



27 July 2020

Mr. Timothy Monville
National Transportation Safety Board

MEMO: MPS-20-012 Revision A

SUBJECT: Teardown Inspection of Propellers and Governors from:
Cessna 335 N79HP,
File #:(MPS: 2018-11, NTSB: ERA19FA060)

Subject propeller was installed on a Cessna 335, N79HP, which crashed on 1 December 2018 near Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida. McCauley was requested to assist in the examination of the propellers and with the interpretation of the damage indications.

The propellers were inspected at McCauley Propeller Systems Engineering Lab, Wichita, Kansas on 25 June 2019, with the following in attendance:

Ms. Christy Eckerman	Federal Aviation Administration-Wichita ACO
Mr. Jeff Janusz	Federal Aviation Administration-Wichita ACO
Mr. Kevin Stahl	Textron Aviation-McCauley Engineering
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Mr. Randy Lammon	Textron Aviation-McCauley Engineering Lab
Mr. Casey Love	Textron Aviation-Air Safety Investigation
Mr. Raul Coutreras	Textron Aviation-Air Safety Investigation
Mr. Danny Ball	Textron Aviation-McCauley Engineering
Mr. Ricardo Asensio	Textron Aviation-Air Safety Investigation

The propellers arrived together in a single large wooden crate. Inside the crate, there was one propeller assembly and one partial propeller assembly.

The installed position of the two propellers on the airframe was provided by investigators on the scene of the accident.

Blade numbering in the table below is based on the factory stamped socket numbering found near the propeller attach flange. Two blades were free of the right-hand propeller hub (loose). Additionally, the loose blades in right-hand



propeller were assigned a socket number in the propeller based on factory build convention (installed lowest serial to highest starting in socket 1).

The model number and serial numbers of the propellers are as follows: *(Dates of manufacture for the serialized components is shown parenthetically in italics)*

	Left-Hand Propeller	Right-Hand Propeller
<u>Model:</u>	3AF32C87-NR	3AF32C87-MNR
<u>Serial (S/N):</u>	715262 (1971 manufacture)	700087 (1970 manufacture)
<u>Blade 1 S/N:</u>	F51507YS (pre-1980)	K100092YS (pre-1980) out of hub marked "B"
<u>Blade 2 S/N:</u>	K98635YS (pre-1980)	K100348YS (pre-1980)
<u>Blade 3 S/N:</u>	K98319YS (pre-1980)	F45251YS (pre-1980) out of hub marked "A"

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. The RH propeller had indications consistent with mid amounts of rotational energy absorption (rotation at impact likely with some engine power) during the impact sequence. The LH propeller had indications consistent with low amounts of rotational energy absorption (rotation at impact likely with low engine power) during the impact sequence. Exact engine power levels were not determined.



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

1. The 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 propeller hubs have witness marks from contact with blade counterweight hardware during the accident sequence. The position of all these marks indicates an approximate propeller blade angle of low pitch position at impact.
3. The LH and RH propeller pistons were found near the low pitch stop position.
4. The LH propeller was found with a dent in the cylinder near the feather end. The piston assembly was found outside the dented region near the low pitch stop position.
5. The propellers blade bending, twisting, paint scuffing, and overall propeller assembly damage is typical of that associated with low amounts rotational energy absorption during the impact sequence.
6. The LH and RH propellers had indications of several post-delivery field service events including ferrule drill holes and part stampings.
7. The LH propeller had both start latch screws (part number B-4324) intact. The RH propeller had one intact start latch screw and the other was missing along with the support plate (C-7032). The missing support plate section aligns with the broken-out hub section. Intact start latch screws are consistent with a propeller having a blade angle greater than the start latch propeller blade angle of 17.3° during the impact sequence.

At NTSB request, the propellers were return shipped to: Florida Air Recovery & Storage, Jacksonville, FL.



The governors of the propeller were shipped to the Wichita FAA Aircraft Certification Office sealed in a plastic bag inside a cardboard shipping box.

