



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Central Region

Aircraft Exam Summary at Accident Site

CEN22FA317

A. ACCIDENT

Location: Chapelle, New Mexico

Date: 7/16, 2022

Aircraft: Bell UH-1H+

NTSB IIC: Michael Folkerts

B. EXAMINATION PARTICIPANTS:

Michael Folkerts, IIC
National Transportation Safety Board
Denver, CO

Raymond Romero
Federal Aviation Administration
Albuquerque, NM

Fabian Salazar, Air Safety Investigator
National Transportation Safety Board
Federal Way, WA.

C. SUMMARY

Examination of the airframe and engine was conducted at the accident site. All major parts of the helicopter were accounted for. The fuselage was destroyed by impact forces. The tailboom separated from the fuselage and sustained substantial damage. The main rotor separated from the transmission at the mast, just below the hub. One blade was heavily damaged, while one blade was minimally damaged. The tail rotor system separated from the top of the vertical stabilizer but remained attached at the silent chain. The composite T/R blades were fractured and separated at near bot roots.

D. DETAILS OF THE INVESTIGATION

Airframe Examination

Fuselage.

The front of the helicopter, from the nose to the top of the windshields, was destroyed and fragmented into barely recognizable parts. What remained of the fuselage was the roof, from the top of the windshield to the aft fuselage near the mount for the tailboom, and the floor. The floor of the helicopter began at the pedals and extended back to the aft end of the cabin. There were no seats installed in the cabin. The Bambi Bucket and personal equipment were found in this area. None of the doors (pilots, jump, sliding cabin) were accounted for.

The cockpit living space was compromised by upward crushing of the floor and downward crushing of the roof. The pilot's seats remained attached at the floor mounts. The instrument panel remained intact and was partially attached by the instrumentation wiring. A Garmin multifunction display was found on the right side of the instrument panel and retained for download. A Hobbs meter was installed in the cockpit and recorded 1117.7 hours.

The tailboom separated from the fuselage and came to rest about 20 ft from the main wreckage. All the mounting points retained the mounting hardware and sections of the fuselage where it was mounted. The tailboom exhibited considerable upward crushing from the bottom of the tailboom upwards. The most severe crushing was observed at the end of the tailboom and extend forward toward the fuselage. The tail skid "stinger" was bent upwards significantly, consistent with a very hard contact with the ground. The left synchronized elevator separated from the tailboom and exhibited a contact mark on the underside, near the root, consistent with contact from one of the main rotor blades. An area of contact and damage was observed on the left side of the tailboom that was consistent with contact from a main rotor blade and coincided with the contact mark on the left synchronized elevator. The vertical stabilizer remained attached to the tailboom and exhibited significant downward bending sufficient enough to allow the tail rotor assembly to contact the ground.

The main landing gear sustained substantial damage. The left skid separated from the fuselage and was found in the wreckage closest to the first point of probable impact FPPI. The right skid separated from the cross tube at the mounts and was located further away from the FPPI. The aft cross tube separated from the fuselage. The forward cross tube remained attached to the fuselage and was displaced aft.

Flight Controls. Flight control continuity was not established at the field examination. The left and right collective control sticks remained attached to the floor. The left-side collective was in a position consistent with full up or close to full up. The right-side cyclic control stick remained attached to the floor. The left-side cyclic was not observed. The right-side anti-torque pedals were not observed. The left-side pedals remained attached to the floor.

Transmission. The transmission remained attached to the fuselage. The condition of the five mounting points was not observed. The lift link remained attached at both ends. Once free of debris, the transmission input quill rotated freely and turned the main rotor mast and the tail rotor output quill easily without noise or unusual sounds coming from the gears. An area of the fuselage, directly below the input quill exhibited rotational scoring, consistent with the rotating drive shaft contacting the area. The synchronized elevator control remained attached to the non-rotating swash plate and bell crank but separated at the large control tube below the bellcrank attached to the aft transmission.

The K-Flex “short shaft” separated from the engine and transmission. The drive shaft section was found about 120 ft west of the wreckage. The drive shaft retained some of the flexors on both ends. The engine output quill retained the drive shaft end and some flexors sections.

