

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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WRECKAGE EXAMINATION REPORT

January 18, 2024

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A. ACCIDENT

Location: San Pedro, California
Date: September 25, 2023
Time: 1250 Pacific Daylight Time
Airplane: Sling 4 TSI, Registration N135WT

B. PARTICIPANTS

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C. SUMMARY

On September 25, 2023, about 1250 Pacific daylight time, an experimental amateur-built Sling 4 TSI, N135WT, was substantially damaged when it was involved in an accident near San Pedro, California. The pilot and passenger were seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to preliminary Automatic Dependent Surveillance Broadcast data, the airplane departed about 1223. After a flight near the coastline, the instructor turned to a northerly heading to return to the airport. At 1245 the airplane turned to a northerly heading and about one minute later it began a descent from an altitude of about 2,400 ft mean sea level. At 1246:46, the pilot reported to air traffic control that he had "an engine failure" and requested approval to land. The controller

immediately cleared the airplane to land and the pilot acknowledged the clearance. He then asked the pilot for his desired runway and the pilot responded with the "south runways", referring to runways 29R and 29L. There were no further transmissions from the pilot.

A witness video that recorded the accident flight from about 1249 showed a trail of white smoke behind the airplane as it maintained a northerly heading. Approximately 12 seconds later the smoke ceased and the airplane subsequently began a right descending turn. The airplane then entered a steep right turn in a nose down attitude and rapidly descended towards the ground as it disappeared from view.

The airplane impacted a field about 3 nm southeast from the pilot's destination airport, Zamperini Field Airport (TOA), Torrance, California.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

1.1 Fuselage

The fuselage frame was mostly deformed and had been separated from the aft fuselage and empennage at the cabin by recovery personnel. The instrument panel and wiring harnesses were pushed forward and the center console and throttle quadrant had been displaced.

1.2 Empennage

The empennage was mostly intact with the exception of the left horizontal stabilizer and elevator/elevator trim that had been cut by recovery personnel. The tail assembly was otherwise intact with some compression wrinkles near the bottom of the rudder and some deformation along the right and left elevators. The elevator trim tab displayed some nose-up trim.

1.3 Wings

The right and left flap and aileron remained attached to their respective wings. Both flaps exhibited similar downward deflection and both ailerons exhibited similar opposing deflection. The left wing leading edge was compressed aft from the wing root to about midspan.

The right wing leading edge exhibited some cosmetic damage and some deformation midspan outboard. A large crease was traced from the wing root to the trailing edge on the top of the wing and numerous compressions wrinkles were observed on the bottom of the wing. An approximately 20° upward bend was observed in the right wing about midspan and the right wingtip had separated.

1.4 Survivability

The airplane was equipped with individual seats for the pilot and front seat passenger that were attached to seat rails. Two rear seats were located in the aft cabin with three point shoulder harnesses. Three point shoulder harnesses were installed for both the front seat occupants. The inertial reels are mounted along the frame lower fuselage behind the front seat occupants and the belt is fed through a support mounted to the canopy portion of the frame (upper fuselage frame) with the clasp attached. The latch mechanism is attached to the fuselage frame beneath the center console. According to the construction manual, "supplied installation hardware" (the bolt types are not specified) include a bolt with a shoulder and a shim to secure the belt support to the canopy.

Both seat rails displayed some longitudinal scoring and crush damage but remained attached to the fuselage. The front seats had separated from the seat rails. The left shoulder harness remained attached to the fuselage canopy frame. A 1.25" hex bolt lock washer and shim were present at the seat belt shoulder harness support at the canopy and the bolt that affixed the support to the canopy rotated freely by hand. The left seat buckle was intact and the left seat latch remained attached at the center console. The inertial reel and belt did not move when actuated by hand, but the reel remained attached at the fuselage and was undamaged.

The right seat shoulder harness separated from the fuselage canopy frame along with the hex bolt, lock washer and shim. The bolt and shim were recovered and the lock washer could not be located within the recovered wreckage. The bolt hole was attached to the canopy frame and exhibited thread damage at the remaining three threads. (See Figure 1). The hole was partially occluded by a section of the carbon fiber canopy. The bolt threads were intact. The inertial reel remained attached to the fuselage and the latch remained attached to the center console. The latch functioned normally when the clasp was inserted. A measurement of the distance between the interior canopy carbon fiber frame and the left side bolt hole compared to the length of the bolt used to secure the support to the canopy revealed that only about 0.25" of bolt shaft (the equivalent of three threads) were available to thread the bolt to the bolt hole.

