 central standard time, a Pitts Model 12 airplane, N512P, sustained substantial damage when it was involved in an accident near Conroe, Texas. The pilot sustained minor injuries, and the passenger sustained serious injuries. The airplane was operated as a *Code of Federal Regulations* Part 91 personal flight.

The pilot reported to a mechanic that he noticed a fuel pressure warning light prior to the loss of engine power.

Engine:

The engine was transported via truck to Barrett Precision Engines, Inc. from recovery facility, Air Salvage of Dallas. Engine crate sealed until arrival of NTSB investigator and participants. Initial photographs and documentation were completed, and engine was mounted in the test cell (see Figure 1).



Figure 1. Engine mounted in test cell

Prior to the functional engine test, 2 upper cylinder spark plugs wires (damaged during impact sequence) were repaired. Due to the presence of non-ferrous metal noted in the airframe fuel system, the engine driven fuel pump was removed, flushed (non-ferrous metal noted in pump when flushed), and a functional bench test was completed at Aircraft Accessories. When bench tested, a leak was noted at the rear drain and rear diaphragm. The fuel pump flowed normally at idle and cruise power settings. The fuel pump was placed back on the engine for the functional engine test. A cold compression check was completed on all 9 cylinders: #1 - 76, #2 - 78, #3 - 76, #4 - 72, #5 - 76, #6 - 76, #7 - 74, #8 - 75, #9 - 76.

During the engine prime procedure, the engine driven fuel pump leaked from the rear pressure relief valve and diaphragm area. Due to the potential fire and safety concerns, the pump was removed and replaced with a slave pump. The pump was disassembled. Scratches and scoring marks were noted on the pressure relief valve seat, which allowed fuel into the air side of the fuel pump (see Figure 2). The diaphragm was undamaged. When the air cavity filled completely with fuel, the pump fuel pressure would equalize, or go to zero within the pump, and the pump would not

flow any fuel. During examination of the airframe, blue stains, consistent with a fuel leak, were noted on the external pump housing.



Figure 2. Pressure relief valve with diaphragm

The engine, with the slave fuel pump, was started without issue. About 800 RPM, a vertical vibration was observed with the engine and test cell stand. The functional test was terminated at that time due to safety concerns.

The airframe electric fuel pump, which was shipped with the engine, was tested at Aircraft Accessories. The fuel pump was flushed, and non-ferrous metal was noted in the pump (consistent with the metal noted in the airframe fuel system). The electric pump was placed on the test bench. Initial start revealed some abnormal flow and pressure, more than likely due to some additional debris. After a short time, the pump flow and pressures were normal during the test procedure. The pump was disassembled, and non-ferrous metal debris was noted within the pump. The pump rotor was difficult to remove from the housing. When removed, the outer diameter of the pump rotor contained scratches and scoring (see Figure 3).



Figure 3. Electric fuel pump rotor

Submitted by:

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