



MEMORANDUM FOR RECORD

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Senior Air Safety Investigator
Eastern Region

Date: April 30, 2023

Persons: Thomas Mancuso – FAA, Gary Howe – Bell, Jon-Adam Michael -Rolls, Manny Nalawatta – Director of Maintenance

NTSB Accident Number: ERA22FA257 Fairfield, NJ

Subject: On-scene Observations and Consultations

Narrative:

The gentlemen listed above provided information to me both verbally and through demonstration and download of stored data. The examinations of surveillance video, the helicopter, its engine, and its systems were all performed in my presence. The reports of those examinations were reviewed and the findings were consistent with what was observed.

Airport surveillance video captured the helicopter's approach, its alignment with the runway, and its slowing as the nose pitched upward, and the helicopter climbed slightly. As the helicopter slowed, the nose yawed to the right, the helicopter became unstable, and started to descend vertically while rotating around the main rotor mast. Seconds into the vertical descent, the right yaw slowed, stopped, and the helicopter rotated to its left for the remainder of the vertical descent to ground contact. After ground contact, the main rotor continued to turn and the main rotor blades continued to strike the ground, ultimately shedding about 50 percent of the span of each blade.

The helicopter came to rest upright on its belly, with the landing gear fractured and separated. The cockpit and cabin areas remained largely intact with vertical crushing of the seat pan visible at the pilot's station and the roof beneath the engine and transmission crushed vertically into the cabin area. The tailboom was fractured about its midpoint.

Examination of the helicopter by Mr. Mancuso minutes after the accident revealed that the tail rotor crosshead drive plate, in place behind the pitch change rod attachment nut, was not bolted to the tail rotor crosshead as prescribed. The two attachment bolts were not installed, and there were no remnants of any bolts in their threaded receptacles in the crosshead. Further, the threads were undamaged. They showed no sign of corrosion, deformation, smearing, or cross-threading.

Main rotor continuity was confirmed by rotating the KAFLEX drive shaft by hand. Movement was confirmed from the drive shaft through the transmission to the mast. The transmission was visually inspected, and no pre-impact anomalies observed. The chip detectors were removed and visually inspected with no particulate matter observed. No abnormal sounds were heard when the transmission was rotated by hand.

Main rotor flight control continuity was confirmed from the cockpit through several breaks to each respective rotor blade.

Continuity was confirmed on the tail rotor drive system from the forward short drive shaft (under the engine) to the point of tail boom fracture. Continuity was confirmed from the tail boom fracture to the tail rotor gearbox. When the drive shaft segment was turned by hand, rotation was observed through the tail rotor gearbox.

Tail rotor control was confirmed from the pedals through breaks to the tail rotor gearbox to the pitch control rod. Movement of the pitch change push-pull tube resulted in smooth movement of the pitch change rod; the attached tail rotor crosshead drive plate would move with the pitch change rod, but independently of the crosshead to which it was no longer bolted.

Examination of the helicopter in the operator's hangar revealed no preimpact mechanical anomalies other than the absence of the tailrotor crosshead attachment bolts.

Examination of the engine revealed that the fuel and oil lines were intact. The fuel and oil filters were intact, contained no debris, and their respective fluids were normal in odor and appearance. The Electronic Control Unit (ECU) non-volatile memory was downloaded, and the data depicted no FADEC faults during the accident flight after the engine start sequence. The triggering event for the incident recorder was a torque rate exceedance, which is consistent with a sudden stoppage of the aircraft power train during the event.

According to the operator, the tail rotor was installed the day before the accident following the replacement of 4 "feathering bearings." The director of maintenance (DOM) had performed the task. In a written statement, the DOM said that he prepped the tail rotor assembly for installation by laying the parts out on a maintenance cart, performed the installation, and had one of his mechanics verify the mast nut torque. He then "finished" the installation and had another "verify" the work. A company pilot completed a preflight inspection of the helicopter and performed "ground functional checks" and three consecutive maintenance runs to affect balancing of the tail rotor.

According to the DOM, between the mast nut torque application and completion of the installation, he was "called out" to consult on two different aircraft repairs. He could not recall how much time elapsed before he returned to the installation of the tail rotor assembly.

Company surveillance video inside the hangar captured the work and preflight inspections performed on the helicopter prior to the maintenance ground runs and the accident flight. The video lacked the resolution necessary to identify individual tools, hardware, and materials used during the maintenance and preflight tasks.