

## **CEN20LA125**

### **Propeller Examination**

Location: Myers Aviation  
545 Aviation Way  
Oshkosh, WI 54902

Date: May 13, 2020

Participants: Les Doud – Hartzell Propeller Air Safety Investigator  
Jon Weston – FAA ASI, Milwaukee FSDO  
Jake Minesinger – Hartzell Chief Pilot

### **Propeller Description**

The propellers examined are 97.7” diameter, Steel Hub Turbine Series, 4-blade, feathering, reversing, pressure to decrease pitch. Oil pressure from the propeller governor is used to move the blades to the low pitch (blade angle) direction. A spring and counterweights move the blades to the high pitch/feather direction in the absence of governor oil pressure. The propeller incorporates start locks to keep propeller blade angle low to minimize the starting torque. The blades are of aluminum construction. The hub and clamps are made of steel alloy.

Installation Data Sheet No. 1915 provides additional propeller installation data.

Both the left and right propellers had been inspected during a 100-hour inspection on August 8, 2019 by Intercontinental Jet Service at a TSO of 97.8 hours. Both propellers had last been overhauled on May 8, 2017 by Air Prop Specialists.

Both hub units had what appeared to be a faint, “-5JL” stamping on the hub barrel despite records indicating both were -5GL models. The -5JL and -5GL models use the same 840-139 hub unit so there is no effect on fit/form/function. No other efforts were made to reconcile part numbers and component S/Ns during this examination.

Left Propeller

Model: HC-B4TN-5GL/LT10282NSB-5.3R

Assembly S/N: CDA3259M4 (DOM 12/5/1999)

Blades S/Ns (per logbook, not verified by stamping on blade butt, all DOM 11/27/1991):

L1 – H41877

L2 – H41866

L3 – H41869

L4 – H41857

Right Propeller

Model: HC-B4TN-5GL/T10282NB-5.3R

Assembly S/N: CDA3170M5 (DOM 8/31/94)

Blades S/Ns (per logbook, not verified by stamping on blade butt, all DOM 11/27/1991):

R1 – H41865

R2 – H41856

R3 – H41875

R4 – H41870

**Propeller Examinations**

Both propeller spinner domes and the propellers were removed from the aircraft for transportation by Myers Aviation prior to this examination. Both propellers were presented for examination with the spinner domes removed at the Myers Aviation facility in Oshkosh, WI on May 13, 2020.

Left Propeller

The left propeller was presented for examination in the condition shown in Photo #1. The propeller was presented in the feathered position. The four blades were labeled L1, L2, L3 and L4 in sequence of rotation.

There was no remarkable damage on the left propeller. The beta tube had been removed, appeared straight and rolled-true on a flat table. All four blades were secure in their clamps with no looseness or free play detected. All the slip indicators were aligned. There were no remarkable indications of grease leaks from the blade bearings/clamps as suggested by the last logbook entry (Photo #2). The feather angles were measured at the 30” station (yellow stripe) and also at the inboard tip stripe before any work was performed on the propeller. The following angles were measured:

At 30” Station	At Inboard Tip Stripe
L1 – 88.7°	81.0°
L2 – 87.5°	79.9°
L3 – 89.5°	81.8°
L4 – 89.6°	81.6°

Although the feather angle tolerance is 88.0 +/- 0.7° at the 30” radius, angles at the tip were closer together indicating the blades were not twisted or bent due to impact damage (Photo #5). All four blade leading edges and surfaces exhibited normal wear and erosion.

One of the L3 grease fitting caps was dislodged and the fitting was visible (Photo #4). There was some residual oil on the forward end of the piston and piston nut that appeared to be turbine oil (Photo #3).

The left propeller was mounted on a tripod and cycled with air pressure between the reverse pitch stop and the feather stop (Photo #6). There were no remarkable characteristics noted during this cycling. During the first cycle from feather to reverse, all four start locks engaged normally and the start lock plungers were free to move without obstruction. No air leaks were detected from the hydraulic unit.

Photo #1 – Left propeller as-presented



Photo #2 – Last entry in left propeller logbook

Date	Propeller TSN TSO	A/C Hrs	Description of all operations pertaining to Airworthiness Directives, Service Documents, Overhaul, Major or Minor Repair, and Inspections.
2-17-2020	Hobbs 1035.2		This propeller HC-B4TN-5, SN CDA3259M4, blades #41877, H41866 H41869, H41859, TSO 147.3 HUB TSN 5533.5, Blades 7.7 2874.4 is unairworthy due liquid covering all four (4) blades and leaking from blade clamps.

