



ERA18LA031

Clearwater, Florida

November 25, 2017

Piper PA-46-500TP – N863RB

NTSB ENGINE ACCESSORIES

EXAMINATION REPORT

March 19-21, 2018

PARTICIPANTS IN THE EXAMINATION

Heidi Kemner
Air Safety Investigator (IIC)
National Transportation Safety Board
Ashburn, VA

David Barnard
Senior Air Safety Investigator
Pratt & Whitney Canada
Montreal, Canada

HISTORY OF FLIGHT

On November 25, 2017, about 1315 eastern standard time, a Piper PA-46-500TP, N863RB, was substantially damaged when it experienced a loss of engine power during the initial climb from St. Pete/Clearwater International Airport (PIE), Clearwater, Florida. The airline transport pilot sustained serious injuries. The airplane was registered to and operated by a corporation as a 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and an instrument flight rules flight plan was filed for the flight that was originating at the time of the accident and was destined for Pensacola International Airport (PNS), Pensacola, Florida.

ENGINE INFORMATION

Engine Manufacturer: Pratt & Whitney Canada
Engine Model Number: PT6A-42A
Engine Serial Number: PCE-RM0231
Recent Inspection: April 1, 2017 – annual inspection
Built: April 18, 2005
Recent Recorded Cycles: 912
Recorded Engine Total Time: 1341.0

HOVEY's Aviation

	Date: 01 April 2017	N#: N863RB	LICENCE NUMBER
	Model: PT6A-42A	Serial #: PCE-RM0231	
	Total Time: 1341.0	Hour meter: 1341.0	
	Make: Pratt & Whitney	Cycles: 912	
	1. C/W an ANNUAL inspection IAW FAR 43 Appendix D using Piper Meridian Event 1 and Event 2 as a guide.		
	2. C/W 1000 hour replacement main oil filter.		
	3. Inspected fuel filters and strainer. Replaced paper filter.		
	4. C/W P&W minor inspection items.		
	5. C/W chip detector system inspection.		
	6. Checked igniters. Replaced both ignitors.		
	7. Replaced left ignitor lead.		
	8. Replaced beta brush block.		
	9. C/W compressor wheel rinse.		
	10. Washed engine down. Lubed engine controls.		
	11. Ground run up and leak checked.		
	This engine is determined to be in airworthy condition and approved for return to service.		
	George Hovey A&P [Redacted] IA		

Photo 1: Most Recent Inspection (Annual Inspection)

INITIAL EXAMINATION AS RECEIVED

The engine accessories were received boxed and sealed. After removal from the box, they were photographed. The accessories that were noted in the box were:

- The propeller governor
- The propeller overspeed governor
- The torque limiter
- Fuel control unit
- Fuel pump
- Fuel oil heat exchanger

DETAILED EXAMINATION

Fuel Control Unit

The fuel control unit and the fuel pump remained intact and attached. They were separated, and the plastic coupling was engaged and moved freely by hand.

The Px orifice was free of blockages. The Py orifice was not blocked. The Py bleed was not blocked. The throttle shaft was impact bent and straightened to facilitate testing. It broke during

the attempted straightening. When tested for air leaks, air was leaking between the air adapter and the drive body, which was within manufacturer tolerance.

The fuel control unit was mounted on a test stand. It was run for 10 minutes, manufacturer maximum fuel flow was not obtained, however, from the time the fuel control unit began to run the fuel flow dropped 8 pounds per hour over the 10 minutes. Throughout the test, the fuel temperature remained at 85° F.

The fuel control unit was removed from the test stand and disassembled for further examination. The flow body was removed and disassembled. The governor lever and enrichment lever were examined with no anomalies noted. The flyweight assembly was examined and the teflon tube remained intact, the bearings could be moved by hand, and grease was noted on the assembly. The metering valve moved freely when operated. The shutoff valve was oriented correctly and moved freely when operated by hand. The bypass valve diaphragm was removed, and no cracks were noted. The fuel control inlet screen was examined and no debris was noted in the screen and no screen wires were damaged. The acceleration bellows were measured and the manufactured length matched the measured length. The governor bellow was tested and no leaks were observed. The torque tube was pressure tested and no air was noted escaping from the torque tube. The bypass valve was examined under a microscope for metal burs and none were noted. The metering valve sleeve was examined under a microscope for extruded adhesive at the joint and none were noted. No evidence of galvanic corrosion was noted on the air inlet.



