



4 March 2022

Mr. Aaron Sauer
National Transportation Safety Board

MEMO: MPS-22-013 Rev -

SUBJECT: Teardown Inspection of Propellers from:
310J, N3187L,
File #:(MPS: 2022-01, NTSB: CEN22FA070)

Subject propellers were installed on a Cessna 310J, N3187L, which crashed on 12 December 2021 near Dobies Airport, Inola, Oklahoma. McCauley was requested to assist in the examination of the propellers and with the interpretation of the damage indications.

The propellers were inspected at the McCauley Engineering lab in Wichita, Kansas on 1 March 2022, with the following in attendance:

Mr. Kevin Stahl	In-person and Present	Textron Aviation-McCauley Engineering
Mr. Travis Martin	In-person and Present	Textron Aviation-McCauley Engineering-Lab
Mr. Aaron Sauer	In-person and Present	National Transportation Safety Board
Mr. Andrew Hall	In-person and Present	Textron Aviation-Air Safety

The installed position of the two propellers on the airframe was provided by the National Transportation Safety Board.

The model number and serial numbers of the propellers are as follows: *(Dates of manufacture for the serialized components is shown parenthetically in italics Unreadable or obscured digits are shown by bracketed placeholders {X})*

	Left Hand Propeller	Right Hand Propeller
<u>Model:</u>	D2AF3{4}C81-O/S-84JF-3*	D2AF34C81-O/S-84JF-3
<u>Serial (S/N):</u>	78476{8} (1978 manufacture)	786627 (1978 manufacture)
<u>Blade 1</u> <u>(S/N):</u>	K95932YS** (pre-1980 manufacture)	C73951YS (pre-1980 manufacture)
<u>Blade 2</u> <u>(S/N):</u>	K95935YS** (pre-1980 manufacture)	C73958YS (pre-1980 manufacture)



* Obscured character on the model number stamping is assumed to be “4” based on the blade shank size for this propeller blade.

** Blades arrived for examination free from the hub sockets. Socket attribution is based on lowest blade serial in blade 1.

After the examination, the following conclusions are drawn:

1. Both propellers had damage resulting from the impact sequence. There were no indications of any type of propeller failure or malfunction prior to impact sequence.
2. Both the left hand and right hand propellers had indications consistent with low amounts of rotational energy absorption (little to no rotation at impact likely with little to no engine power) during the impact sequence. Exact engine power levels were not determined.
3. Both propellers had impact signature markings or component positions indicating blade at or near feathered blade angle during the impact sequence. Feather blade angle is 82.6° measured at the 30” blade spanwise station. The concluded propeller blade angles are consistent with indicated power levels.

The conclusions noted above are based on a variety of observations, some of which are noted below:

1. Both LH and RH propellers had sudden-failure type damage that is typically associated with impact forces; and gross part deflections. The investigation found no evidence of any type of fatigue failure.
2. Both LH and RH propellers had witness marks from contact between the blade actuation pins and blade ferrules impacting other blades during the impact sequence. The LH propeller had witness marks between the blade ferrules and the feathering spring. The RH propeller had witness marks between the counterweight and the propeller hub. The position of all these marks indicates an approximate propeller blade angle near the feather blade angle (82.6°).
3. The propeller blade bending, twisting, paint scuffing, and overall propeller assembly damage is typical of that associated with low to no amounts rotational energy absorption during the impact sequence.
4. The LH propeller had all 6 attach studs present for the tear down and they appeared to be straight in the hub. The RH propeller had all 6 attach stud threaded holes stripped and the studs were not present in the hub for the



tear down. The RH propeller stud attach holes that were all elongated during the impact sequence in the same linear direction. The direction of the elongated holes is consistent with little to no amounts of rotational energy during the impact sequence.

5. Both propellers had evidence of field service events including blade actuation pin re-drilling and hub and cylinder paint.

At the request of the NTSB the propellers were return shipped to Air Salvage of Dallas, Dallas, Texas.

Respectfully,

Kevin S. Stahl
Textron Aviation-McCauley Propeller Engineering