



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

AIRFRAME AND ENGINE EXAMINATION

WPR19FA103

This document contains eight embedded photos.

A. ACCIDENT

Location: Farmington, New Mexico
Date: March 31, 2019
Aircraft: Cirrus SR-22, N173CT, SN: 2961
NTSB IIC: Elliott Simpson

B. EXAMINATION PARTICIPANTS:

Elliott Simpson
Senior Aviation Accident Investigator
National Transportation Safety Board

Brannon D Mayer
Air Safety Investigator
Cirrus Aircraft

Vernon R. Rockett
Principal Avionics Inspector
Aviation Safety
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Mike Council
Air Safety Investigator
Continental Motors, Inc

C. SUMMARY

Examination of the airplane was conducted at the accident site on April 2, 2019.

The wreckage was located in flat high desert terrain, at an elevation of about 6,185 ft, about 30 miles south of KFMN airport.

The first identified point of impact was a 4-ft-deep by 10-ft-wide crater which contained the nose landing gear assembly, two propeller blades, and fragmented engine and airframe components. Two matching linear impact marks, the total length of which corresponded to the airplane's wingspan, emanated from the crater on a north-south heading. The right wingtip and green navigation lens fragments were found at the tip of the northern mark, and red navigation lens fragments were located at the tip of the southern mark. (Photo 1).

The debris field was 450 ft long, on a heading of about 210°. The engine came to rest about 30 ft beyond the crater (photo 2), and the remainder of the debris was composed of fragmented pieces of composite main cabin and wing structure, fanned out to a width of about 100 ft. The aluminum ailerons, elevators, and flaps were crushed and distributed throughout the debris field, and the farthest components were the left forward seat and a wing fuel cap.

All primary components located at the accident site.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

The flaps and ailerons had separated from their respective wings. Due to fragmentation, aileron control cable continuity could not be determined, however, all identified control cable ball swages remained in place at their respective actuation pulley's. Damage precluded an assessment of the roll trim motor position.

The flap actuator had detached from the airframe; the flap actuator jackscrew indicated the flaps were in the "UP" position.

The empennage had fragmented, and both elevators had detached from the horizontal stabilizer. All identified elevator and rudder cable turnbuckles remained intact, and the elevator and rudder cables remained attached to the bulkhead. Due to fragmentation, elevator and rudder control cable continuity could not be established. The pitch trim motor was essentially in the neutral position, with slight nose up pitch.

Both main landing gear assemblies had separated from their respective wing mounts, and the nose landing gear assembly had separated from the engine mount.

Remnants of both cabin doors were found distributed around the wreckage site, and the baggage door was partially intact, but exhibited impact damage had separated from the fuselage.

Impact damage precluded an accurate assessment of cabin switch positions or gauge readings.

Both pilot seats had separated from the fuselage. The seatbelt and associated air bag on the left pilot seat were not located and determined to have likely been intermingled with the pilot and recovered by the coroner. The seatbelt air bag on the right pilot seat was not deployed. Both rear seats exhibited impact damage and were separated from the fuselage.

The rocket-powered airframe parachute was located in the center of the debris field. The harness cables remained attached to their respective airframe fittings, and the top of the parachute canopy remained folded evenly along its pleats and had not unfurled (photo 2). Although the canopy lines had extended to their full length, the solid-fuel rocket motor remained attached to the parachute assembly and had not been expended (photo 3). These findings were consistent with the parachute system having not been activated in flight.

All three propeller blades were separated from the hub and had fragmented. Two propeller blades were located in the impact crater. The third propeller blade was located in the debris field

approximately 200 feet from the initial point-of-impact. The spinner was crushed around the impact damaged propeller hub and all three composite blades separated (photo 4).

2.0 Engine Examination

The engine sustained significant impact damage, liberating the oil sump, most of the accessories, and bending the forward cylinders aft (photo 5). Internal examination did not reveal any evidence of catastrophic failure, and examination of the spark plugs revealed that their electrodes exhibited wear signatures and coloration consistent with normal service life and erosion, when compared to the Champion “Check-A-Plug” chart (photo 6).

