

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24FA310

WRECKAGE EXAMINATION REPORT

September 8, 2025

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A. ACCIDENT

Location: Geneva, OH
Date: 07/21/2024
Time: 1754 EDT
2154 UTC
Airplane: Titan T-51 Mustang (N751TX)

B. WRECKAGE EXAMINATION REPORT

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C. SUMMARY

On July 21, 2024, about 1754 eastern daylight time, an Experimental Titan T-51 Mustang, N751TX, was substantially damaged when it impacted terrain near the Germack Airport (7D9), Geneva, Ohio. The commercial pilot was fatally injured. The airplane was operated by the pilot as a personal flight conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

The airframe displayed significant impact damage to both wings, the fuselage, and the empennage. The airframe had also been cut into several sections by recovery personnel to facilitate transport to the salvage facility.

Flight control continuity was established for the elevator, rudder, and ailerons through breaks that were consistent with impact damage as well as recovery cuts. Continuity was established for the throttle and propeller controls through breaks that were consistent with impact damage.

The fuel tanks displayed impact damage and were devoid of fuel. The fuel caps remained secured to their respective fuel tanks. Fuel line continuity could not be established due to extensive fragmentation of the wreckage.

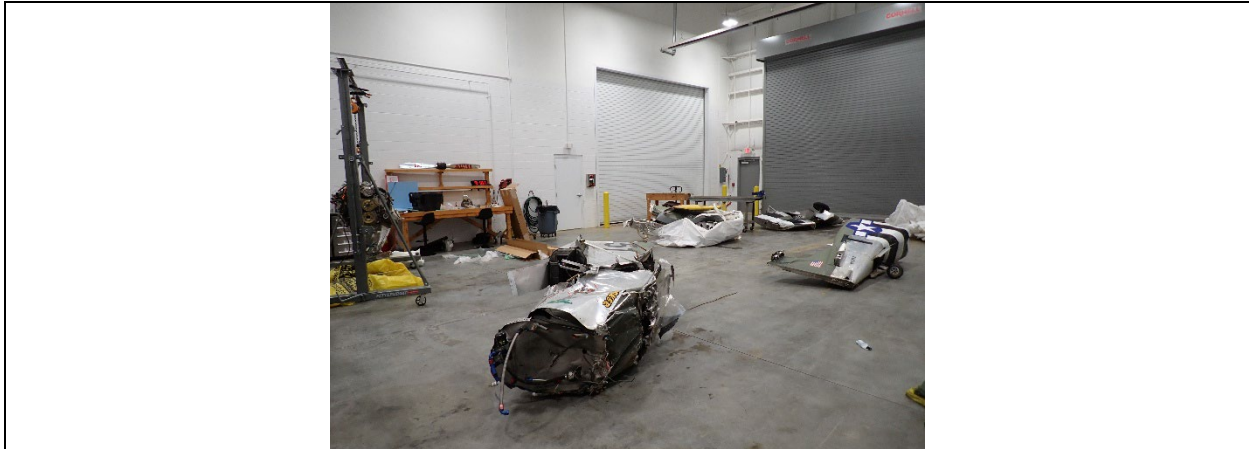


Figure 1: Airframe overview

2.0 Engine Examination

The engine had been removed from the airframe prior to the examination. The engine displayed impact damage signatures with most of the damage observed to the forward portion of the engine, intake manifold, and rocker arm covers. The propeller reduction gearbox had fracture separated from the engine and displayed impact damage signatures. A portion of the fractured propeller hub remained attached to the propeller drive shaft.



