

Inspectors Statement

My Name is Cornelius J. Baker, I am an Aviation Safety Inspector assigned to the West Columbia, South Carolina Flight Standards District Office. This statement was made from notes I took during this investigation.

On August 2, 2023, Inspector Vestal and I traveled to Charleston Air Force Base/International Airport (CHS) to assist Inspector Charles Lewis in inspecting the wreckage of N31PB, a Bell Helicopter 407. The aircraft had crashed the night before while landing at CHS. The pilot reported losing tail rotor authority, returning from picking up the helicopter after maintenance.

The tail boom section had separated from the fuselage, and I started at the engine output for the tail rotor drive shaft. This section within the engine compartment was connected and turned freely. Aft of the engine compartment there was a section of tail rotor drive shaft, which had sheared just aft of the first hanging bearing support at the flex coupling. Even with the damage at this hanger bearing the tail rotor drive shaft still turned freely. Just aft of this is the area is where the tail boom separated from the fuselage, but aft of the connections point of the tail boom to the fuselage. There were several flex couplings. failed but all attaching bolts were still attached and appeared properly torqued. Inspecting the failed tail boom and the separated tail rotor drives shafts appear to be a result of the accident. The tail rotor gear box and tail rotors where still attached to the tail boom. The tail rotor could still rotate, and the blade angles freely changed. Opening the upper access door and looking at the pitch change assembly the lever assembly was disconnected from the trunnion assembly. Removing the upper and lower tail cone fairings it was found that the center bolt that connected the lever assembly to the idler assembly was missing and the lower bolt that connects to the pitch change rod assembly was loose, the cotter pin for nut was missing and the nut was backed off were you could see threads about halfway into the castellated nut. There appeared to be no damage to the lever assembly which would indicate the center bolt had fallen out or was not installed prior to the accident.

A review of the logbook for the work that was just performed prior to the accident was read. The entry stated that the upper 4 pitch change link bearings for the main rotor were replaced and 4 of the tail rotor drive shaft disc packs were replaced on August 1, 2023. Contact was made with the mechanic who performed the maintenance. Scheduled to meet him the next day at the Sumter Airport. Inspector Vestal and I met Mr. Mark Davis in front of Pride Aviation. Mr. Davis took us into the hangar of Pride Aviation and said that this is where he performed the maintenance on N31PB. Mr. Davis was presented with a compliance brochure. Mr. Davis was asked if he had the proper calibrated tools to perform the maintenance on the helicopter. Mr. Davis retrieved a toque wrench and showed it to Inspector Vestal, who said it was within calibration. Mr. Davis was asked what technical data he uses to perform the maintenance. Mr. Davis stated in part I have a Bell Helicopter account for the data. Mr. Davis pulled up the account and showed us the Bell manuals. At this point we asked to sit down and go over what work was done with this technical data. We moved to the conference room in the terminal building. Mr. Davis was asked to show us the technical for the work performed on August 1st. During the

discussion the area around the tail rotor gear box was not opened. Mr. Davis was then asked about the maintenance performed on June 28, 2023. Specifically, Inspector Vestal asked about the output shaft seal replacement that was performed and would he need to disconnect the pitch link lever assembly. Mr. Davis stated, "No there would be no reason to be in that area for the output shaft seal replacement." Inspector Vestal then asked what inspection you would have been in that area. Mr. Davis said in part during the 24-month inspection would require an inspection of the area. Mr. Davis was shown the picture of the disconnected lever assembly, to which Mr. Davis replied I must have overlooked it. Mr. Davis was asked if he replaced the dust boot between the housing and the trunnion assembly because it looked new. Mr. Davis stated in part, "Yes, about 2 years ago he thought." Mr. Davis was asked does anyone else beside you work on this helicopter that would have been in that area. Mr. Davis stated in part, "No, not that I know of". Mr. Davis later provided a copy of an invoice where he had performed the boot replacement in October of 2020.

On August 4, 2023, I contacted Anthony Dickerson with Bell Helicopter Technical Support, and we discussed what inspections would have been performed around the lever assembly. Mr. Dickerson stated the 300-hour/3-month inspection requires one side of the boot be removed and cleaned, then the bearing greased. This boot is located between the tail rotor housing and the trunnion assembly that the lever assembly connects to. The logbook entry of June 28, 2023 indicates a 300-hour/3-month inspection was performed during that maintenance event. This inspection/Lubrication would not require the lever assembly to be disassembled, but you should have clearly seen the nuts and bolts of the lever assembly.

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