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BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

Le Bourget, 18 February 2013

François HOCHART
Head of Investigations Department
BEA
200 rue de Paris, aéroport du Bourget
92352 Le Bourget Cedex

to

Mister James Silliman
Senior Air Safety Investigator
NTSB
31 West 775 North Avenue
West Chicago, Illinois 60185

Subject: registered N352LN EC AS 350 accident on 26 August 2011 in Mosby (Missouri)

Dear Mister Silliman,

Please find attached Eurocopter comments on recommendations submitted by Air Methods.

The BEA would like to make some additional comment about AMC recommendation 6.3.2 : "Encourage review of the Eurocopter AS350 loss of engine power emergency procedures, and those of other engine manufacturers, and the associated EP training to ensure there are no inconsistencies or potentially negative responses being taught (for example, not emphasizing the benefits of immediate application of aft cyclic)."

The BEA estimates that required response to a loss of engine power in any helicopter requires a coordinated response of collective, cyclic, and anti-torque inputs to establish and maintain a proper autorotative descent. A coordinated response of all three inputs is critical to the success of the autorotation; however, collective input is primarily emphasized in most of helicopters flight manual procedures, as main rotor RPM must be preserved, and lowering the collective is required to do so regardless of the flight profile. Furthermore, lowering the collective is the only input of the three inputs that is not a natural reflex response. This is the reason why the action of lowering the collective following a loss of engine power is learned by the pilots during initial training, whereas establishing a given attitude and direction with the cyclic and anti-torque pedals appears to be a natural reaction and must be coordinated with the initial down collective input.

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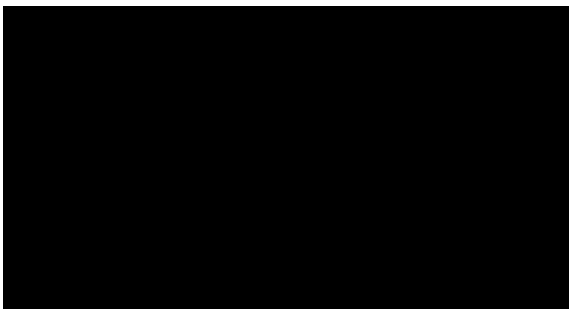
Regarding AMC's recommendation to review the emergency procedure for a loss of engine power, section 6.1.17 of AMC's submission looks incorrect in stating that the timely application is "contrary to the manufacturer's recommended procedure." Cyclic and anti-torque inputs are dependent upon on the flight profile (speed, attitude, etc.) at the time of the power loss. This is why the emergency procedure instructs the pilot to establish a 65-knot airspeed (given attitude) which induces specific inputs to do so.

Also the BEA did not clearly understand AMC Proposed Recommendation 6.3.3: "Encourage review of the Eurocopter AS350 emergency procedures which specifically place the power lever and the corresponding RFM restriction out of the fly gate for emergency procedures training."

It is understood that the recommendation aims at restraining full autorotation trainings, i.e. trainings with no engine power available when flaring and pulling the collective pitch lever.
Yet the Mosby accident occurred because the pilot failed to perform such an autorotation after the engine flamed out. Moreover the event seems more to be linked to a lack of coordination and a failure to reduce collective pitch in a timely manner, which is not depending on the engine power reduction process.
Unless the recommendation was not correctly understood, the BEA estimates that it will not participate in preventing the recurrence of such an event.

Best regards,



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BEA

EUROCOPTER
AN EADS COMPANY

January 21, 2013

Mr. Jim Silliman
Sr. Air Safety Investigator
National Transportation Safety Board
31 West 775 North Avenue
West Chicago, Illinois 60185

Dear Mr. Silliman:

This letter is in reference to NTSB accident # CEN11FA599 involving Air Method's Corporation's Eurocopter AS 350 B2 helicopter, N352LN, which occurred on August 26, 2011, in Mosby Missouri. Eurocopter has reviewed the party submissions for this accident investigation and wishes to submit the following comments regarding the proposed recommendations submitted by Air Methods Corporation (AMC):

1. AMC Proposed Recommendation 6.3.1:

   "Encourage the FAA to work with the Air Medical Operators Association (AMOA) in the incorporation of voluntary safety programs in HEMS operations and facilitate ASIAS/MITRE type information sharing activities."

   Eurocopter Response to AMC Proposed Recommendation 6.3.1:

   Currently, there is a general lack of knowledge, standardization and cooperation among many operators within the HEMS community with regard to such voluntary safety programs and information sharing activities, which have proven to be effective towards enhancing safety in other industry segments. Therefore, Eurocopter fully supports AMC's recommendation to encourage the FAA to work with the Air Medical Operators Association (AMOA) in the incorporation of voluntary safety programs [such as Flight Data Monitoring (FDM)] in HEMS operations and facilitate ASIAS/MITRE type information sharing activities.

2. AMC Proposed Recommendation 6.3.2:

   "Encourage review of the EurocopterAS350 loss of engine power emergency procedures, and those of other engine manufacturers, and the associated EP training to ensure there are no inconsistencies or potentially negative responses being taught (for example, not emphasizing the benefits of immediate application of aft cyclic)."