Picture 1. View of Fuel Pump and Fuel Control Unit

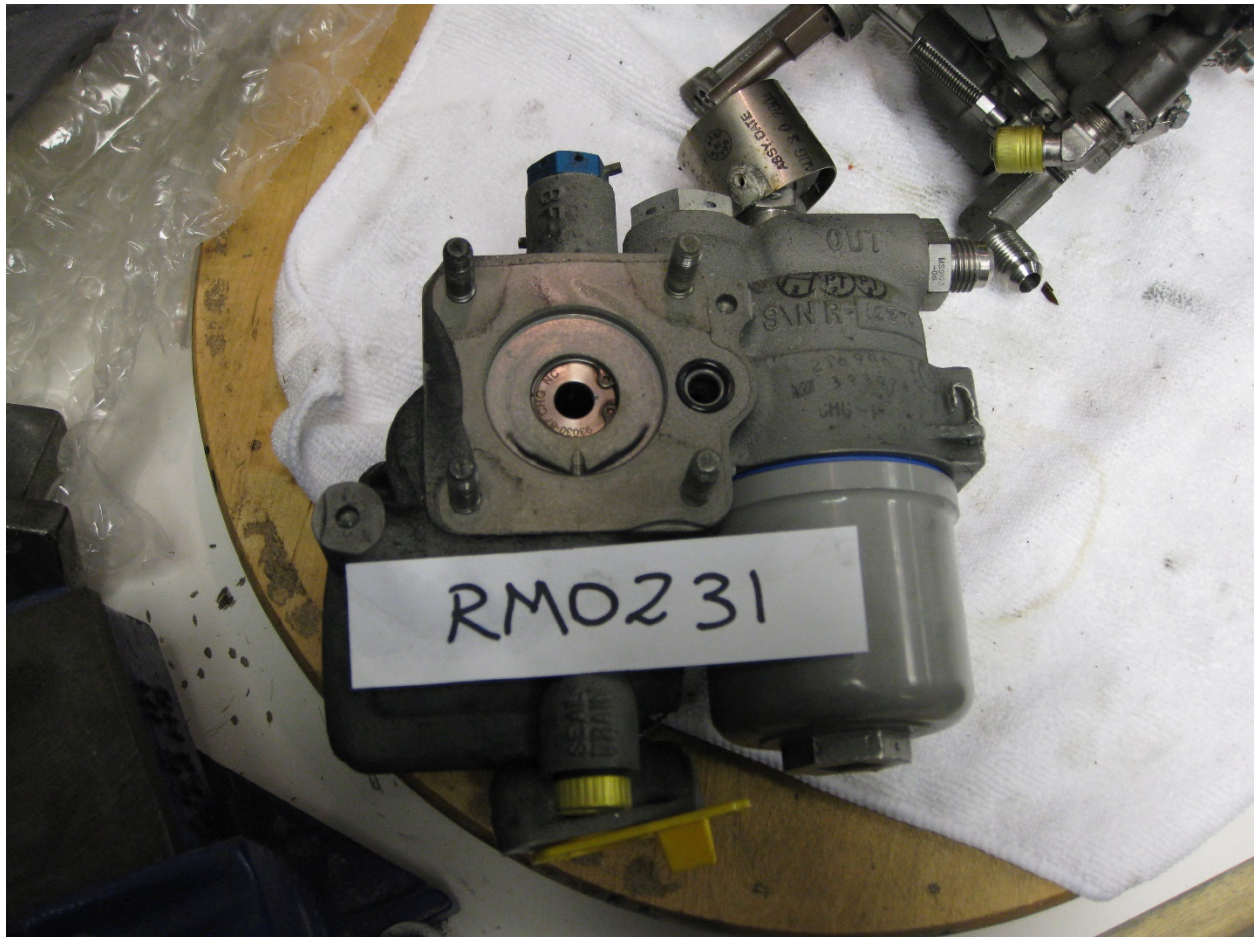
Fuel Pump

The fuel pump inlet screen was removed and no debris was noted. The outlet filter was removed and examined. There was a single piece of metallic debris in the filter. Fuel was removed from the fuel pump and no debris or water was noted.

The fuel pump was flow tested with a slave drive shaft. The results indicated that there was a slight leakage during tests at maximum power. However, at low rpm, there was no leakage.

It was disassembled and bluing was noted on one of the brass bushings on the bearing against the drive cover. The gears were examined and normal wear was noted.

The fuel pump drive shaft was examined and a torsional fracture was noted. It was sent to the lab for material hardness testing and to determine the material properties of the drive shaft and to confirm the fracture mode.



