



The National Transportation Safety Board

Office of Aviation Safety
Central Region
Memorandum for the Record
Accident Site and Airframe
Examination Findings
CEN22FA151
Rowlett, Texas
March 25, 2021

The accident site and helicopter wreckage were examined in detail at the accident site.

The main section of the helicopter was found in a vacant lot in between a commercial strip mall and a municipal roadway. The main wreckage was mostly consumed by a post-impact fire. A 4-ft. section of the tail boom with the tail rotor assembly attached, impacted the top of a one-story commercial building about 300-feet from the main helicopter wreckage. Main rotor blade impact marks on the separated section of the tail boom were consistent with main rotor blade contact of the tail boom in flight. Although most of the helicopter was consumed by a post-impact fire, detailed examinations of the airframe, drive system, annunciator light panel, flight controls, main rotor, tail rotor, drive system, powerplant controls, and fuel system did not reveal any obvious pre-impact anomalies.

Date & Time: Sat, Mar 26, 2022, 12:08:04 CDT
Position: +032.907879° / -096.582196° (±15.6ft)
Altitude: 507ft (±10.9ft)
Datum: WGS-84
Azimuth/Bearing: 087° N87E 1547mils True (±13°)
Elevation Angle: +13.0°
Horizon Angle: +00.4°
Zoom: 1.0X



Particular attention was made to the flight control system. Control tube fractures displayed overload and/or thermal damage. All control tube attachments were accounted for and secure. Main rotor swashplate moved freely by hand. Both MR pitch links were fractured at the upper rod end (overload). All three hydraulic servos sustained thermal damage and could not be moved by hand. Tail rotor pitch change slider moved freely by hand.



Portion of Tail Section with Tail rotor Assembly Still Attached. Main Wreckage in Background.

Airframe

- Main rotor blade impact marks adjacent to the separated section of the tail boom were consistent with main rotor blade contact of the tail boom in flight. Most of the main wreckage was consumed by a post-impact fire.
- The attitude of the main wreckage impact appeared to be right side low, skids level. Several windshield fragments were recovered in the debris field directly in front of the nose of the fuselage.
- The majority of fuselage was consumed by a post-impact fire. The forward end of tail cone was separated from the fuselage due to thermal damage. The aft end of tail cone was

separated consistent with multiple main rotor blade strikes. Dents and paint transfer marks that matched the main rotor blade leading edges were present. The empennage sustained minimal impact damage. Damage to the top of the upper vertical stabilizer was consistent with contact with a main rotor blade (black paint transfers). Steel tube frames were bent and distorted along with significant thermal damage.

- The landing gear sustained impact and thermal damage with some components being partially or completely consumed by the post impact fire. A portion of the front cross tube remained in the front left elbow. The cross tube was not rotated in the elbow. The surface of the disconnect in the cross tube was thermally damaged. The toe section of the left skid remained attached to the front left strut. The center section of the left skid was mostly consumed by fire. The heel section of the left skid remained attached to the aft left strut. A small portion of the aft cross tube remained inside the aft left elbow and a slightly larger portion remained in the aft right elbow. The surface of both disconnects were angular and jagged and the right side portion was folded at the disconnect. Neither portion of cross tube had rotated in the elbows. The right skid was disconnected at the aft right strut and at two places near the front right strut. The forward portions sustained some thermal damage also. The front right strut was not recovered.

Cabin, Cockpit, and Instruments

- Most of the cabin structure was consumed by fire and the remaining segments sustained severe impact damage. The upper portion of the instrument panel was separated from the console and sustained some impact and thermal damage. The dual tachometer was separated from the panel and its crystal broken. Both needles were on their lower pin and moved easily. The manifold pressure gauge was separated and destroyed. The airspeed indicator needle was jammed at the high pin of 150 knots. The vertical speed indicator needle was jammed at 2000 fpm descent. The altimeter read 7825' at 30.12. The clock read 11:15. The flight displays were inoperable and sustained thermal damage.
- The lower instrument panel sustained impact and thermal damage and the gauge cluster was separate from the panel. The Amp meter was damaged. The oil pressure needle was at the upper end of the green arc. The oil temperature needle was at 200 degrees. The cylinder temperature needle was at approximately 250 degrees. The main fuel needle was at approximately half. The needle for the auxiliary fuel was bent and distorted. The Garmin units that were installed did not retain any non-volatile data.

