

Smith Maja

To: Crookshanks Clinton
Subject: RE: Damage assessment

From: Crookshanks Clinton
Sent: Wednesday, October 18, 2017 2:01 PM
To: Smith Maja [REDACTED] >; Deforge Carolyn [REDACTED] >; Shin, Chihoon [REDACTED] >; McKenny Van [REDACTED] >
Cc: Hogenson Dennis <[REDACTED]>; Crookshanks Clinton [REDACTED] >
Subject: RE: Damage assessment

Maja,

Based on the photos and the pilot statement, there was damage to the main rotor blades, tail rotor blades, horizontal stabilizer end plate, vertical stabilizer, and aft fuselage. The damage to the tail rotor blades can be excluded under the ground damage exclusion. One of the main rotor blades suffered extensive damage. The outboard 9 inches was separated, the blade spar was deformed aft, and the trailing edge was buckled along about half its length. Two other main rotor blades were scuffed/scratched in localized areas. The aft fuselage around the tailboom attach point was buckled and fractured. The horizontal stabilizer and vertical stabilizer also sustained impact damage. There is no question that this is substantial damage. In fact, the operator reported the damage as substantial.

What I really think you are looking for is an assessment of the cause of the main rotor damage. The significant damage to the one main rotor blade is consistent with impact with an object of substantial mass. There is nothing specific to indicate that the blade impacted a cable but the damage could be consistent with this. The damage evident is not consistent with separation of the blade end on its own due to some other pre-existing condition. The scuffing and scratching on the other two blades has a unique appearance with areas where there are defined parallel scratches. This type of damage is very consistent with cable impact.

The long line cable was not recovered and the pilot reported releasing it before the flight. The procedures call for the ground crew to place the coiled cable in the passenger compartment that has no doors. Based on the statement, no one can verify that the cable was released or that it was placed in the passenger compartment. Examination of the release mechanism after the accident showed no damage and testing did not reveal any anomalies. If the cable were not released prior to the flight, I would expect a portion of it to remain attached or there to be damage to the release mechanism if it had somehow impacted the main rotor.

So, I don't think the long line cable remained attached to the hook for the accident flight. It is likely that it was in the passenger compartment. In level flight it would be forced away from the main rotor if it came out of the helicopter. It may be able to get into the main rotor disc during somewhat aggressive maneuvering. The main rotor damage is due to impact with an object and seems to be consistent with cable impact.

I hope this helps. Let me know if you have any questions. I've copied Chich and Van on this and the photos to see if they can offer anything.

Thanks,

Clint Crookshanks
Aerospace Engineer (Structures)

