

CEN19LA240 - Exam Summary

Tuesday, September 10, 2019
8:25 AM

National Transportation Safety Board Office of Aviation Safety Washington, D.C. 20594

A. ACCIDENT:

Aircraft Make/Model/Registration:	Robinson / R-44 / N7508Z
Date:	7.27.2019
Time	1628 CDT
City:	Blair, NE

B. EXAM LOCATION & PARTICIPANTS:

Robinson Helicopter Company
Torrance, CA

NTSB AS40	Van McKenny Aerospace Engineer (Helicopters) Washington, DC
RHC	Thom Webster Aviation Safety Investigator Torrance, CA

C. ACCIDENT SUMMARY:

On July 27, 2019, at 1628 central daylight time, a Robinson R44 II helicopter, N7508Z, impacted terrain following a reported system malfunction near Blair, Nebraska. The commercial pilot sustained minor injuries, and the helicopter sustained substantial damage to the main rotor blades and tailboom. The helicopter was registered to and operated by NE IA Helicopters, LLC, Tekamah, Nebraska, as a Title 14 *Code of Federal Regulations* Part 137 aerial application flight. Day visual meteorological conditions prevailed at the time of the accident, and a flight plan was not filed. The local flight departed an off-airport location for aerial application operations at an unknown time.

According to the pilot, after completing the last spray pass, he pulled the helicopter up over a tree ridge and began to head towards the south. At the top of the climb, the pilot noticed the engine RPM was

beyond "max limitations" and the rotor RPM was in the green range. The pilot initiated a right pedal turn to the north and decreased the engine throttle in an attempt to lower the engine RPM. After adjusting the engine throttle, the engine RPM remained at the upper limit, but the rotor RPM decreased. The pilot then attempted to correct the rotor RPM by increasing the throttle; however, the rotor RPM began to fluctuate up and down, and continued to decrease. Due to being unable to control the rotor RPM, the pilot performed a forced landing to a corn field. During the forced landing, the main rotor blades impacted corn and terrain, and the helicopter came to rest upright.

D. DETAILS OF THE EXAMINATION

- Shipping box was undamaged and sealed. The box was opened and contained the following:
 - Upper sheave, clutch assembly, freewheel clutch

PN: C051-2	Rev: W	SN: 8088
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 - Belt tension actuator
 - Scroll sections
 - Actuator support bearing brackets
- Lower actuator support bearing bracket visual observations.
 - Entire bracket separated from scroll wall along the edge of bracket.
 - White torque strip was applied on outer rivets on each side of the bracket IAW SB-94
 - Rub marks / fretting between bracket & lower scroll wall.
 - (A/C left side) Elongated rivet holes on scroll wall. Associated rivets were sheared.
 - (A/C right side) bracket rivets intact with backing plate attached, with fragment of scroll wall in-between bracket and backing plate.
- Upper actuator support bearing brackets.
 - Both brackets separated from scroll wall.
 - Rub marks / fretting between bracket and upper scroll wall observed.
 - All four rivet holes were deformed (not round) or elongated. All four rivets were sheared.

Freewheel unit

- Oil drained - black in color. Oil was filtered thru a 190 micron filter when drained, no particles visible
- Clutch disassembled. All bearings shiny, even wear, no discoloration. All moved freely in place.
- Race surfaces were smooth, no indentations or discoloration.

Clutch Actuator

- Upper housing of clutch actuator was fractured from housing to slider tube. Fracture surface was jagged and angular. Actuator screw was fractured at the worm gear interface in a thread groove. Actuator screw fracture surface was jagged & angular
- Wire harness and switches intact. No visual damage.
- All switches pass functional test

- Diode between pins 2 & 5 was observed shorted. Would not have affected normal operation, other than disengaging clutch when the over extension switch is activated.

Clutch motor

- 24V DC applied
- Operated in forward and reverse directions steadily. No vibration or grinding identified.

Time Delay Assembly (Clutch)

- Spec Test using production test equipment
 - 24 V DC applied.
 - Circuit appeared to short, over drawing current. Fail test (suspected faulty test equipment).
- Tested each circuit with a multimeter - all circuits passed, no discrepancies identified.
- Time delay installed on functional aircraft (R-44 II). Power was applied and the actuator extended and retracted as designed.