

NATIONAL TRANSPORTATIONS SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594

SUMMARY OF AIRCRAFT EXAMINATION

-- CEN18FA258 --

A. ACCIDENT

Location: Arlington, Indiana
Date: July 6, 2018
Time: 1720 Eastern Daylight Time
Aircraft: Bell 47G-2, N96195

B. PARTICIPANTS

Jennifer Rodi
Senior Aviation Accident Investigator
National Transportation Safety Board

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C. ACCIDENT SUMMARY

On July 6, 2018, about 1720 eastern daylight time, a Bell 47G-2 helicopter, N96195, was substantially damaged when it impacted a corn field near Arlington, Indiana. A postimpact fire ensued. The commercial pilot was fatally injured. The helicopter was owned and operated by Central Indiana Ag Services, LLC. The aerial application flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 137. Visual meteorological conditions prevailed and no Federal Aviation Administration (FAA) flight plan had been filed for the flight. The local flight departed a loading platform at a farm 1 mile northwest of the accident location, about 1655.

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D. AIRCRAFT INFORMATION

The helicopter, a Bell 47G-2 (serial number 681), was manufactured in 1953. It was registered with the FAA and held a restricted airworthiness certificate for agricultural operations. A Lycoming VO-435-A1F engine rated at 250 horsepower at 2,700 rpm powered the helicopter. The engine powered a 2-blade main rotor and a 2-blade tail rotor.

E. DESCRIPTION OF ACCIDENT SITE

The wreckage was located on the south end of a corn field. The initial impact point was characterized by damage to the corn, just north of the edge of the field. The initial damage swath/scar was 20 ft long and 6 ft at its widest point. The wreckage came to rest inverted about 20 ft from the initial impact point. The helicopter impacted on an approximate bearing of 002° and the field elevation was 850 ft. The main wreckage included the fuselage, engine, tail boom, tail rotor assembly, and spray assembly.

The main rotor, which included the mast and upper portion of the transmission, came to rest 75 ft north of the main wreckage.

F. DETAILS OF AIRCRAFT EXAMINATIONS

The fuselage included the instrument panel, spray booms, product tanks, skids, and cabin. The cabin sheet metal was crushed and wrinkled on the right side. The forward plexiglas windscreen was broken and separated. The landing skids were bent /creased to the right and the entire landing skid assembly was shifted to the right. Dirt was embedded in the landing gear skids on the left side. The spray booms, tanks, and tubing were impact damaged and partially separated.

The instrument panel was impact damaged but remained attached to the cabin. The fuel air mixture control was in the “full rich” position and the carburetor heat was in the off position. The cyclic on both sides moved throughout its entire range without binding and control pushtube movement was observed along the column bulkhead to the point of separation.

The helicopter was equipped with a single pilot seat on the left side of the cabin. A black cushion was in place on the seatback of the pilot seat. No seat was installed on the right side of the cabin. The helicopter was equipped with four-point harnesses. The pilot’s harnesses were buckled at the metal buckle. The webbing had been cut by first responders to support extrication and were otherwise unremarkable. The right-side harnesses buckles were latched and otherwise unremarkable.

The engine remained attached to the fuselage and was impact damaged. The throttle control was about 3/16 inch off from the full throttle stop. The carburetor heat was impact damaged and the position could not be confirmed.

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The left side of the engine exhibited exposure to heat and fire. The fan belts separated, and the fan blades were bent opposite the direction of rotation. Both magnetos were removed from the engine. When actuated by hand, both magnetos produced a spark at each lead. The spark plug wires were impact and fire damaged and could not be functionally tested. The bottom bank of spark plugs exhibited normal worn features when compared to a Champion spark plug chart. The engine was rotated through the hydraulic pump drive pad. Valve train movement and tactile compression were observed on all cylinders. Internal continuity was confirmed.

The lower portion of the transmission remained attached to the engine. The internal gears of the transmission rotated without hesitation when rotated at the engine and at the tail rotor spline. A large scar or witness mark was observed on the inside well of the transmission. The mounting holes on the housing of the transmission were labeled 1 through 8 for identification purposes in the report. (See figure 1) The #1 and #7 holes were torn and partially separated, and no fasteners remained. The #2 and #3 holes were unremarkable, and no fasteners remained. The #4 and #5 holes were elongated, and no fasteners remained. The #6 and #8 holes were elongated, and the material exhibited tearing on the outer edge of the hole. No fasteners remained.