- The tail rotor pedals were positioned with the left pedal forward. The cyclic assembly was separated from the keel panels which were consumed by fire. The right cyclic grip was fractured, and the upper portion was consumed by fire. The removable left cyclic was fractured and its grip was consumed by fire. The fractured surfaces were angular and jagged. The collective assembly was separated from the structure mounts which were consumed by fire. The removable collective stick was partially consumed by fire. The collective friction hardware was consumed by fire.
- The clutch switch was in the engaged position, but the guard was consumed by fire. The other switch positions were not determined. The avionics panel sustained impact and thermal damage. Cyclic and collective positions could not be determined due to thermal damage to surrounding structure. Throttle position at the grip and carb heat knob could not be determined due to thermal damage. The fuel mixture control knob was in the full rich position.
- Both seat belt buckles appeared to be latched prior to thermal damage. The front seat belts and inertia reels were consumed by fire. The remains of the buckles and latches were recovered with both buckles latched.

Cockpit Switches

- The keyed ignition switch was in the “BOTH” position. The clutch switch was in the “ENGAGED” position. Most instruments were unreadable due to severe impact and thermal damage. The battery and alternator switch positions could not be determined. The carburetor heat knob was found pulled to the ON position and it was bent.

Annunciator Lights

- The annunciator lights were pulled and examined with a 10x magnifying glass. The warning lights were mostly intact. Each warning light bulb was visually inspected for indications of filament stretch with the following results (S=Stretched, T=Tight, D=Distorted, B=Broken):

Gov Off- T, D
 Oil pressure – S
 Eng Fire – T, B
 Alt -S, D
 Low RPM – S TR
 Chip – T, D
 Starter On – T
 Carbon Monoxide – T, D MR
 Chip – T, B
 MR Temp – T, B
 Clutch – T, B Full
 Throttle – S

Fuel System

- Both fuel tanks were mostly consumed by fire including the bladders with the remaining segments still positioned on each side of the main rotor gearbox. The main tank filler cap remained secure to the filler neck. The auxiliary fuel tank filler cap was separated and recovered in the main wreckage with the locking tabs missing. Most of the fuel hoses, vent tubes, vent hoses and rollover valves were consumed by fire. The gascolator sustained minor thermal damage and retained no fuel. The gascolator screen was clear of debris. The fuel shut-off valve was consumed by fire.

Driveline

- The lower sheave was unremarkable. The V-belts were mostly consumed by fire but large remnants remained in the grooves of the upper sheave. The upper sheave sustained slight thermal damage. The Sprag clutch operated properly with smooth rotation. Both actuator bearing rotated smoothly. The actuator was disconnected from the upper support bearing and at the screw tube (overload).
- The forward flex coupling was undamaged. The main rotor gearbox sustained minor thermal damage. approximately 30 degrees of movement was accomplished, confirming continuity from the input yoke to the rotor head. Oil was visible in the sight gauge. The chip detector was free of metallic debris.
- The intermediate flex coupling was slightly bent.
- The tail rotor driveshaft was fractured in several places in association with the blade strike to the tail cone. The damper bearing remained on the shaft and rotated smoothly by hand. The damper bearing housing and linkage was separated from the bearing and bulkhead and not recovered. The aft flex coupling was undamaged.
- The tail rotor input shaft rotated smoothly by hand more than 360 degrees confirming continuity thru the output shaft. The output shaft was straight. Oil was visible in the sight glass. The chip detector was free of metallic chips.

Main Rotor

- Both main rotor blades remained attached to the hub. Both blades were bent and fractured and sustained some thermal damage near the hub. One blade tip was buried about 4 feet deep in the dirt in front of the nose of the cabin. Both blades had varying degrees of chordwise scuff/score marks in the lower surface and leading edge.
- Both teeter stops were smashed across their centers and sustained thermal damage. Both droop stops were undamaged.

Tail Rotor

- The tail rotor blades sustained slight impact damage, bending one blade inward slightly.

There was no damage to the leading edges. The blade to hub mounting bolt heads along the tip of the output shaft had white paint transfer from the roof in which they came to rest. The sheet metal roof had three corresponding dents or holes.

Powerplant Controls

- Power controls in the cockpit could not be determined due to severe impact damage.

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