   Eurocopter Response to AMC Proposed Recommendation 6.3.2:

When a loss of engine power occurs, the pilot must react in a timely manner to execute a successful autorotation landing. As the NTSB knows, an autorotation landing is a maneuver taught to helicopter pilots during their primary training, and the specific procedure used to accomplish this maneuver is very similar, nearly identical in some cases, for different makes and models of helicopters. The first step of this procedure for the AS350B2 is to set low collective pitch, as it is critical to do so in a timely manner in order to preserve and control rotor RPM. This required input is a constant regardless of the flight profile (i.e. airspeed, altitude) at the time of the power loss. The pilot must simultaneously establish a 65-knot airspeed with coordinated cyclic and anti-torque inputs depending on the flight profile at the time of the power loss to achieve an optimal attitude for the autorotation landing.

A loss of engine power can occur in any multitude of flight profiles; therefore, the emergency procedure for an autorotation landing must apply in all such flight profiles. Eurocopter has reviewed the current emergency procedure and believes it clearly and concisely outlines the proper steps to accomplish an autorotation landing following a loss of engine power by emphasizing the flight controls inputs that will apply in any situation while relying on the pilot's basic skills to accomplish the tasks and inputs that may vary based on the situation and flight profile.

Furthermore, section 6.1.17 of AMC's submission is incorrect in suggesting that application of aft cyclic is "contrary to the manufacturer's recommended procedure." As explained above, cyclic and anti-torque inputs are dependent upon on the flight profile (i.e. airspeed, attitude) at the time of the power loss. For example, in the AS350, at speeds below Vy, some forward cyclic is needed, and at speeds above Vy like in the accident scenario, aft cyclic is needed. However, this is not always the case depending on the aircraft's attitude at the time of the power loss. This is why the emergency procedure instructs the pilot to establish a 65-knot airspeed (given attitude) versus specifying which inputs are required to do so.

Following are the results of the simulator demonstrations conducted during the investigation:

- The failure to reduce collective pitch in a timely manner resulted in unrecoverable low rotor RPM.
- A coordinated combination of reduction of collective pitch and aft cyclic were required to maintain rotor RPM and execute a successful autorotation.
- When an unannounced loss of power was initiated at ~275 AGL and ~115 knots:

- A proper response (down collective/aft cyclic) resulted in an average time of about 25 seconds between the unannounced loss of power and touchdown.

- An improper response (failure to reduce collective pitch or pull cyclic aft) resulted in an average time of four to five seconds between the unannounced loss of power and impact with terrain.

When pilots were asked to refrain from making down collective or aft cyclic inputs following a loss of engine power during the demonstrations described above, all commented it was unnatural and uncomfortable to do so.

Lastly, it was never conclusively determined during the investigation why the accident pilot failed to react properly to the loss of power. It was discovered during the investigation that the pilot sent and received text messages during the accident flight. This or other activities/distractions could have possibly prevented the pilot from reacting properly. Therefore, it should not be assumed that the pilot's failure to react properly to the loss of engine power was a skill-based error and/or the result of a lack of adequate guidance in the emergency procedure.

3. AMC Proposed Recommendation 6.3.3:

"Encourage review of the Eurocopter AS350 emergency procedures which specifically place the power lever and the corresponding RFM restriction out of the fly gate for emergency procedures training."

Eurocopter Response to AMC Proposed Recommendation 6.3.3:

Eurocopter concluded that the safest and most effective way to conduct training autorotations is to perform a full autorotation to the ground with the fuel flow control lever (FFCL) at an Ng setting of above 67%. Therefore, this is the procedure outlined in Eurocopter's flight manual training supplement; this procedure is merely a recommended method published by the manufacturer and is not contained within the EASA/FAA-approved section of the flight manual. Eurocopter would like to clarify that there is no restriction contained within this training procedure that states, "A pilot may not reduce the fuel flow levers when conducting autorotation unless termination of the maneuver is planned to be on the ground."

4. AMC Proposed Recommendation 6.3.4:

"Encourage the use of cockpit video recorders to improve safety of flight and accident investigation."

Eurocopter Response to AMC Proposed Recommendation 6.3.4:

Eurocopter fully agrees and supports AMC's recommendation to encourage the use of cockpit video recorders [or other types of flight data monitoring (FDM) equipment] to improve safety of flight and accident investigation and commends AMC's efforts thus far to develop and implement an FDM program within its own organization. The accident rates that exist for HEMS operations and other segments of the helicopter industry have remained relatively stagnant in recent years. Eurocopter fears these unacceptable accident rates will likely remain stagnant in the future without additional information available to allow investigators, operators, manufacturers and regulators to gain a deeper understanding of the accident chain, such as human factors and decision-making, and root causes of these accidents to prevent future mishaps. Furthermore, Eurocopter believes that FDM equipment and programs managed within a just culture environment will provide the following safety and economic benefits to the industry:

- Significant increase in safety and reduction of accidents as proven in industry segments such as offshore helicopter operations Part 121 air carrier operations, which have already implemented effective FDM programs within a just culture environment
- Significant safety improvements and cost savings through modified procedures resulting from information obtained through FDM program
- Potential to detect impending part or system failure
- Reduction of unnecessary inspections, maintenance actions, and aircraft-on-ground (AOG) time through better understanding and data available regarding reported incidents and anomalies
- Can be used to enhance effectiveness and efficiency of training and flight test activities
- Source of data for overall fleet information

Eurocopter respectfully requests that this letter be included in the NTSB's public docket for this investigation. Please do not hesitate to let me know if you have any questions or require any clarification concerning the comments above. Thank you very much for your consideration.

Sincerely,

[redacted]

Lindsay B. Cunningham
Manager, Accident Investigation
American Eurocopter Corporation