

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA046

EXAMINATION SUMMARY

December 4, 2024

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A. ACCIDENT

Location: Big Bear City, California
Date: December 2, 202
Time: 1343 Pacific daylight time
Aircraft: Cessna P210N, N7LV

B. PARTICIPANTS

Investigator	Timothy Sorensen Aviation Accident Investigator National Transportation Safety Board Denver, Colorado
Party Representative	Jim Rosplock Engineer Woodward, Inc. Loves Park, Illinois
Participant	Nate Bogdonas Engineer Woodward, Inc. Loves Park, Illinois

C. ACCIDENT SUMMARY

On December 2, 2023, about 1343 Pacific standard time, Cessna P210N, N7LV, was substantially damaged when it was involved in an accident near Big Bear City, California. The pilot received serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Examination and testing of the propeller governor was conducted on December 3-4, 2024, at Woodward (Loves Park, IL).

D. COMPONENT EXAMINATION SUMMARY

1.0 Propeller Governor

Woodward 8210-140 (s/n 15226599)

The propeller governor was received in a sealed carton. The unit exhibited impact related damage such as localized gouges on the housing, bent fittings, and a

broken off max speed lever.¹ The driveshaft and air bleed lever appeared undamaged and rotated freely using hand pressure. The brass relief valve seal is damaged. Installed lockwire, lockwire seals, and torque sealant were not from the manufacturer. The customer-installed Py inlet fitting was secure but was damaged and bent.² A third-party linkage remained attached to the bleed air lever.

The data plate was secure and denoted as Woodward which included the part and serial numbers, and revision "E".

Upon startup on the test bench, the air bleed system (Py) initially exhibited high air flow which continued when input drive speed was reduced. The Py lever on unit was reset and the unit was tested in accordance with procedure. The air bleed system (Py) appeared to operate as expected. The unit tested in compliance with the specification with one exception. The overspeed setting test point measured 6 psi at 3,710 rpm. The test procedure specified 4 psi max at that speed. The speed was adjusted to provide 24.2 psi as noted in the procedure. At that pressure, the unit speed was 4,000 rpm; however, the specification noted 3,900 rpm max.

The overspeed set screw on the unit was adjusted to provide 4 psi at 3,710 rpm. The speed was adjusted to provide 24.2 psi as noted in the procedure. At the pressure, the unit speed was 4,073 rpm. The specification noted 3,900 rpm max.

The unit was xray inspected in an attempt to determine the reason for the Py valve initially being stuck in the open position. The internal valve springs appeared to be the fully seated into the housing counterbore recesses as expected. No anomalies were observed.

The unit was disassembled; however, no anomalies were identified. The unit was free of debris or sediment. All internal detail parts appeared undamaged.

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¹ The broken input lever was replaced with a serviceable part to facilitate testing.

² The fitting was removed. Upon removal, the mating threads were damaged and were chased with a tap. A replacement fitting was installed to facilitate testing.



Figure 1 - Shipment (As Received)



Figure 2 - Propeller Governor (As Received)



Figure 3 -- Propeller Governor (As Received)