Photo #3 – Residual oil on piston nut/around pitch change rod

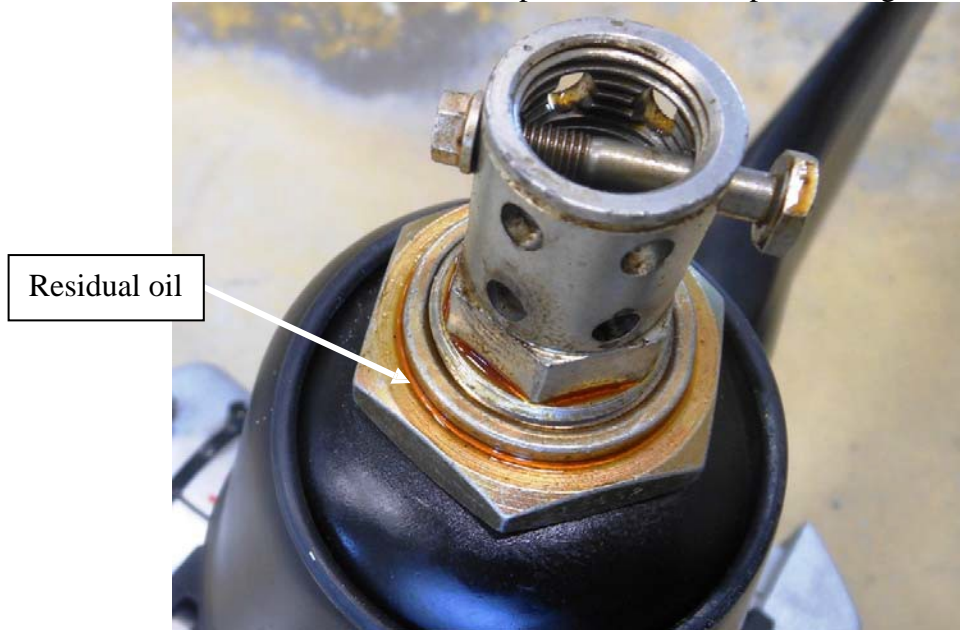


Photo #4 – Grease fitting cap not secure on fitting



Photo #5 – Left propeller blades leading edge-on view (L1-L4 left-to-right)



Photo #6 – Left propeller on tripod for cycling (shown on reverse stop)



## Right Propeller

The right propeller was presented in the condition shown in Photo #7. All four blades had been forcefully rotated in the low pitch direction by impact forces. The blade/clamp/counterweight had rotated past the propeller rotational axis, approximately 180 degrees from the feathered position, essentially in a “backwards feathered” position with the blade trailing edges pointing forward. With the clamp link screws on the opposite side of the rotational axis, the feathering spring pressure effectively locked the propeller in its as-presented position (Photo #8). All four blades were secure in their clamps with no looseness or free play detected. All the slip indicators were aligned. The four blades were labeled R1, R2, R3 and R4 in sequence of rotation.

The beta tube had been removed, appeared straight and rolled-true on a flat table. There were contact marks on each hub arm made by the link screw as it rotated over the arm (Photo #10). There were also contact marks on the piston link arm attach points made by contact with the counterweight arms/slugs as they rotated past the rotational axis (Photo #10). All four link arms appeared bent in compression. There was some rotational free play between the blade clamp and link arm suggesting the link screw hole was elongated from impact forces. The piston was also visibly rotated/dragged around on the cylinder by the link arms and/or contact by the counterweights (Photo #9). It could not be determined if the piston had lifted off the cylinder during the impact sequence or if the forward spring cup remained attached to the cylinder.

All four blades were bent in a similar fashion; aft and slightly opposite rotation. All four blades were also twisted in a similar fashion; towards low pitch (Photo #12). Only blade R2 displayed any remarkable chordwise/rotational scoring, on the face side near the tip (Photo #13). All four blades had spanwise abrasion in the mid-blade bend area suggesting the airplane continued a skid/slide after propeller rotation stopped (Photo #14).

Photo #7 – Right propeller as-presented



Photo #8 – Right propeller locked in position with clamps “over-center”

