



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

Date: August 17, 2018

SUMMARY OF AIRCRAFT EXAMINATION

(WPR18LA226)

A. ACCIDENT

Aircraft	Hughes 369D, N105JL
Date	August 17, 2018
NTSB Investigator-in-Charge	Thomas M. Little

B. EXAMINATION PARTICIPANTS

Thomas M. Little Senior Aviation Accident Investigator National Transportation Safety Board Western Pacific Region Federal Way, Washington	Joan Gregoire Chief Air Safety Investigator McDonnell Douglas Helicopters Mesa, Arizona
--	--

Wayne Richardson
Director of Operations
Western Helicopters Inc.
Riverside, California

C. SUMMARY

On August 17, 2018, about 1050 Pacific daylight time, a Hughes 369D helicopter, N105JL, was substantially damaged following a hard landing during a practice autorotation at Riverside Municipal Airport (RAL), Riverside, California. The certified flight instructor received minor injuries and the pilot receiving instruction was seriously injured. The helicopter was registered to Helicopters Unlimited, La Crescenta, California, and operated by Western Helicopters, Inc., Riverside, California, in accordance with Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed for the local instructional flight, which departed RAL about 1030, and no flight plan was filed.

In a statement submitted to the National Transportation Safety Board investigator-in-charge, the certified flight instructor reported that after he and the student had both performed several uneventful power recovery autorotations, he advised the student that the next evolution would be a full touch down, 180° autorotation. The instructor stated that during the maneuver the helicopter was turning back to the runway slower than he wanted it to. When he realized that they were going to be short of the intended landing zone, he advanced the throttle to make a power recovery, but the descent was greater than anticipated. The instructor opined that he then told the student to level the skids, and that he was on the controls to assist him. Subsequently, the helicopter landed hard, which resulted in the tail boom separating and the main rotor blades contacting the ground. The helicopter then spun around to the right, during which the student was ejected from the helicopter.

The aircraft wreckage was recovered to a hangar at Riverside Municipal Airport (RAL). Since the accident was a result of operational issues, the main focus of the wreckage exam was on the passenger restraint system. The wreckage examination was conducted on October 31, 2018 at a Western Helicopter Hangar facility. As a result of the examination, which was overseen by the NTSB IIC for this accident, the following compilation of factual data was revealed:

C. Aircraft and Maintenance History

A review of the aircraft records was conducted on 31 October 2018. The last 100-hour/300-hour inspection was dated 11 June 2018 at an airframe total time of 11,725.1 hours. No Hobbs time was indicated for these inspections.

Two running time meters were observed in the fuselage. A DATCON hour meter (maintenance) indicated 2,594.4 hours and a Honeywell hour meter (revenue) indicated 593.3 hours.

D. Aircraft Performance and Weight & Balance

Since the focus of the wreckage exam was on the passenger restraint system, a review of aircraft performance and weight & balance data was not conducted.

E. Systems Examination

1. Fuselage, Tailboom, Empennage, and Landing Gear

Since the focus of the wreckage exam was on the passenger restraint system, a detailed examination of the fuselage, tailboom, empennage, and landing gear was not conducted. However, the following observations were made.

- Fuselage
The fuselage appeared undamaged.
- Tailboom
The tailboom had separated from the fuselage.
- Empennage
The empennage, including the stabilizers, tail rotor transmission, and tail rotor assembly had separated from the aft end of the tailboom.
- Landing gear (skid)
The skid-type landing gear assemblies remained attached at the lower fuselage structure and the skid tubes appeared undamaged.

2. Cockpit, Cabin, Electrical System, and Instruments and Avionics

Since the focus of the wreckage exam was on the passenger restraint system, a detailed examination of the cockpit, cabin, electrical system, and instruments and avionics was not conducted. However, the following observations were made.

- Cockpit
The cockpit was configured with dual flight controls and for left-hand command.

Survivable space was not compromised; however, the lower plastic windscreens were fractured.

The pilot and copilot doors were not installed.

The passenger restraint system at the pilot seat location was a four-point restraint system, which consisted of a two-piece adjustable lap belt, a yoke-style shoulder harness, and an inertia reel.

Each lap belt has a triangular end fitting at one end which incorporates a latching mechanism. The latching mechanism is used to anchor the lap belt to the fuselage structure in the cockpit. The right-hand lap belt was observed separated from the anchor attachment point in the cockpit. The anchor attachment point was located on the seat bottom structure underneath the right rear corner of the pilot's seat bottom cushion. A dataplate located on the right-hand lap belt next to the end fitting indicated it was manufactured in August 2007 by Belt Makers, Inc, Torrance, California, and the model number was H3604-B-700. The dataplate also indicated that the lap belt was manufactured to FAA TSO-C22f Safety Belts standards with a rated strength of 1,500 pounds. On the end fitting itself, the number 442868 was stamped into the metal.

The latching mechanism had small holes, which when the latch was closed, the holes were stacked in alignment. It did not appear as though anything, such as a cotter pin, had been installed through the holes. The other lap belt end fittings were examined, and nothing was found installed through the holes. When viewing the disconnected latching mechanism from the side, the part of the mechanism that pivots to open and close the latch appeared splayed outward.

The possibility of D-ring reversal or dynamic rollout (see FAA SAFO 16016, 11/9/16) occurring with the end fitting was examined on the production line at MD Helicopters, Inc. (MDHI). A production aircraft with restraint systems installed was used. Nothing was installed through the holes in the latching mechanisms. It was found to be possible to separate the end fitting from the anchor point by twisting the lap belt near the end fitting in various ways. Initially, it took many tries; however, once it was discovered that separation could be achieved and how, it could then be achieved on a more regular basis. As a result, MDHI issued a service bulletin (SB 369D-227) mandating the installation of a cotter pin through the holes in the latching mechanism.

- Cabin. The cabin had two forward-facing seats, each with a four-point passenger restraint system. The passenger doors were not installed.
- Electrical System. The electrical system was not examined.
- Instruments and Avionics. The instruments and avionics were not examined.

3. Flight Control Systems

Since the focus of the wreckage exam was on the passenger restraint system, the flight control systems were not examined or tested for continuity; however, the following observations were made.

- Cyclic

The left-hand cyclic control stick was fractured at the base of the grip. The cyclic pitch interconnecting torque tube was fractured just outboard of the longitudinal rigging friction knob. The right-hand cyclic control stick was unremarkable.

- Collective

Both collective control sticks were unremarkable.

- Anti-torque

The left-hand anti-torque control pedal assembly was fracture separated from the anti-torque torque tube and at or near the pedal bracket mounting holes. The right pedal was missing from the right-hand anti-torque control pedal assembly.

4. Engine and Engine Controls, drivetrain, main rotor system, and fuel system

Since the focus of the wreckage exam was on the passenger restraint system, the engine and engine controls, drivetrain, main rotor system, and fuel system were collectively not examined.