Figure 2: Engine overview

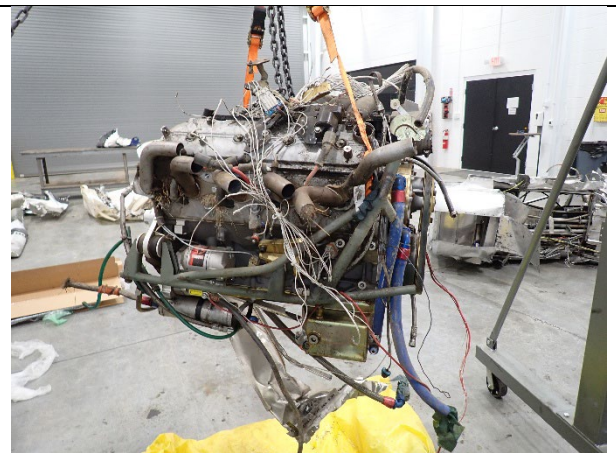


Figure 3: Engine overview

While attempting to rotate the crankshaft manually, it was found that the crankshaft would only rotate approximately 25° before binding and seizing. The engine was partially disassembled to facilitate examination. Both valve keepers for the No. 1 exhaust valve were found to have separated from the valve and spring

assembly, and one of the valve keepers for the No. 3 intake valve had also separated. The keepers were found in the rocker box assembly and appeared to be undamaged. The No. 1 exhaust valve was found to be seized in the valve guide. Upon further disassembly, the No. 1 exhaust valve was found to be bent and the No. 1 piston displayed semicircular impressions that were consistent with multiple valve strikes with the No. 1 exhaust valve. The damage observed to the valve and piston was consistent with a floating valve, which can occur during an engine overspeed. The rest of the rocker arms, valves, and valve springs displayed normal operating and lubrication signatures. The pistons and cylinders displayed varying amounts of corrosion and contamination from water intake. The contamination was consistent with impact/post-impact intake.



Figure 4: No. 1 piston with valve strike impressions

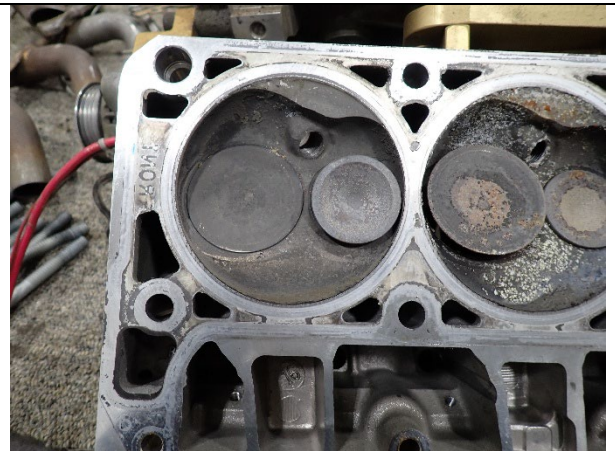


Figure 5: No. 1 cylinder head with valves

The crankshaft remained intact and after removing the cylinder heads, was capable of rotating 720 degrees without any signs of binding. The connecting rods remained attached to their journals and displayed normal operating and lubrication signatures. The camshaft and lifters were removed and the components displayed normal operating and lubrication signatures.