The left-hand governor was visually inspected at McCauley Propeller Systems Engineering Lab, Wichita, Kansas on 9 May 2019, with the following people in attendance:

Ms. Christy Eckerman	Federal Aviation Administration-Wichita ACO
Mr. Jeff Janusz	Federal Aviation Administration-Wichita ACO
Mr. Kevin Stahl	Textron Aviation-McCauley Engineering
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Mr. Randy Lammon	Textron Aviation-McCauley Engineering Lab
Mr. Danny Ball	Textron Aviation-McCauley Engineering
Mr. Henry Soderlund	Textron Aviation-Air Safety Investigation

The left-hand governor was pressure tested on 6 February 2020, with the following people in attendance:

Ms. Christy Eckerman	Federal Aviation Administration-Wichita ACO
Mr. Jeff Janusz	Federal Aviation Administration-Wichita ACO
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Mr. Ricardo Asensio	Textron Aviation-Air Safety Investigation
Mr. Danny Ball	Textron Aviation-McCauley Engineering
Mr. Randy Lammon	Textron Aviation-McCauley Engineering Lab

The left-hand governor was tear down inspected on 23 June 2020, with the following people were in attendance:

Ms. Christy Eckerman	Federal Aviation Administration-Wichita ACO
Mr. Dan Withers	Federal Aviation Administration-Wichita ACO
Mr. Kevin Stahl	Textron Aviation-McCauley Engineering
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Ms. Jenifer Barclay	Textron Aviation-Air Safety Investigation



The right-hand governor was tear down inspected at McCauley Propeller Systems Engineering Lab, Wichita, Kansas on 26 June 2019, with the following people in attendance:

Ms. Christy Eckerman	Federal Aviation Administration-Wichita ACO
Mr. Jeff Janusz	Federal Aviation Administration-Wichita ACO
Mr. Kevin Stahl	Textron Aviation-McCauley Engineering
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Mr. Randy Lammon	Textron Aviation-McCauley Engineering Lab
Mr. Casey Love	Textron Aviation-Air Safety Investigation
Mr. Raul Coutreras	Textron Aviation-Air Safety Investigation
Mr. Danny Ball	Textron Aviation-McCauley Engineering
Mr. Ricardo Asensio	Textron Aviation-Air Safety Investigation

The model number and serial numbers of the governor is as follows: *(Date of original manufacture for the serialized components is shown in italics)*

	Left-Hand	Right-Hand
<u>Model:</u>	DCFS290D8/T3	DCFS290D7A/T3
<u>Serial (S/N):</u>	781856 (1978 Manufacture)	792092 (1979 Manufacture)
<u>MPS P/N:</u>	D-20686-1	D-20672-2

The governors arrived packed in cardboard box in plastic bags. The left-hand governor arrived as a complete assembly. The right-hand governor arrived as a partial assembly missing the A-20609 Assembly-Lever Control, B-20040 Spring-Torsional, and B-20684 Assembly-Control Head was partially missing.

The installed position of the two governors on the airframe was provided by investigators on the scene of the accident.

After the examination and pressure testing, the following conclusions are drawn:

1. No indications of any type of governor failure or malfunction prior to impact were found in either governor.



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

1. No attempt was made to operationally test either governor due to the presence of debris and contaminants from the impact sequence.
2. The left-hand governor had indications that it was in a fire. This governor was pressure tested with oil to approximately 300 psi. No leaks were noted.

At the conclusion on the examination, the governors were given back to the Wichita FAA Aircraft Certification Office.

Respectfully,

Kevin S. Stahl
Textron Aviation-McCauley Propeller Engineering



Memorandum For Record

Timothy W. Monville
Sr. Air Safety Investigator
Eastern Region

Date: August 4, 2020
NTSB Accident Number: ERA19FA060

On August 4, 2020, at 1329 EDT, FAA inspector Christy Eckerman sent NTSB an email with the following information:

“I, Christy Eckerman, Continued Airworthiness Specialist, Wichita ACO Branch was present and provided Federal oversight on behalf of the NTSB, observed the inspection of the left and right propeller, right and left governor at Textron Aviation, Inc. (McCauley) associated with ERA19FA060, N79HP, Cessna 335, accident in FT. Lauderdale, FL, December 1, 2018. The final report was reviewed with no additions or corrections.

Christy Eckerman
Continued Airworthiness Specialist
Continued Operational Safety Section, AIR-7K1
[REDACTED],