



September 16, 2016

National Transportation Safety Board
Ms. Rodi, Investigator in Charge
490 L'Enfant Plaza, SW
Washington, DC 20594

Subject: Submission for NTSB Accident # CEN15MA290

Aircraft: AS350B3, S/N 7595
Registration: N390LG
Date: July 3, 2015
Location: Frisco, Colorado
Operator: Flight For Life Colorado, Air Methods Corporation

Dear Ms. Rodi,

Airbus Helicopters appreciates the opportunity to participate in the NTSB investigation of the subject accident as a technical advisor to the French Bureau d'Enquêtes et d'Analyses (BEA). As the investigation concludes, Airbus Helicopters would like to take the opportunity to provide a summary of its observations and suggest a possible cause for the accident based on facts gathered during the investigation.

Findings:

Following are the key findings:

1. Video footage that captured the take-off for the accident flight showed the helicopter making a no hover takeoff (sometimes referred to as a "jump-takeoff"), from the helipad while rotating counter-clockwise; the helicopter appeared to make $\frac{3}{4}$ of a rotation by the time it reached the approximate height of the hangar building (~30 ft.), then ascending out-of-sight. A short time later it appeared descending, on another security camera, approximately 350 ft. to the west of its take-off location. In this view, it was still rotating counter-clockwise (approximately $\frac{1}{4}$ of a rotation), prior to impacting the ground.
2. A thorough and complete post-accident inspection of the aircraft wreckage was conducted; no pre-impact anomalies were identified with the aircraft, to include its flight control or hydraulic systems.
3. Due to thermal and impact damage related to the accident, it was not possible to determine the positions of the hydraulic switches at the time of the accident.
4. The pilot had approximately 13,200 total flight hours; of which, 5,231 were in the Airbus Helicopters AS350 variant, but only 111 hours were in the dual hydraulics AS350B3e. The pilot primarily flew the new (subject) dual hydraulic system B3e helicopter that was now based at the Summit Medical Center (91CO), heliport; however, records indicated that in the months prior to the accident, the pilot occasionally still flew in a single hydraulic system B3 helicopter that was previously based at 91CO. No records were found at the Airbus Helicopter, Inc. Training Center that show the pilot had ever had factory pilot training. The

pilot received basic indoctrination and initial training in July 2003 by Air Methods for the AS350B3 (single hydraulics), then received differences training on the AS350B3e (dual hydraulics) in August 2014. His most recent recurrent training was in March 2015.

5. The AS350B3e dual hydraulic system (option) is referenced in the Flight Manual Supplement. During the on-site portion of the investigation, Air Methods Corporation's (AMC's) normal procedures checklist for the AS350B3e was obtained. This checklist would have served as the primary checklist/reference for the pilot at the time of the accident flight. A review of this checklist revealed that it did not contain the detailed steps of the yaw servo hydraulic check incorporated in the Airbus Helicopters AS350B3e flight manual. However, the detailed steps for the dual hydraulic system checks would have been outlined within the Airbus Helicopters AS350B3e Flight Manual, Supplement (Section 9.23) and within AMC's expanded checklist.
6. The Takeoff Check and Procedure section of the Airbus Helicopters AS350B3e Flight Manual (4.4.2.) states that the pilot should; 'gradually increase collective pitch to 5 ft hover (1.5 m), and check the engine, mechanical control, instruments, and warning lights'.
7. Airbus Helicopters released Safety Information Notice (SIN) No. 2776-S-29 on August 21, 2014, just under a year prior to this accident, warning pilots that during the preflight run up hydraulic checks, if the step to restore hydraulic pressure to the tail rotor hydraulic circuit was omitted, the pilot could encounter difficulty in moving the pedals, i.e. the perception of locked, jammed, or stuck pedals.
8. Airbus Helicopters released Service Bulletin (SB) No. AS350-67.00.64 on February 25, 2015 (4 months prior to the accident), which introduced a recommended modification to the warning lights associated with the dual hydraulic system on the Caution Warning Panel (CWP). The SB modifies the CWP so that actuation of the yaw servo hydraulic switch to the "off" position would result in a flashing "HYD2" light on the CWP. This Service Bulletin was not incorporated on the mishap aircraft at the time of the accident.
9. The Summit Medical Center helipad (91CO), heliport is located in an area that meets the general definition 'confined area' where the flight of the helicopter is limited in some direction by terrain or the presence of obstructions, natural or manmade. In this case for 91CO, a north departure (to the pilot's left), is the most advantages to avoid obstacles. As a general rule, a normal takeoff from a hover should be made when departing a confined area; to include a stabilized HIGE before turning out for departure.



Possible Causes:

The investigation team considered and researched various possible scenarios that could have led to the accident. As the investigation concludes, Airbus Helicopters submits the scenario which it believes best explains the accident. The dual hydraulic system checks as outlined in the Airbus Helicopters AS350B3e Flight Manual, Supplement should have been performed as follows:

Yaw Servo Hydraulic Check:

- a. Yaw servo hydraulic switch (collective grip)—OFF, pedal forces should remain low (yaw load compensator effect).
- b. [HYD TEST] or [ACCU TST] – DEPRESS, forces felt on pedals.
- c. [HYD TEST] or [(sic) ACCU TST] – RESET IN OFF position (out).
- d. Yaw Servo Hydraulic Switch (collective grip) – ON, check no forces are felt on yaw pedals (boosted).

Had the pilot failed to correctly perform this required pre-flight check, and then attempted the documented no hover takeoff, the resulting higher than expected pedal forces may have been challenging to overcome. Accordingly, Airbus Helicopters submits the following as the most likely possible cause of the accident:

The pilot's failure to reengage (ON) the Yaw Servo Hydraulic Switch on the collective grip during the run up hydraulic check, followed by conducting a no hover takeoff in a confined area, resulting in increased required pedal forces to maintain yaw control in a challenging environment, and ultimate loss of control of the helicopter.

Airbus Helicopters respectfully requests that this submission be published in the NTSB's public docket for the subject accident.

Thank you for your consideration.

Sincerely,

A solid black rectangular box redacting the signature of Seth D. Buttner.

Seth D. Buttner
Manager of Accident Investigation
Airbus Helicopters, Inc.