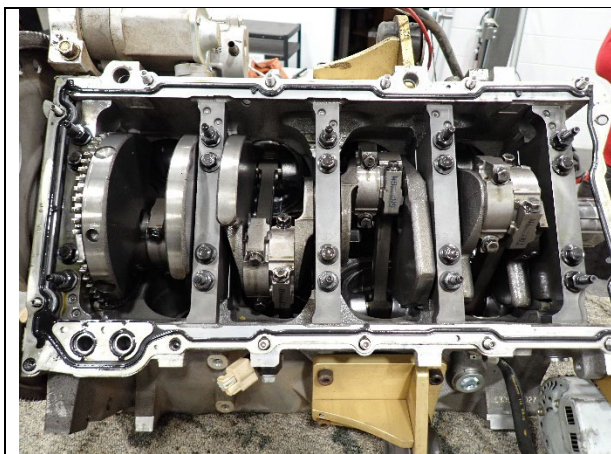


Figure 6: Crankshaft assembly

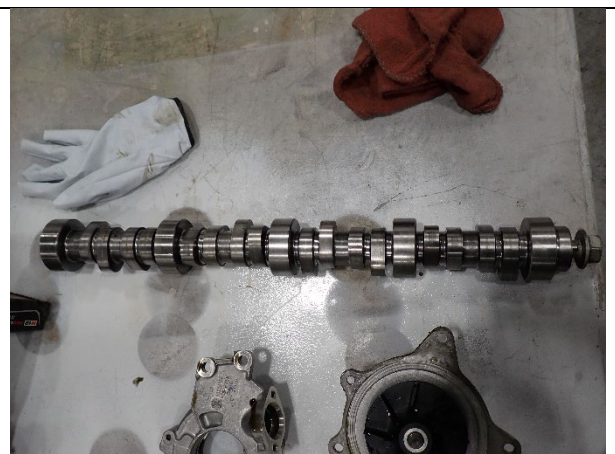


Figure 7: Camshaft

The coolant pump was removed and partially disassembled. The coolant pump vanes were intact, and the drive was capable of rotation. The engine radiator remained attached to the airframe and appeared to be undamaged. The coolant hoses going to the radiator remained secured to the radiator and there were no signs of a coolant leak.



Figure 8: Coolant pump



Figure 9: Radiator

The oil sump remained intact and appeared to be undamaged. The sump was removed, and the oil sump contained an unquantified amount of fluid that was consistent with engine oil. The oil pickup tube remained attached to the oil pump and there were no obstructions observed. The oil pump was removed, and the pump drive gear was observed to be able to rotate without any binding and the pump could be heard pumping residual oil.

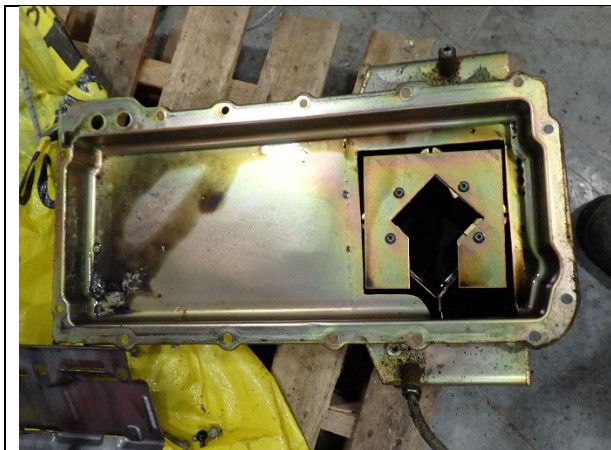


Figure 10: Oil sump

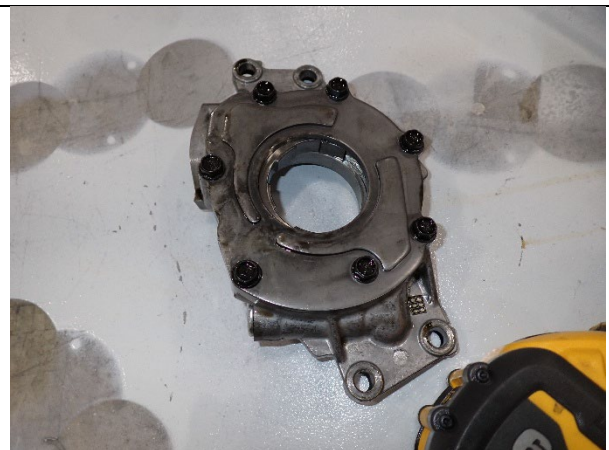


Figure 11: Oil pump

The ignition system displayed significant impact damage to the left side ignition system as several of the ignition leads and ignition coils were severed/destroyed; however, all the ignition leads remained attached to each spark

plug. The ignition coils and ignition leads on the right side of the engine remained attached and displayed minor impact damage. The spark plugs were removed and the electrodes displayed normal operating and wear signatures.

