

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23FA313

PROPELLER EXAMINATION

March 19, 2024

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A. ACCIDENT

Location: Churchville, MD
Date: July 25, 2023
Time: 1906 EDT
2306 UTC
Airplane: Piper PA-28R-200; N34PT

B. PROPELLER EXAMINATION

IIC	Joshua Young National Transportation Safety Board Washington, DC
Party Coordinator	Jon Hirsch Piper Aircraft Vero Beach, FL
Party Coordinator	Brian Cozine Textron Aviation - McCauley Engineering Lab Wichita, KS

C. SUMMARY

On July 25, 2023, about 1906 eastern daylight time, a Piper PA-28R-200, N34PT, was substantially damaged when it was involved in an accident near Churchville, Maryland. The commercial pilot was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

D. DETAILS OF THE EXAMINATION

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: B3D36C424E
Serial (S/N): 230227 (*2023 manufacture*)
Blade 1 (S/N): ARB3{0}030 (*2023 manufacture*)
Blade 2 (S/N): ARB30031 (*2023 manufacture*)
Blade 3 (S/N): ARB3{0}035 (*2023 manufacture*)

1.0 Propeller Examination

At the accident site the propeller blades were arbitrarily labeled A, B, and C for identification purposes. During this examination the blade number was determined as marked on the propeller hub. Blade A correlated to blade number 3, blade B to blade number 1, and blade C to blade number 2. Throughout this examination summary the blades will be referred to using the blade number.

The propeller arrived in a single wooden crate. Inside the crate was one propeller assembly with no accessories or spinner.



Photo 1: The propeller as first viewed still seated in the crate.

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.

The blade angle actuation components exhibited gross part deflection and structural overload failure associated with the impact sequence. All three links were broken, the piston rod was bent, and the piston return spring was

deformed. Specific blade angles at the time of impact could not be determined. Internal witness marks did not give an indication of the blades being outside of the normal operating range of the propeller.



Photo 2: Removal of the blade actuation piston and spring assembly. (McCauley Photo)



Photo 3: View of broken actuator links. (McCauley Photos)



Photo 4: View of deformations to the actuator piston rod. (McCauley Photos)

One of the three blade actuating pin assemblies was not found during the teardown investigation. The other two pin assemblies were found separated from their respective blade mounting locations. All three blade roots had witness marks associated with their respective pin assemblies being removed by overload forces. Additionally, the rear of the hub containing the mounting studs and the rear quarter of blade socket number 2 were missing, allowing open access to the loose and broken components on the inside of the hub.



Photo 5: View of fractures to the No. 1 blade socket. (McCauley Photo)



Photo 6: View of the rear hub and missing rear quarter of blade socket No. 2. (McCauley Photo)



Photo 7: View of rear hub fracture surfaces. (McCauley Photos)



Photo 8: View of the root of blade 1. (McCauley Photo)



Photo 9: View of the root of blade 2. (McCauley Photo)



Photo 10: View of the root of blade 3. (McCauley Photo)

The propeller blades had chord wise scratches, leading edge paint removal, and leading edge gouges and nicks. These observations are consistent with a

high amount of rotational energy during the impact sequence. Engine power levels were not determined.



Photo 11: Overview of blade 1. (McCauley Photo)



Photo 12: Overview of blade 2. (McCauley Photo)



Photo 13: View of the leading edge of blade 2. (McCauley Photo)



Photo 14: Overview of blade 3. (McCauley Photo)

Submitted by:

Joshua Young
Air Safety Investigator