



8 January 2018

Mr. Andrew Swick
Aviation Accident Investigator
National Transportation Safety Board

MEMO: MPS-18-002.A

SUBJECT: Teardown Inspection of Propellers from:
Cessna 310R, N87297,
File #:(MPS: 17-07, NTSB: WPR17LA136)

Subject propellers were installed on a Cessna 310R, N87297, which crashed on 30 June 2017 near Santa Ana, California. 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 System's Engineering Lab, Wichita, Kansas on 8 November 2017, with the following in attendance:

Mr. Andrew Swick	National Transportation Safety Board
Mr. Ricardo Asensio	Textron Aviation-Air Safety Investigation
Mr. Aaron Sturgeon	Textron Aviation-McCauley Engineering Lab
Mr. Travis Martin	Textron Aviation-McCauley Engineering Lab
Mr. Kevin Stahl	Textron Aviation-McCauley Propeller Engineering
Mr. Danny Ball	Textron Aviation-McCauley Propeller Engineering

The propellers arrived together in a single wooden crate. Inside the crate, the two propeller assemblies were separated by carpet remnants.

Blade numbering in the table below is based on the factory stamped socket numbering. Installation position on the aircraft was provided by NTSB.



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

	<u>LH Propeller:</u>	<u>RH Propeller:</u>
<u>Model:</u>	3AF32C504-C/G-82NEA-5.5	3AF32C87-N2R/S-82NC-5.5
<u>Serial (S/N):</u>	960084 <i>(1996 manufacture)</i>	733240 <i>(1973 manufacture)</i>
<u>Blade 1 S/N:</u>	PI060 <i>(Sept 1995 mfg)</i>	K101624YS <i>(pre-1980)</i>
<u>Blade 2 S/N:</u>	PI070 <i>(Sept 1995 mfg)</i>	K102885YS <i>(pre-1980)</i>
<u>Blade 3 S/N:</u>	PI078 <i>(Sept 1995 mfg)</i>	K105672YS <i>(pre-1980)</i>

After the examination, the following conclusions are drawn:

1. Both propellers had damage as a result of impact. There were no indications of any type of propeller failure or malfunction prior to impact.
2. Both the LH and RH propellers had indications consistent with a low amount of rotational energy absorption (rotation at impact likely with low engine power) during the impact sequence. Exact engine power levels were not determined.
3. There were no impact signature markings or component positions indicating blades at feather position at impact. Both propellers had several indications of operating on or near the low pitch stop position at impact. 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 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 or pre-impact issue.
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. Both the LH and RH propeller blade bending, twisting, paint scuffing, leading edge impacts, and overall propeller assembly damage is typical of that associated with low-level rotational energy absorption (rotation with likely low amount of engine power) at impact.
5. The RH propeller had indications of several post-delivery field service events including ferrule drill holes and part stampings.

The propellers were return shipped to: South West Transportation and Recovery, Chino, CA.

Respectfully,

Danny L. Ball
Textron Aviation-McCauley Propeller Engineering