Hydraulics. All three servos were visually examined. All pressure and return lines were at least finger tight and did not exhibit signs of leakage. The hydraulic filter was opened and exhibited no debris or contamination at the filter. The collective servo remained attached to the collective levers. The lateral and longitudinal servos separated from the swashplate at the control tubes.

Main Rotor Control System. The main rotor control system remained intact and exhibited minimal damage. The swashplate support remained secure to the top of the transmission. The collective lavers remained secured to the collective sleeve. The non-rotating swash plate remained secured to the swash plate support. The rotating swash plate remained secured to the non-rotating swash plate. The two trunnion bearings for the top of the cyclic servos (longitudinal and lateral) remained secured in the rotating swash plate. The scissors and sleeve assembly remained attached to the mast. Both drive links remained attached at both of their ends. The main stabilizer bar control tubes fractured about mid length. Both mixer levers remained attached to the stabilizer bar assembly. One exhibited a fracture at the top of the bearing that holds the control tube. That section of the assembly was not recovered but may be with the wreckage. The pitch change links remained attached to the mixer and the pitch horns. Both pitch horns separated from the blade grips. Both blade grips remained attached to the hub and retained the end of the main rotor blades. Both drag links remained attached to the blade grip and aft end of each blade. One end of the stabilizer bar was bent about 45° in the direction of rotation. One damper separated from the mast and was found in the wreckage. Figure 1 is an exemplar main rotor control system.

