

ERA24LA094

POWERPLANTS

Group Chairman's Factual Report - Attachment #1

McCauley Propeller Teardown Inspection of Propeller from: Cessna 208B, N1983X

February 27, 2025



23 April 2024

Mr. Rob Hunsberger
National Transportation Safety Board

MEMO: MPS-24-020

SUBJECT: Teardown Inspection of Propeller from:
Cessna 208B, N1983X
File #:(MPS: 2024-02 NTSB: ERA24LA094)

Subject propeller was installed on a Cessna 208B, which experienced a forced landing on 19 January 2024 near Washington, DC. McCauley was requested to assist in the examination of the propeller and with the interpretation of the damage indications.

The propeller was inspected at McCauley Propeller Systems Engineering Lab, Wichita, Kansas, on 22 April 2024, with the following in attendance:

Bobbie Kroetch	In-person and Present	FAA
Travis Martin	In-person and Present	Textron Aviation-McCauley Engineering Lab
Brian Cozine	In-person and Present	Textron Aviation-McCauley Propeller Engineering
Scott Thompson	In-person and Present	Textron Aviation-McCauley Engineering Lab
PJ Beavers	In-person and Present	Textron Aviation Air Safety Investigations
Casey Love	In-person and Present	Textron Aviation Air Safety Investigations

The propeller arrived in a single wooden crate. Inside the crate was one propeller assembly, partially disassembled; one spinner; a cardboard box of propeller components; and the propeller logbook.

Based on the lack of torque sentry stripes and loose fasteners, the rear spinner bulkhead had been previously removed and then temporarily reinstalled prior to placing the propeller assembly in the shipping crate. The spinner shell had many small indentations on the inside surface in the vicinity where counterweights are normally installed on the propeller assembly.

All three counterweights were found in the cardboard box with their mounting bolts, separate from the propeller assembly. Two of the counterweight mounting bolts, associated with blades 1 and 3, had stripped aluminum in their threads.



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Blade #2's counterweight mounting bolt threads did not contain stripped aluminum. It was confirmed with the observing Textron Aviation Air Safety investigators that #2's counterweight was removed from the propeller after the incident.

The propeller assembly had been partially disassembled prior to shipment. The spring can, feathering spring, piston and attachment hardware, and beta rods and attachment hardware were contained in the cardboard box of components. In order to remove the piston, the cylinder must be removed. The cylinder had been reinstalled with three of its fasteners prior to shipment. The beta ring was found loose under the propeller assembly. Removal of the three beta rods disconnects the beta ring from the propeller assembly. None of these components showed evidence of damage.

The propeller was removed from the shipping crate and initial inspection found all three blades retained in the propeller hub but free to spin in their sockets. Retaining rings and shim stacks had been popped out of their grooves on each blade. All three blades had significant damage. Blade 1 had approximately 9.25" of the tip missing, significant gouges on the leading edge, and was bent forward from mid-span. Blade 2 had approximately 8.75" of the tip missing, significant gouges on the leading and trailing edges, and was bent forward from mid-span. Blade 3 had approximately 5.75" of the tip missing, significant gouges on the leading and trailing edges, and was bent aft from mid-span.

All components of the propeller pitch control system were found intact inside the propeller hub, but all three pitch actuation pins were found removed from their respective blades. All six of the pin attachment bolts were found to have stripped aluminum in their threads. All three actuating pins were still attached to their respective actuation links, and all three links were still attached to their respective yoke mounting locations. Blades 1 and 3 had slightly bent yoke-to-link attachment bolts, and the bushings at all three locations were cracked, but all links and pins were retained and free to rotate.

Impact damage witness marks were observed on the root faces of each blade inside the hub. The orientation of the witness marks are consistent with the blades being in the forward thrust operating range at the time of impact, however exact blade angles could not be determined.



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The model number and serial numbers of the propeller are as follow: *(Dates of manufacture for the serialized components are shown parenthetically in italics)*
{obscured or damaged numbers are shown in brackets}

Model: **3GFR34C703**
Serial (S/N): **140740** *(2014 manufacture)*
Blade 1 (S/N): **AIJ300{X}6** *(2014 manufacture)*
Blade 2 (S/N): **AIJ300{7}5** *(2014 manufacture)*
Blade 3 (S/N): **AIK30001** *(2014 manufacture)*

Examination of the propeller produced the following observations and conclusions:

1. The propeller had sudden-failure type damage and gross part deflections typically associated with impact forces. The investigation found no evidence of any type of fatigue failure. There were no indications of any type of propeller failure or malfunction prior to the impact sequence.
2. The blade angle actuation components exhibited gross part deflection and structural overload failure associated with the impact sequence. Specific blade angles at the time of impact could not be determined. Internal witness marks were consistent with the blades being in the forward thrust operating range at the time of impact.
3. Blade leading edge damage, blade tip removal, and blade tip bending are consistent with the propeller having significant rotational energy during the impact sequence. Engine power at time of impact was not determined.



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Following the investigation, the components of the propellers were returned to the shipping crate. Upon request from NTSB, the propeller will be return shipped to:

Southern Airways Express Parts
500 Airport Rd
Lititz, PA 17543

Respectfully,



Brian Cozine
Textron Aviation-McCauley Propeller Engineering