

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN22LA234

EXAMINATION SUMMARY

07/13/2022

A. ACCIDENT

Location: Henderson, Texas
Date: 06/06/2022
Time: 0950 CDT
Aircraft: Robinson R44 N94WC

B. EXAMINATION SUMMARY

IIC	Alex Lemishko NTSB Denver, CO
Participants	Les Williams FAA North Texas FSDO Irving, TX Thom Webster Robinson Helicopters Torrence, CA Troy Helgeson Lycoming Engines Williamsport, PA

SUMMARY:

On June 6, 2022, about 0950 central standard time, a Robinson R44 helicopter, N94WC, was substantially damaged when it was involved in an accident near Henderson, Texas. The pilot sustained serious injuries and the passenger sustained minor injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

An examination was conducted at the Henderson, Airport on July 13, 2022, supervised by the FAA. Airframe maintenance records were not made available to the investigation team. Engine logbooks were present for review. The helicopter had been relocated from the accident site to a secure hangar prior to FAA arrival. The examination findings were reported to the NTSB IIC.

Airframe

- Impact and rough scrape marks were present on left side of fuselage. The windshields were shattered with minor deformation of the windshield door frames. The lower right side of fuselage was separated from firewall forward to the landing gear forward cross tube opening. The belly and chin were compressed upward slightly and dented. A large dent in leading edge of mast fairing was consistent with contact from a main rotor blade.
- The upper frame had several overload fractures near the main rotor gearbox mounts. The horizontal and vertical firewalls were slightly deformed. The lower frames showed no visible damage.
- The tail section sustained minimal damage at the forward end. There was impact damage to trailing edge of lower vertical stabilizer, consistent with a tail rotor blade strike.

Landing Gear

- The left skid tube was separated from the forward strut and forward of the aft strut. This section of skid tube was not present. The heel of the left skid remained attached to the aft left strut. The heel and strut mount had course scuff marks running mostly up and down.
- The aft left elbow was separated from the aft cross tube and the frame mount. The aft cross tube was bent downward at the left elbow but no apparent bow across the center.
- The front left strut and elbow remained attached to the fuselage, but the elbow was fractured at the forward cross tube (overload). The forward cross tube appeared straight.
- The right skid and struts were undamaged, and both elbows remained attached to the airframe.

Drive Systems

- The lower and upper sheaves were unremarkable. The V-belts appeared to have normal wear. Two V-belts were positioned aft of the lower and upper sheaves. The extension distance of the belt tension actuator was 1.25". The actuator was undamaged. The upper and lower support bearing rotated smoothly by hand.

- The upper sheave rotated freely and smoothly on the clutch shaft when moved by hand in a clockwise direction (looking forward) and move with the shaft when rotated in a counterclockwise direction.
- The forward flex coupling was bent.
- The main rotor was rotated by hand more than 360 degrees with no anomalies confirming continuity from input yoke through driveshaft. No oil was visible in the sight gauge, but the helicopter was tilted to the left. The driveshaft was straight.
- Both elastomeric teeter stops were smashed with no damage to the brackets. The droop stops were not damaged.
- One main rotor blade was fractured about 4 feet from the root with a slight upward bend in the spar at the fracture surface. The outboard section of blade was not present. The other blade had several downward bends with partial fractures and a portion of the spar and tip cap were not present.
- The intermediate flex coupling had very light scuff marks from contact with the scroll.
- The tail rotor drive shaft was bowed and disconnected aft of the damper bearing. The surface of the disconnect was angular and jagged. Both ends of the disconnect were flattened and twisted in the direction of normal rotation. The damper bearing rotated smoothly by hand and the friction arm moved normally.
- The aft flex coupling was not damaged.
- The tail rotor gearbox housing was separated from the input cartridge. The input gear was not damaged and rotated smoothly by hand. The input cartridge bolts were sheared. Two of the mounting flanges were fractured. The surfaces of the fractures were rough and matte gray in color. The output portion of the tail rotor gearbox was not present nor were the tail rotor blades. Some residual oil, blue/green in color was present around the aft bulkhead.

Flight Controls

- Cyclic and collective flight control continuity was confirmed from the cockpit to the main rotor blades. There were a few fractures found in the control tubes to the main rotors. All the fractures were angular and jagged and consistent with impact damage.
- Tail rotor control continuity was confirmed from the anti-torque pedals back to the tail rotor gearbox, tail rotor mast, pitch change links, and tail rotor blades.

Engine Controls

- The fuel mixture control knob was found in the full rich position. The mixture arm on the carburetor was in the full rich position. The control wire attachment hardware was secure, and the sheath was secure in the clamps. The mixture control knob operated properly.
- The carburetor heat control knob was locked in the off position. The slider valve in the airbox was in the off position. The control wire attachment hardware was secure, and the sheath was secure in the clamps. The carb heat control knob operated properly.
- The throttle grip on the collective was in the fully open position. The throttle arm on the carburetor was in the fully open position. The throttle control operated properly.

Engine

- The engine and engine mounts remained attached to the firewall. The engine firewall exhibited some buckling. The engine accessories remained attached to the engine, and the engine throttle and mixture control cables remained attached to the carburetor. Engine control continuity was confirmed.
- All the spark plugs had undamaged electrodes and appeared normal as compared to the Champion Aviation Check a Plug Chart AV-27. Both magnetos remained attached to the engine and showed no visual damage. Spark was observed from all leads when the engine was rotated by hand. The carburetor fuel inlet screen and airframe fuel screen were both found free of debris. The air filter was found contaminated with dirt and what appeared to be a mud dauber's nest. The engine oil filter was cut open and found free of debris.
- The valve covers, and bottom sparkplugs were removed for the examination. The crankshaft was rotated by hand and thumb compression was obtained at all cylinders except number 2 cylinder. Examination of number 2 cylinder revealed that the exhaust push rod was bent, and the exhaust valve was found stuck. Borescope inspection of cylinder #2 showed that the exhaust valve had contacted the piston. The intake valve appeared to be recessed in the valve seat. See Photos 1-4.
- The valve-to-valve guide clearance was checked on cylinders 4 and 6 and both

showed clearances less than .005 inch. Examination of the engine logbooks showed no indication of Mandatory Service Bulletin 388C being complied with. SB 388C requires compliance every 300 hours or if valve sticking is suspected.



Photo 1 Bent Push Rod
(Courtesy of Lycoming)



Photo 2 Valve Impression on Top of Piston
(Courtesy of Lycoming)



Photo 3 Recessed Intake Valve
(Courtesy of Lycoming)



Photo 4 Impact Marks on Exhaust Valve
(Courtesy of Lycoming)

Submitted by:

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