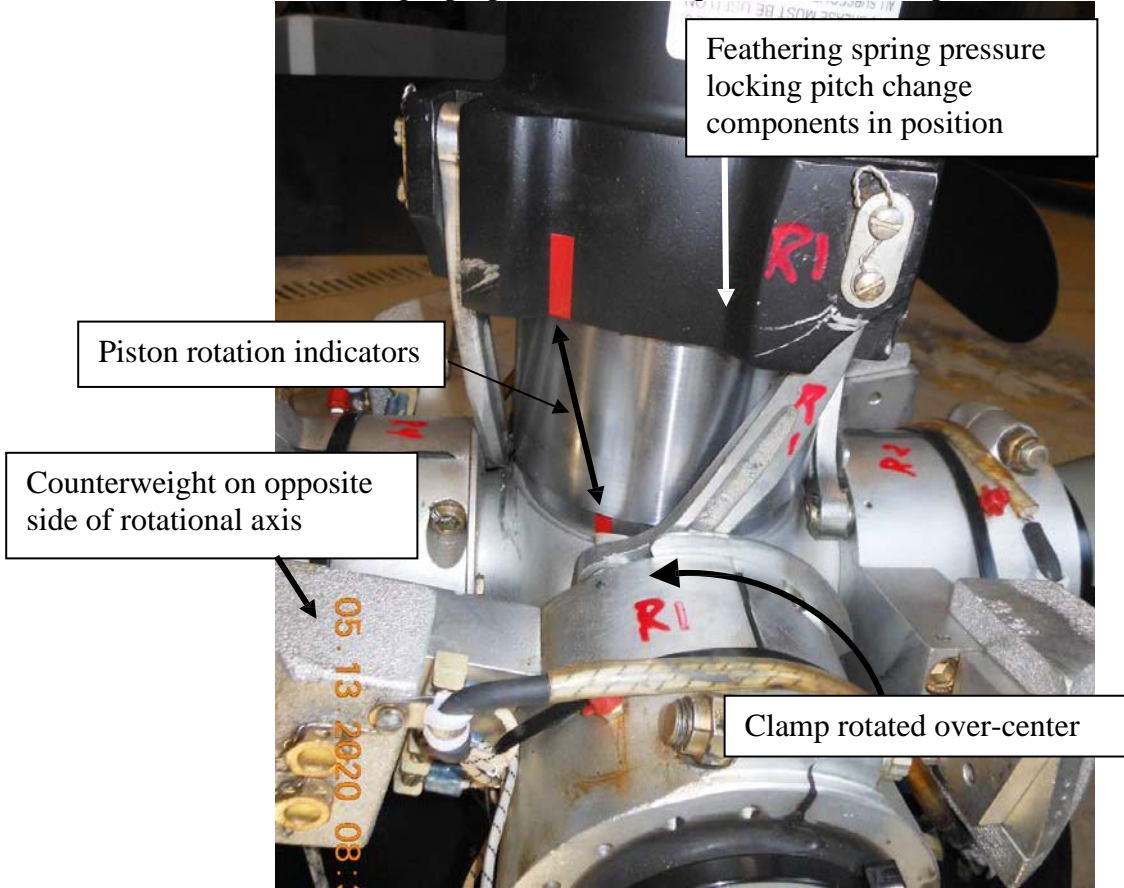


Photo #9 – Piston rotated about cylinder

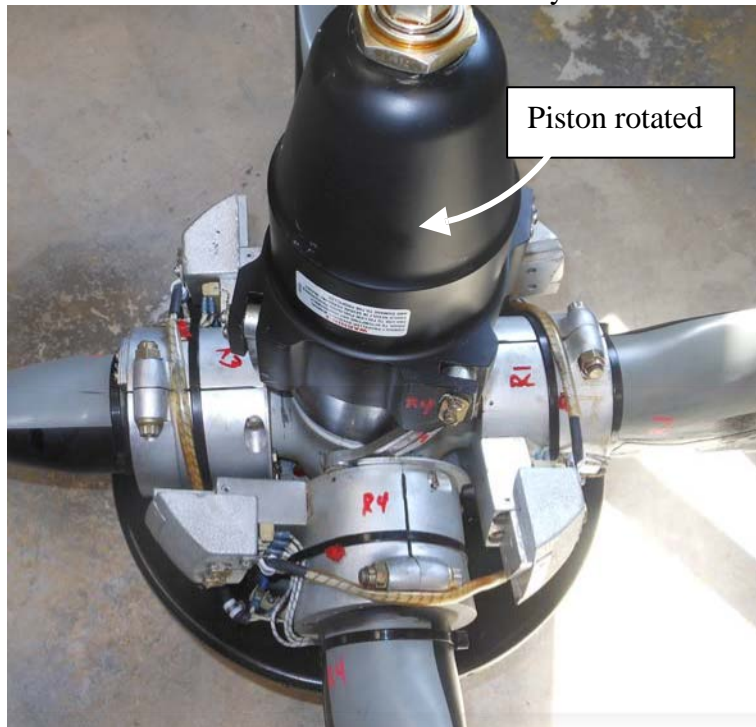


Photo #10 – Scoring marks by link screw and counterweight contact mark

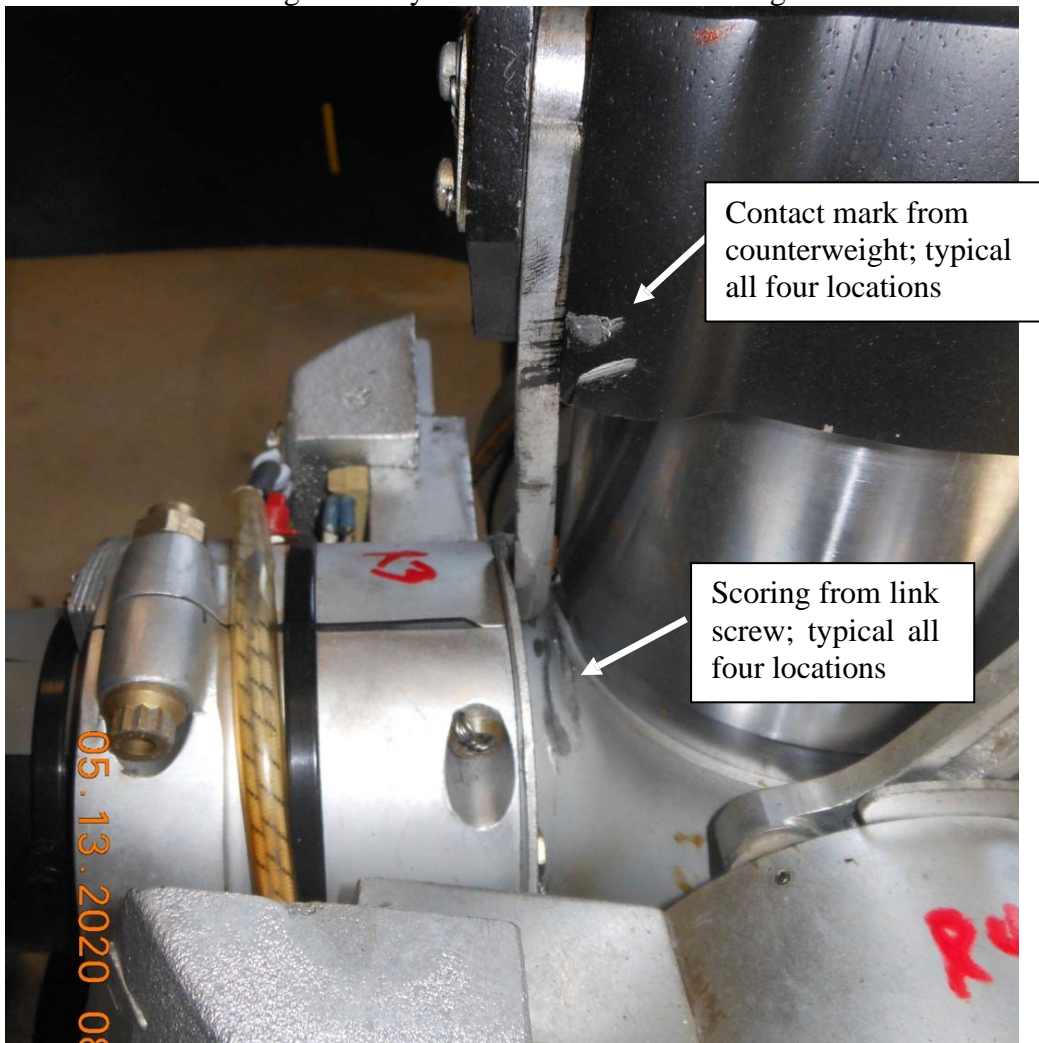


Photo #11 – Last logbook entry for right propeller

Date	Propeller		A/C Hrs	Description of all operations pertaining to Airworthiness Directives, Service Documents, Overhaul, Major or Minor Repair, and Inspections.
	TSN	TSO		
2/17/2020	Hobbs	10352		This propeller HC-B4TN-5, S/N CDA 3170MS, blades H41865, H41856 H41875, H41870, TSO 1473, Hub TSN 5533.5, Blades T.I. 2874.4 is unairworthy due to ground event prop strike all four blades 100% Rpm and 30% torque.



Photo #12 – Right propeller blades relative bend and twist (R1-R4 left-to-right)



Photo #13 – Chordwise/rotational scoring on R2 face side



Photo #14 – Spanwise abrasion in mid-blade (typical of all four blades)



## **Conclusions**

There were no visible discrepancies noted that would prevent or degrade normal propeller operation of the right propeller prior to impact. All visible damage was consistent with high impact forces at low power as stated in logbook (Photo #11). There were no visible or functional discrepancies with the left propeller that would prevent or degrade normal operation. The left propeller appeared undamaged and serviceable.

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