The throttle body remained attached to the induction manifold and displayed minor impact damage signatures. The throttle control arm was capable of normal movement and the throttle valve actuated normally. The fuel injectors displayed varying amounts of impact damage and most of the injector wiring was severed. The fuel pump was impact damaged and was unable to be functionally tested.



Figure 12: Intake manifold



Figure 13: Throttle body

3.0 Propeller Gearbox, Governor and Propeller Examination

The propeller gearbox had impact separated from the rest of the engine and displayed impact damage signatures. A small amount of residual gearbox oil was within the gearbox housing. Continuity was established within the gearbox by rotating the drive shaft and observing propeller shaft movement. The reduction gearbox was disassembled and the internal components displayed normal operating and lubrication signatures.



Figure 14: Gearbox assembly

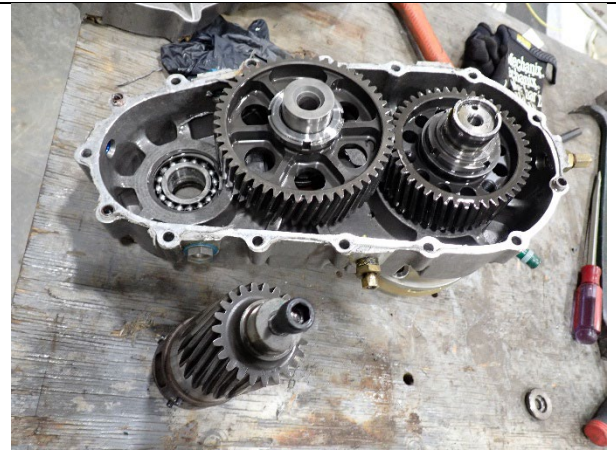


Figure 15: Gearbox assembly (partially disassembled)

The propeller governor drive adapter had separated from the reduction gearbox and had impact damage signatures. The adapter drive gear to governor drive gear continuity was established by rotating the adapter drive gear. The propeller governor adapter oil galley was clear of obstructions. The propeller governor had minor impact damage. The propeller governor drive was rotated manually, and there were no signs of binding during rotation, and the pump could be heard pumping residual oil. The propeller control arm remained intact and operated normally during manual operation.



Figure 16: Propeller governor drive adapter



Figure 17: Propeller governor

The propeller hub was fractured into multiple pieces; a portion of the hub remained attached to the reduction gearbox. The other portions of the hub were located on the ground around the airplane's flight path. The propeller blades were marked with "A", "B", "C", and "D" to identify each propeller. The propeller blade marked "A" remained intact and had separated from the propeller hub. There was a portion of impact damage about $\frac{3}{4}$ of the propeller's length. The propeller blade marked "B" remained attached to a portion of the separated propeller hub and had impact damage to various portions of the propeller. Both propeller blades marked

"C" and "D" had separated at the propeller shank and displayed impact damage at the leading edge of the propeller blades.

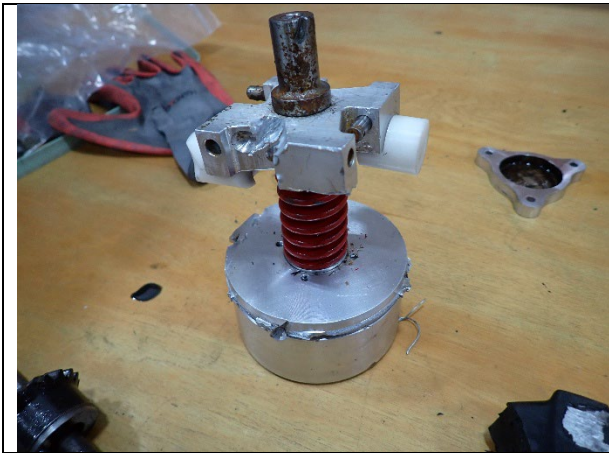


Figure 18: Propeller piston



Figure 19: Propeller blades (Source: Hartzell)

Submitted by:

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