An engine data plate remained attached to the crankcase and identified the engine as a Continental Motors model IO-550N (50) serial number 691525. According to CMI engine serial data, the engine was assembled at Continental Motors in December 2007, and sold to Cirrus Design Corporation. According to the Continental Motors representative, the engine had been modified by the installation of two turbochargers and associated hardware. This modification was installed using Tornado Alley supplemental type certificates SA10588SC and SE10589SC. The turbochargers turbine and compressor wheels were impinged against the housing, and exhibited bending damage to their tips, opposite the direction of rotation.

Both magnetos separated but were recovered in the wreckage. Their pre-impact positions on the engine could not be determined, likewise a manual functional test was not possible due to the damage sustained. The ignition harness was impact damaged with several individual ignition leads cut or pinched.

The induction manifold/throttle body assembly was located in the debris field and examined. The throttle and mixture control cables had separated. The throttle body had been impacted with dirt and mud, with the throttle plate was bent, and found in the closed position.

The fuel manifold valve remained attached to the manifold assembly and was disassembled. Disassembly of the fuel manifold valve revealed that the fuel screen, diaphragm, and spring were intact. The fuel manifold valve body contained a quantity of liquid.

The engine driven fuel pump sustained bending and crushing damage and had broken away from the engine. The drive spline remained within the input drive, and disassembly revealed that the drive vane and impeller blades were damaged (photo 7, 8).

3.0 Airframe and Engine Examination Photos

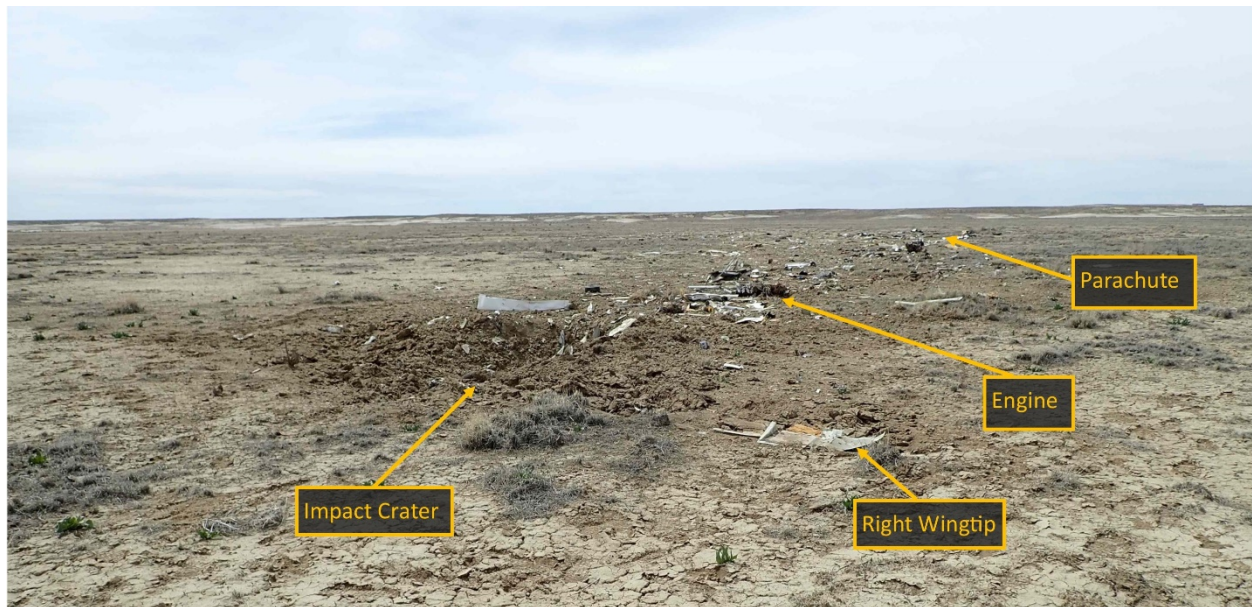


Photo 1 – Accident site debris field



Photo 2 – Engine and parachute



Photo 3 – Parachute rocket motor



Photo 4 – Propeller blades



Photo 5 – Engine at accident site



Photo 6 – Top spark plugs



Photo 7 – First turbocharger turbine wheel



Photo 8 – Second turbocharger turbine wheel

Submitted by: Elliott Simpson