CEN18FA368
Hartzell Propeller Air Safety Investigator Observations
(based on photos provided by on-scene investigators)

NOTE: The observations in this summary are made from photos and work completed by on-scene investigators; the author was not present.

Accident

NTSB File No. CEN18FA368
Date: 8/31/18
Location: St. Ignace, MI
Aircraft: Piper PA-32RT-300T
Registration: N500MJ

Propeller Examination

Date: 9/6/18
Participants: Jon Hirsch – Piper Air Safety Investigator
John Butler – Lycoming Air Safety Investigator
Alex Lemishko – NTSB Investigator in Charge

Propeller Description

Model: HC-E2YR-1BF/F8477-4
Assembly S/N: DK1580E (blade S/Ns not observed in photos)
Description: 80" diameter, Compact Series, 2-blade, non-feathering, pressure to increase pitch. See Installation Data Sheet No. 831.

The propeller was originally assembled and inspected at Hartzell Propeller as "New" on 12/11/1978. The propeller logbooks were not reviewed for these observations therefore Service History is unknown. It is unknown if all the original hardware was still in-use on the propeller at the time of the accident.

As Recovered Condition

The propeller fractured from the engine during the impact sequence and was recovered from the water as-shown in Photo #1.

Both blades were bent aft and twisted leading edge down in varying degrees. Both blades appeared to be forcibly rotated in the assembly lower than the low pitch stop, indicating fractured pitch change knobs.

Photo #1 – Propeller As-Received

Teardown Examination Findings

On-scene investigators separated the hub halves and removed the blades to gain access to the preload plates and compare relative bending and twisting between blades.

Both blades exhibited bending opposite rotation as shown in Photo #2, Blade B being more prominent. Bending opposite rotation suggests power. Both blades had fractured pitch change knobs indicating forcible rotation while under power. There were no apparent chordwise/rotation scoring marks which is consistent with impact into water.

Blade A exhibited some "untwisting" (twist towards high pitch) near the tip of the blade as shown in Photos #3 and #4. Also Blade A exhibited a small amount of S-bending in the tip area. Both of these characteristics suggest impact with power ON.

The Blade A preload plate had material deformation at the high pitch end of travel slot (Photo #5. This suggests the blade was forcibly rotated towards high pitch at initial impact. This is consistent with the "untwisting" and S-bending seen in the tip area of Blade A.

Preload plate B had one credible pitch change knob block impact mark near the low pitch stop blade angle position. All other impact marks on the preload plates were post-initial impact.

Conclusions

Damage on both blades suggested the propeller was operating with power ON in the normal blade angle range prior to impact. There were no discrepancies noted in the photos provided by on-scene investigators that would prevent or degrade normal propeller operation prior to impact. All damage was consistent with high impact forces caused by impact into water.

