

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN22FA070

EXAMINATION SUMMARY

March 8-9, 2022

A. ACCIDENT

Location: Inola, OK
Date: December 12, 2021
Time: 0931 CST
Aircraft: Cessna 310; N3187L

B. EXAMINATION SUMMARY

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C. SUMMARY

On December 12, 2021, about 0931 central standard time, a Cessna 310J airplane, N3187L, was destroyed when it was involved in an accident near Inola, Oklahoma. The pilot sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 ferry flight.

Airframe:

Examination of the airplane revealed the main landing gear assemblies were retracted in the wing wheel wells. The cockpit flight and engine instruments were fragmented and destroyed. The cockpit throttle quadrant control levers were found in the following positions: Left and Right throttles - full forward, Left propeller - feather, Right propeller - full forward, and Left and Right mixtures - full forward. The extensive impact damage to the airframe precluded a functional examination of the flight controls. All flight control cable separations were consistent with overload failure. All flight control attachment hardware remained attached to the respective flight control surfaces and cable connections.

The airplane broke up in-flight with the empennage and portions of both outboard wings found scattered over terrain away from the main wreckage. The main wreckage site included the forward fuselage, left and right wings from the root to wing station (WS) 133, and the left and right engines. The fuselage was mostly intact from the nose to fuselage station (FS) 132 with significant ground impact damage and vertical crushing from the right lower quadrant. The right and left wings had significant ground impact damage. The empennage separated from the aft fuselage at the fuselage station (FS) 200 bulkhead location. The aft fuselage structure from FS 132 on the right side and FS 154 on the left side to the FS 200 bulkhead separated and was fragmented into several pieces. The vertical stabilizer and most of the rudder remained attached to the empennage. The upper 18 inches of the rudder with the counterweight were separated from the rudder. The horizontal stabilizer and elevators separated from the empennage and fractured into multiple pieces. The center 18 inches of horizontal stabilizer front spar remained attached to the empennage FS 214 bulkhead. The aft spar was torn from the FS 234 bulkhead. The tail cone was separated from the empennage.

The elevators separated from the horizontal stabilizer and each fractured mostly symmetrically into 3 pieces. The inboard elevator sections spanned from about (right or left) stabilizer station (SS) 6 to 21, the center elevator sections spanned from about SS 21 to 76, and the outboard elevator sections spanned from about SS 76 to 96. The counterweights remained attached to the outboard elevator sections at the SS 96 rib. The elevator trim tab was separated from the right elevator. The left elevator torque tube remained partially attached to the bell crank and the right elevator torque tube was separated from the bell crank.

The horizontal stabilizer was fractured into several pieces. The horizontal stabilizer rear spar was mostly intact from RSS 10 to the left tip at LSS 96. The structure forward of the rear spar remained attached from LSS 47 to LSS 96 and was deformed downward about 90° twisting the outboard portion of rear spar. The horizontal stabilizer structure forward of the rear spar from LSS 6 to LSS 47 was separated as a unit and damaged. The rear spar lower cap was rotated about 90° forward and up from LSS 47 inboard. The rear spar was deformed forward and downward more than 90° from the centerline to RSS 10 where the rear spar fractured. A section of the rear spar was intact from RSS 10 to RSS 47 with no structure attached. The stabilizer structure forward of the rear spar from RSS 6 to RSS 47 was fragmented into multiple pieces. The horizontal stabilizer was mostly intact with some damage from RSS 47 to the tip at RSS 96.

The right and left wings outboard of WS 133 were highly fragmented. The front spar was fractured into multiple pieces from WS 133 to WS 190. There was no obvious evidence of failure direction on any of the front spar segments examined. Textron Aviation reported the spars were manufactured from 7075-T6 aluminum. The front

spar on both wings was intact from WS 190 to WS 199 and the tip tank ring bulkhead remained attached. The right and left tip tanks were fractured into multiple pieces with significant damage. The welds at the ring bulkhead were fractured.

There was no evidence of significant corrosion or pre-existing cracking noted on any of the components examined.

Left Engine:

Model: Continental IO-470-U; s/n: 148519-8-V

Not functionally tested, disassembled due to impact/ground damage; engine would not rotate

- Fuel pump partially separated from engine; disassembled due to damage
 - Pump would not rotate with drive spline; drive spline intact
 - Pump disassembled and water corrosion (rust) noted on pump drive and internal housing; vanes intact
- Oil pump attached to engine and disassembled
 - Oil screen collapsed and contained metallic deposits within the screen and pump drive gears
 - Bypass valve cap contained metallic deposits
- #5 cylinder partially separated from crankcase
 - #5 piston skirt fractured into 2 sections, fractures consistent with overload and impact damage from cylinder displacement
- All cylinder bores, valves, and pistons displayed normal operational signatures
- Crankcase fractured in multiple locations
- Crankshaft counterweights attached, intact, and free to move
- Crankshaft and main bearings intact and contained normal wear signatures
- Camshaft and lifters were intact and contained normal wear signatures
- #4 connecting rod disassembled from crankshaft; rod and bearings displayed normal wear signatures
- Spark plugs fractured and remained in each cylinder. Plugs exhibited normal wear signatures.
- Spark plug harness and wires cut and separated in several areas
- Prop governor separated and not located during examination
- Fuel metering unit partially attached to throttle body
 - Fuel metering unit screen clear of debris

- Throttle body intact and valve linkage damaged, valve intact and not damaged
- Both magnetos separated and fractured components of the magnetos noted in wreckage debris
- A vacuum pump (unknown left or right engine) separated and disassembled. Rotor fractured and drive was intact
- Intake and exhaust displayed multiple fractures and impact damage

** No evidence of mechanical issues noted in the left engine.

Right Engine:

Model: Continental IO-470-U; s/n: 148814-9-U

Not functionally tested, partially disassembled due to impact/ground damage; engine rotated by input through starter adapter

- Mechanical continuity noted throughout engine to all pistons, valves, and accessory gears
- Fuel pump attached to engine; disassembled due to damage
 - Pump would not rotate with drive spline; drive spline intact
 - Pump disassembled and water corrosion (rust) noted on pump drive and internal housing; vanes intact
- Oil pump attached to engine and disassembled
 - Oil screen clear of debris; gears intact
 - Bypass valve intact
- #5 cylinder removed for internal engine observation; no issues noted with cylinder, piston, valves, connecting rod
- All spark plugs removed, and plugs exhibited normal wear signatures
- Spark plug harness and wires cut and separated in several areas
- Prop governor remained attached to engine, removed, and drive rotated
- Fuel metering unit partially attached to throttle body
 - Fuel metering unit screen clear of debris
- Throttle body and linkage intact, valve intact and not damaged
- Magnetos separated from engine. One magneto housing partially separated and not located. One magneto disassembled; contained dirt and debris, no internal mechanical anomalies noted
- Intake and exhaust displayed multiple fractures and impact damage

** No evidence of mechanical issues noted in the right engine.

Propellers:

Both propeller assemblies revealed no indications of any type of propeller failure or malfunction before impact. Both propellers displayed indications consistent with low power; however, exact engine power levels could not be determined. In addition, both propellers had impact signature markings indicating blade positions at or near feather blade angles during the impact sequence.

Submitted by:

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