Picture 2. Engine Driven Fuel Pump

Propeller Governor

The propeller governor was examined, and the feathering stop was impact separated. The reset arm moved to the maximum stop operated without anomaly. The beta valve was operated by hand without anomaly. The propeller minimum speed anti tamper paint was present but broken. The driveshaft could be rotated by hand.

The propeller governor was bench tested and operated without any anomalies that would have contributed to the loss of torque during the accident sequence.



Picture 3. Propeller Governor

Propeller Overspeed Governor

The propeller overspeed governor was examined and the anti tamper paint for the maximum overspeed was present but broken. The drive shaft was rotated by hand.

The propeller overspeed governor was bench tested with a slave feather solenoid. During the bench test, the maximum and minimum speed was lower than manufacturer specifications, so a $\frac{3}{4}$ turn inward adjustment was applied to the stop screw and then the overspeed governor operated within manufacturer specifications. Overall, it operated without any anomalies that would have contributed to the loss of torque during the accident.



Picture 4. Propeller Overspeed Governor

Torque Limiter

The torque limiter was examined and photographed.

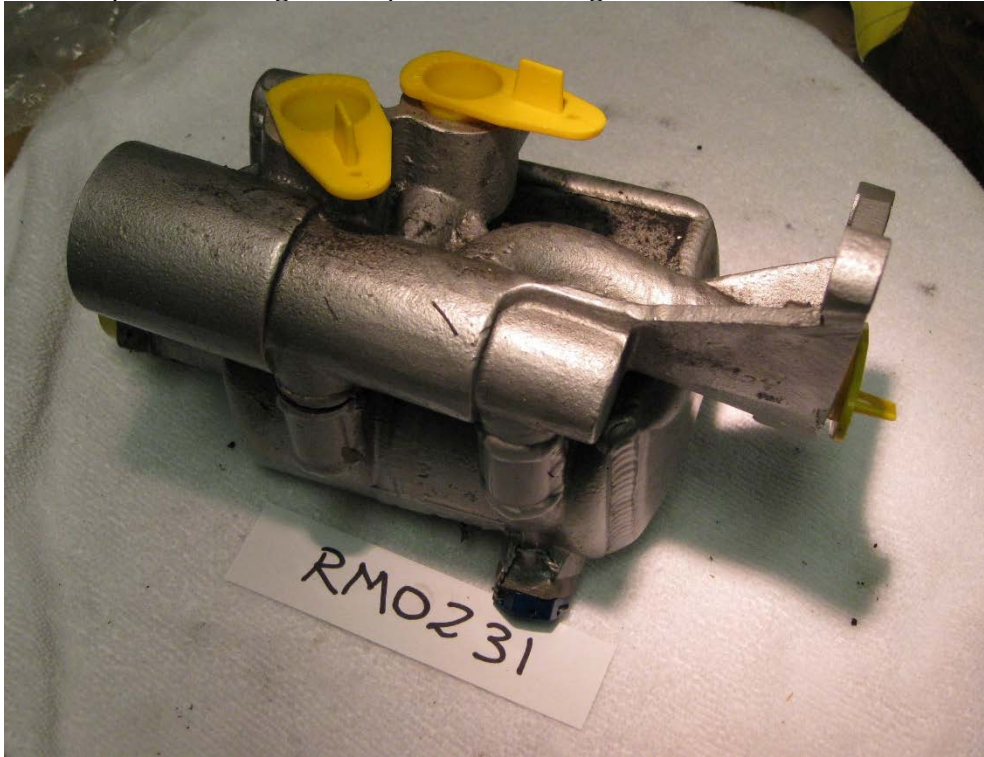
The torque limiter was placed on a test stand and the unit operated below the manufacturer specifications. A $\frac{1}{4}$ turn of the adjustment screw was made and the torque limiter operated within the manufacturer specifications.



Picture 5. Torque Limiter

Fuel Oil Heat Exchanger

The fuel oil heat exchanger was examined. The thermal element was removed and tested and when exposed to a higher temperature, it elongated.



Picture 6. Fuel Oil Heat Exchanger

SUMMARY

The examination revealed that there were no abnormalities with the examined engine accessories. Therefore, the probability exists that the engine was operating normally with no mechanical malfunctions or abnormalities that would have precluded normal operation.

FUTURE ACTIVITIES

The engine accessories will be returned to the salvage yard in Jacksonville, Florida.