Photo #2 – Blade camber side view

Photo #3 – Blades leading edge view

Photo #4 – Blades trailing edge view

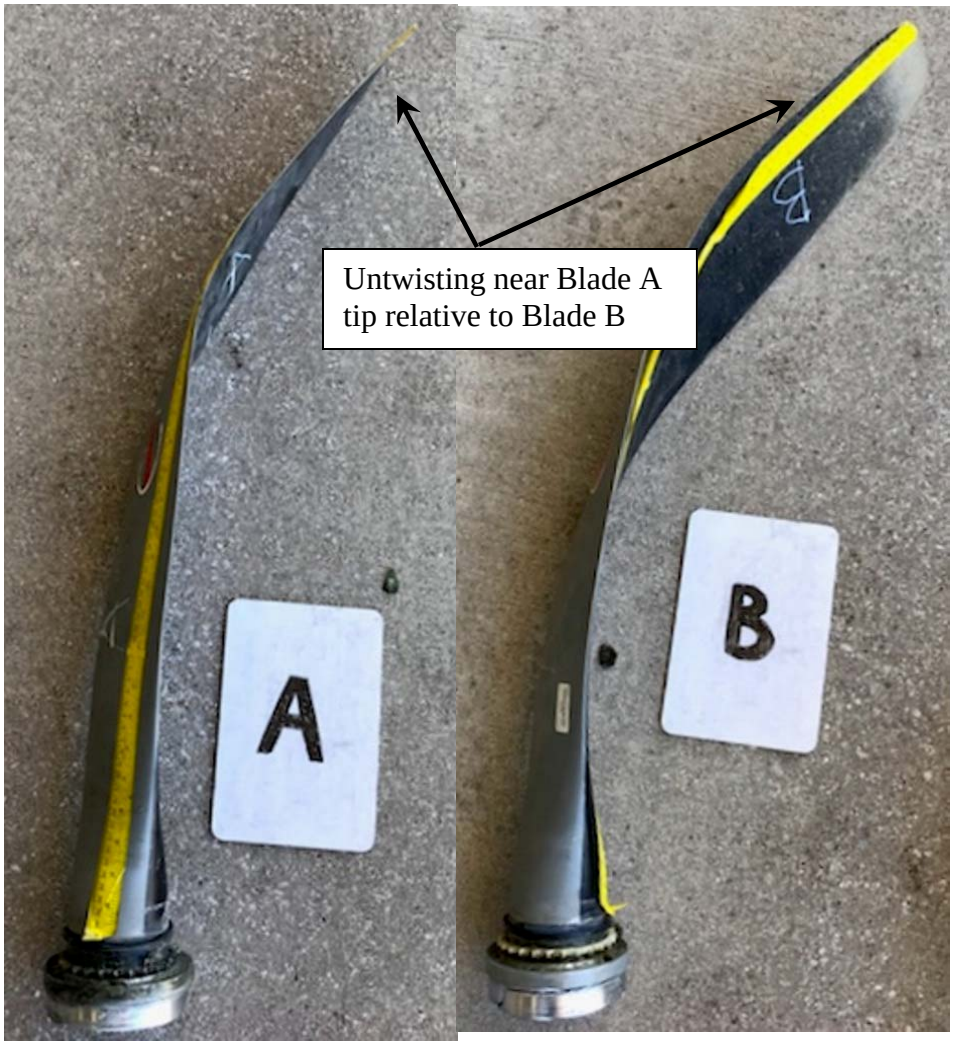

Photo #5 – Preload Plate A

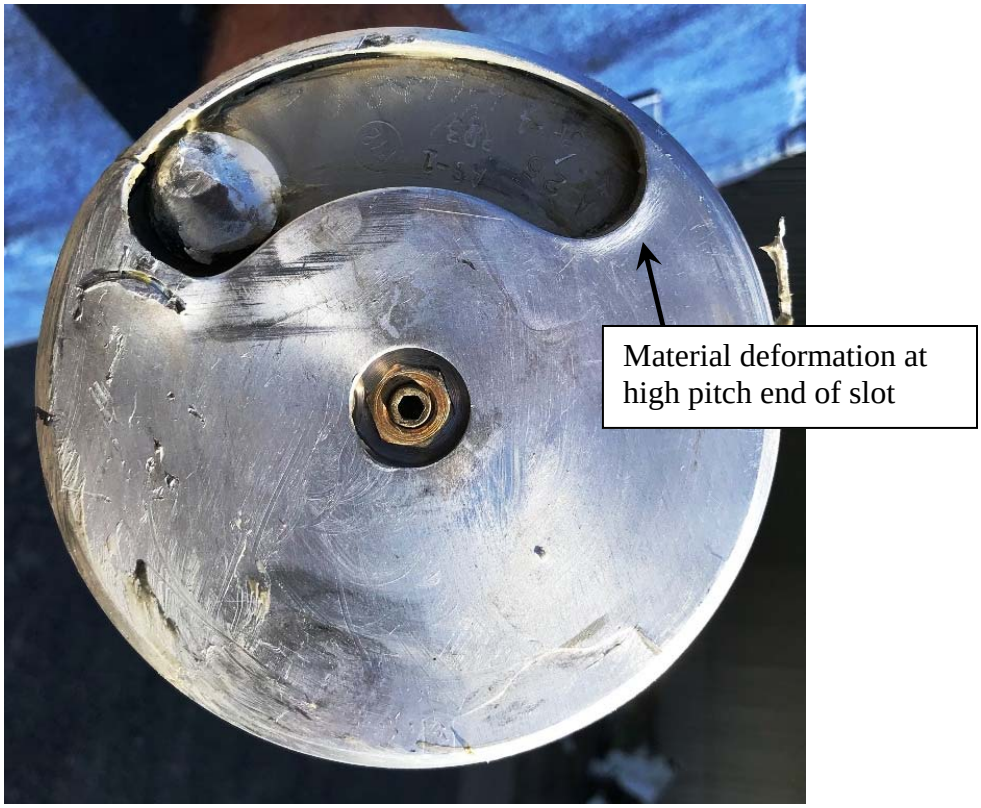

Photo #6 – Preload Plate B