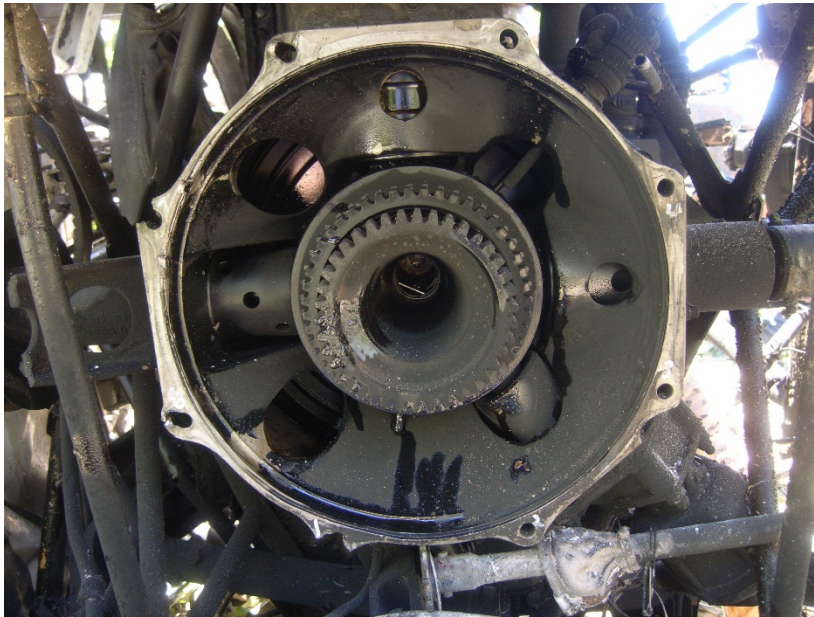


Figure 1. Lower Transmission

The tailboom was bent 90° to the left at the fuselage. The synchronization elevator on the left side was impact damaged and bent down and aft. The right side was unremarkable. The aft mount on the lower ventral fin was impact damaged but the fin was otherwise unremarkable. The tail rotor guard structure was impact damaged and partially separated.

The tail rotor remained attached to the tail boom. Both tail rotor blades were impact damaged and bent. The tail rotor driveshaft was bent 90° at the fuselage and separated at

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the engine. The driveshaft was otherwise continuous aft to the tail rotor. The antitorque cables were continuous from the antitorque pedals aft to the tail rotor. Due to impact damage the full rotation of the tail rotor blade could not be verified; however, rotation was otherwise free and correct. Both blades articulated as designed and movement was noted at the cables correlating with the blades.

The main rotor, including the swash plate, cap, upper cyclic and collective controls, mast, and upper transmission came to rest about 100 ft north of the main wreckage in the corn field. There was no damage or visible witness marks between the main wreckage and the mast assembly.

Both the collective and cyclic push tubes were impact damaged and separated at the top of the mast and main rotor.

The upper transmission remained attached to the main rotor assembly. The ring at which it separated from the lower transmission was labeled 1 through 8 for identification purposes in the report. Bolt #1 and #7 remained inserted. Both the metal from the adjacent mounting surface and the nut remained in this assembly. Bolts #2 and #3 remained in inserted; however, neither bolt remained attached to a nut assembly. Bolts #4, #5, and #6 remained partially inserted; however, neither bolt remained attached to a nut assembly. Bolt #8 remained inserted and was bent at the thread end. No nut was attached.

The red dot blade remained attached at the main hub and the lead/lag link separated. The root of the red blade was impact damaged and a correlating witness mark was observed on the main hub. The red blade was coned up about midspan and was impact damaged.

The white dot blade remained attached at the main hub and the lead/lag link was impact separated. The root of the white blade was impact damaged and a correlating witness mark was observed on the main hub. The white blade was coned up about midspan and was impact damaged. The skin starting at midspan and extending to the tip was impact damaged and torn.