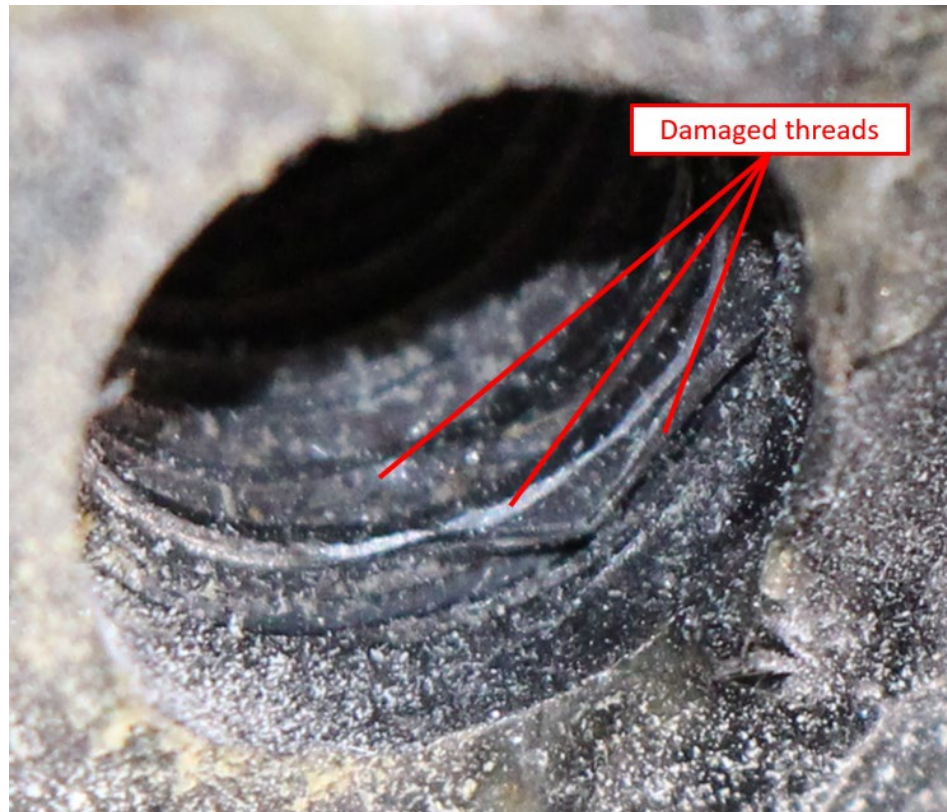


Figure 1: Right Seat Canopy Restraint Bolt Hole

Both seat belt latches functioned normally when tested.

1.5 Fuel/Fuel System

Both fuel tanks were ruptured and were devoid of fuel. The fuel filter was unremarkable, but contained a few ounces of fuel.

1.6 Flight Control System

Continuity of the left and right ailerons was traced from their respective flight control surfaces to the cockpit flight controls. Both ailerons exhibited limited movement when the flight stick was moved and normal deflection was observed. The elevator and rudder control system was continuous from the flight controls to a cut at the aft fuselage made by recovery personnel. Control authority was then traced from the aft fuselage to the respective flight control surfaces. Both flaps were extended to their full deflection (30°) and the flap actuator was fully extended consistent with full flap deflection. The elevator trim and flap actuators functioned normally when tested with battery power.

2.0 Engine Examination

The engine remained attached to the engine firewall, which had separated from the fuselage. The engine sustained some crush damage at the forward end, but was otherwise unremarkable. A moderate amount of oil seepage was observed at the bottom of cylinder 4.

A full engine examination was not conducted as the engine is scheduled to be shipped to another facility for a complete teardown.

Valvetrain and crankshaft continuity could not be achieved as the propeller could only rotate about 20° when rotated by hand.

Approximately 250 mL of oil was drained from the oil sump, which also contained a trace amount of liquid that had an orange hue consistent with engine coolant. The oil sump contained metallic fragments. The magnetic plug showed minimal evidence of fragmentation consistent with normal wear.



Figure 2: Metallic fragments and bottom of oil sump

The spark plug findings are included in the table below:

Plug no	1	2	3	4
Top	Soot, carbon fouling, overall condition normal	Oil residue	Normal in appearance	Mechanical damage
Bottom	Oil fouled (gray in color), overall condition normal	Ground and center electrode damaged, oil residue	Oil residue	Mechanical damage



Figure 3: Cylinder 4 top spark plug

A lighted borescope was used to examine the condition of the cylinders. Cylinders 2 and 4 exhibited evidence of foreign object debris (FOD) damage. A large hole was observed in the cylinder 4 piston with corresponding damage to the cylinder 4 spark plugs and exhaust valve. No evidence of FOD damage was observed in cylinders 1 and 3. The remaining valves were not examined due to instrument limitations.



Figure 4: Cylinder 4 pitting on cylinder wall, penetrated piston face, and broken exhaust valve

The intercooler throttle body hose exhibited metallic fragments and the hose that connects to the turbo contained some oil residue.

Submitted by:

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