

Alexander Lemishko
Senior Air Safety Investigator
NTSB, Central Region

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Propeller Examinations

Contacts: Alexander Lemishko - NTSB IIC
Les Doud – Hartzell Propellers

General Accident Scene

The airplane wreckage was found in a wooded area about 1.5 miles from the departure end of runway 18, LIT airport. Most of the wreckage was completely consumed from a post-impact fire. Both propeller assemblies were found separated from their respective engines. The area was heavily wooded. Several distinct propeller blade strikes were observed in large diameter trees and branches. Detailed on-site documentation of the propellers were not possible due to weather and site conditions.

Six of the eight counterweights were recovered in the debris field, but it was not determined from which blades they originated. In general, the degree of blade damage between left and right propellers was somewhat symmetrical. After recovery, the propellers were examined. Based on all available information, some propeller blades impacted trees and the ground at a low pitch angle, consistent with powered rotation at impact.

Right Propeller
Propeller Model: HC-D4N-3A/D9515K
S/N: FY5074

The propeller hub was found separated from the engine and was found in the debris field. The propeller was found lodged between two trees adjacent to the main airframe wreckage. All four counterweights were found fractured from their respective blades. All four blades varied in blade angle position. The spinner dome was crushed and torn. The propeller cylinder was separated from the hub but remained attached to the assembly via the pitch change rod. The propeller had varying degrees of heat discoloration and damage.

The blades were numbered R1, R2, R3 and R4 in a counterclockwise sequence (aft looking forward). Some blades exhibited chordwise/rotational scoring along the leading edge.

Blade R1 was fractured in the mid-blade region, 26" from the hub, and the fractured segment was not recovered. The blade was bent in the forward/thrust direction with no discernable twisting damage. The blade exhibited heat discoloration and paint blistering.

Blade R2 was fractured in the mid-blade region approximately 30-37 inches from the hub, and the fractured segment was not recovered. The blade exhibited S-bending with no discernable twisting damage. The blade exhibited heat discoloration and paint blistering.

Blade R3 was fractured in the tip-region, approximately 36" from the hub, and the fractured segment was not recovered. The blade was bent aft and twisted towards low pitch. The blade exhibited heat discoloration and paint blistering.

Blade R4 was partially consumed by the post-crash fire along the tip and trailing edge area. The blade was bent aft and twisted towards low pitch. The blade exhibited heat discoloration and paint blistering.



Right Propeller Assembly



Right Propeller Assembly

Left Propeller

Model: HC-D4N-3A/D9515K

S/N: FY5073

The propeller assembly was found separated from the engine and was found in the debris field near the main wreckage. The propeller shaft flange remained attached to the propeller with all eight mounting bolts secured and lock wired. The propeller was found on the ground near the initial impact point. All four counterweights fractured from their respective blades. All four blades varied in blade angle position. The spinner dome was crushed and torn and there was some rotational scoring on the back of the spinner bulkhead.

The blades were numbered L1, L2, L3 and L4 in a counterclockwise sequence (aft looking forward). Some blades exhibited chordwise/rotational scoring along the leading edge on both camber and face sides.

Blade L1 was bent aft and twisted towards low pitch with a wave-type bend the leading edge. Blade L1 could be rotated in the hub by hand force.

Blade L2 was fractured near the mid-blade region approximately 25 inches from the hub, and the fractured segment was recovered in the debris field. The blade exhibited chordwise/rotational scoring and S-bending. The L2 blade retention pocket was fractured near the aft-trailing edge quadrant and the bearing races were fractured.

Blade L3 was fractured in the mid-blade region, approximately 29" from the hub, portions of the fractured segments were recovered in the debris field. The blade was bent forward and twisted towards low pitch.

Blade L4 exhibited chordwise/rotational scoring, was bent forward and twisted towards high pitch. There was a wave-type "S" bend in the leading edge and could be rotated by hand force.



Left Propeller Assembly



Left Propeller Assembly

Summary

There were no discrepancies noted on either propeller that would prevent or degrade normal operation prior to impact with terrain. All damage was consistent with high impact forces on both propellers. Impact signatures and blade angle estimates were consistent with rotation at the time of impact.

Alexander Lemishko

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NTSB Senior Air Safety Investigator
Denver, Colorado