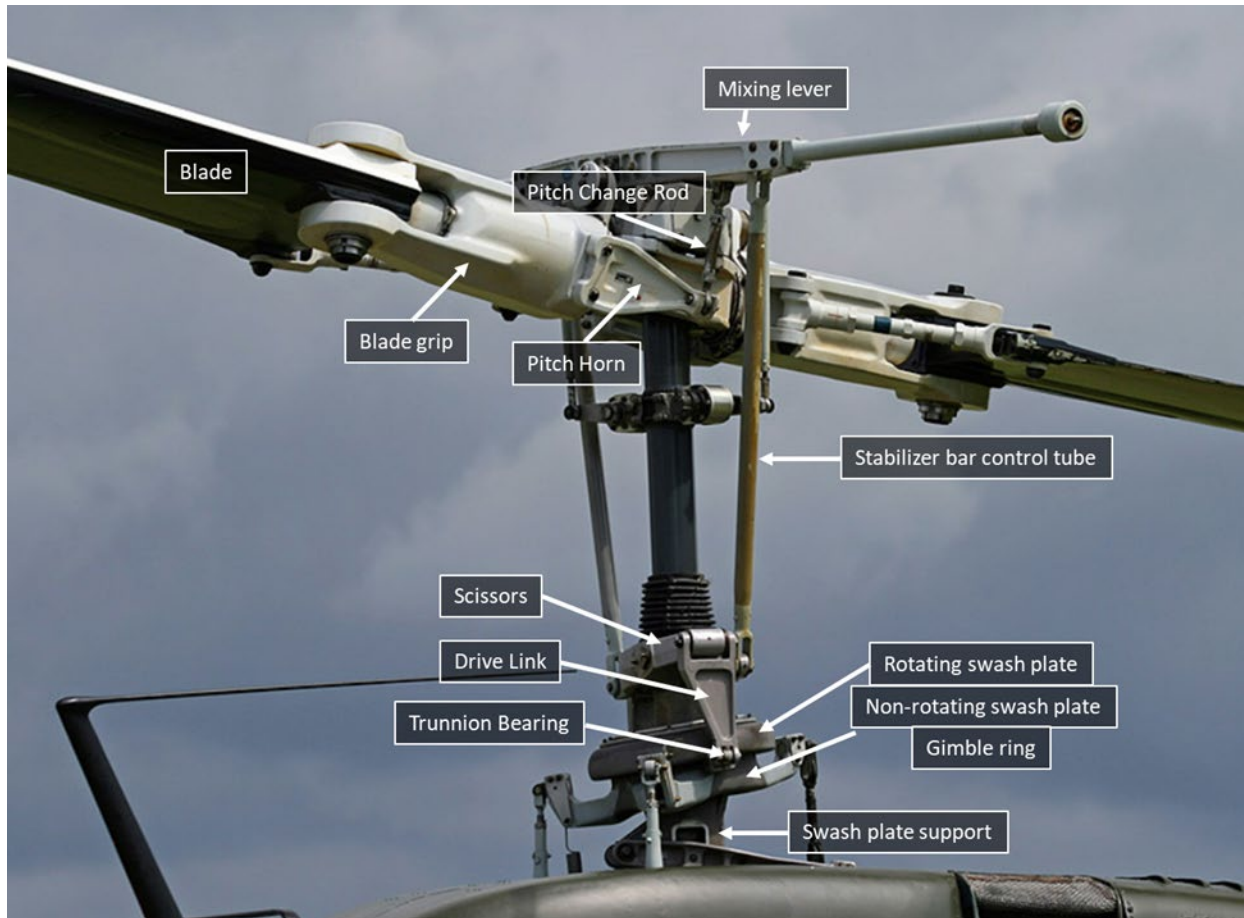


Figure 1. Main rotor control system. Photo courtesy of the internet.

Tail rotor assembly. The tail rotor drive shaft separated from the output quill of the transmission. The number 1 short shaft was not accounted for. The remainder of the T/R drive shaft remained secured at the hanger bearings, except for a section near the damaged area of the tailboom, forward of the 42° gearbox. The last drive shaft section was found in the vertical stabilizer and was disconnected at both ends. The 90° gearbox separated from the top of the vertical stabilizer. The silent chain remained attached to the gear. The T/R hub remained attached to the drive shaft. Both blades separated from the hub near the root. The pitch change links remained attached at both ends. The chip detector was pulled from the 90° gearbox and exhibit no metal shavings. The chip detector for the 42° gearbox had pulled out of the port by the impact forces and exhibited no metal shavings. One tail rotor control cable remained attached at the bell crank and the silent chain. The other cable fractured and the area of the tailboom just in front of the 42° gearbox.

Main rotor blades. (Serial number A-3001, and A-5655). Blade 3001 remained attached to the blade grip and exhibited spanwise separation of the spar from the after body, from the tip of the blade to about four ft from the root. The remaining afterbody exhibited chord-wise fractures and bends. Blade 5655 remained attached to the blade grip and exhibited minor damage except for the tip, which exhibited a section of missing afterbody extending inboard about 24 inches. The main rotor separated from the transmission at the mast, about 5 inches down from the mast. A

large dent was observed on the mast consistent with contact from the hub. The mast separated about three inches down from the dent.

An emergency locator transmitter (ELT) (ARTEX 406, TSO C126, Serial number: 362479) was found in the wreckage. According to the FAA, the device did not alert.

The pointer of the fuel quantity gage, which is AC powered, read about 1,000 lbs.

Engine Examination.

Engine. (T53L-703, Serial Number: LE-23701RX) The engine remained partially secured to the damaged engine deck. Borescope examination revealed minimal damage to the 4th stage power turbine blades and minimal damage to the first stage compressor blades and stator vanes. Very little debris was observed in the inlet of the compressor, despite a large amount of dirt and debris on the outside of the engine. The fuel control was found in the Ground Idle position. Removal of the fuel line going into the fuel control revealed no fuel; however, removal of the line exiting the fuel flow shutoff valve (Kaiser Eckel Valve) revealed fuel in that line. The N2 power section turned easily, with no unusual noise coming from the internal components of the engine. The N1 section was not tested for ease of turning.

Coordinates for key items:

Tail Skid mark (First point of probable impact) N35° 22' 54.4" W105° 14' 7.7"

Aft fuselage impact point: N35° 22' 54.2" W105° 14' 7.9"

Left Skid: N35° 22' 54.1" W105° 14' 8.0"

Right Skid: N35° 22' 54.0" W105° 14' 8.5"

Main Fuselage: N35° 22' 53.8" W105° 14' 9.5"

Tail Boom: N35° 22' 54.0" W105° 14' 9.7"

Tail Rotor Drive Shaft: N35° 22' 54.3" W105° 14' 10.0"

Bay Cover: N35° 22' 54.1" W105° 14' 10.4"

K-Flex Drive Shaft: N35° 22' 54.1" W105° 14' 11.3"