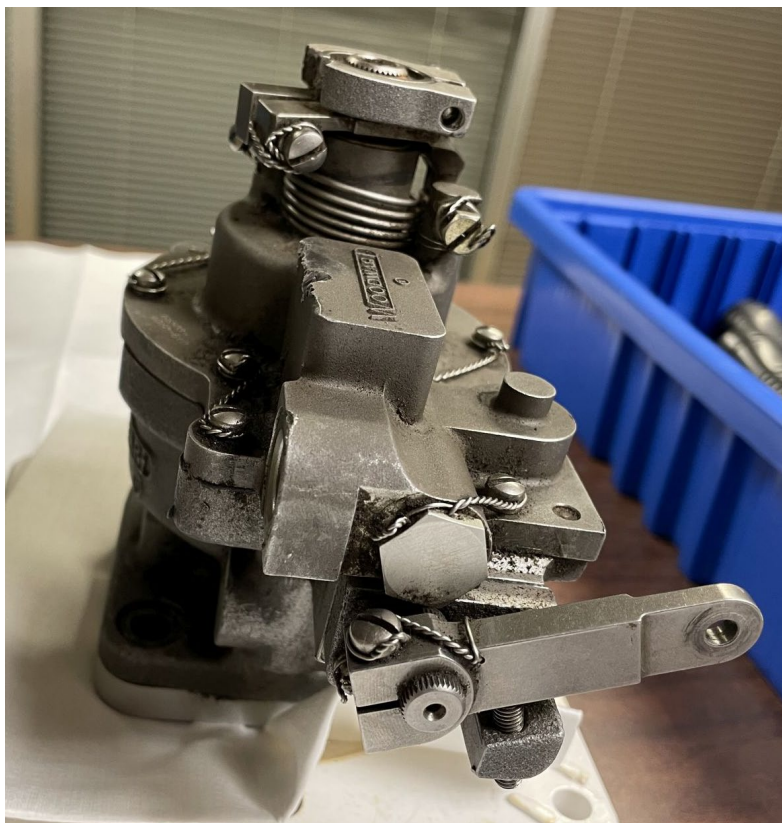


Figure 4 -- Propeller Governor (As Received)

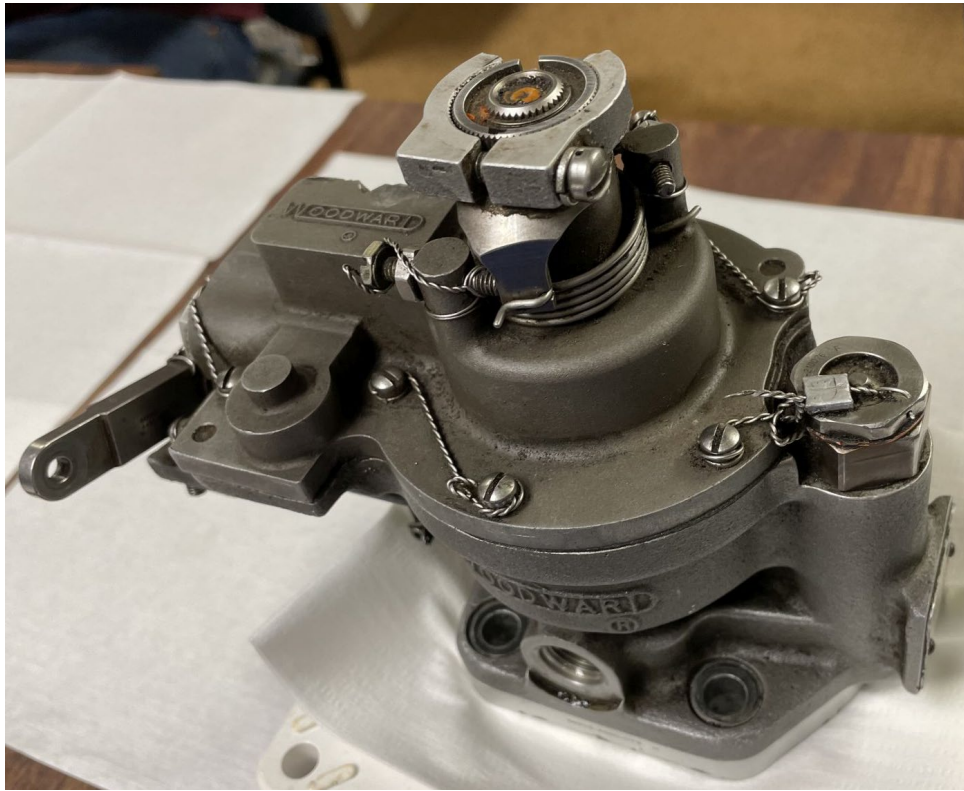


Figure 5 -- Propeller Governor (As Received)

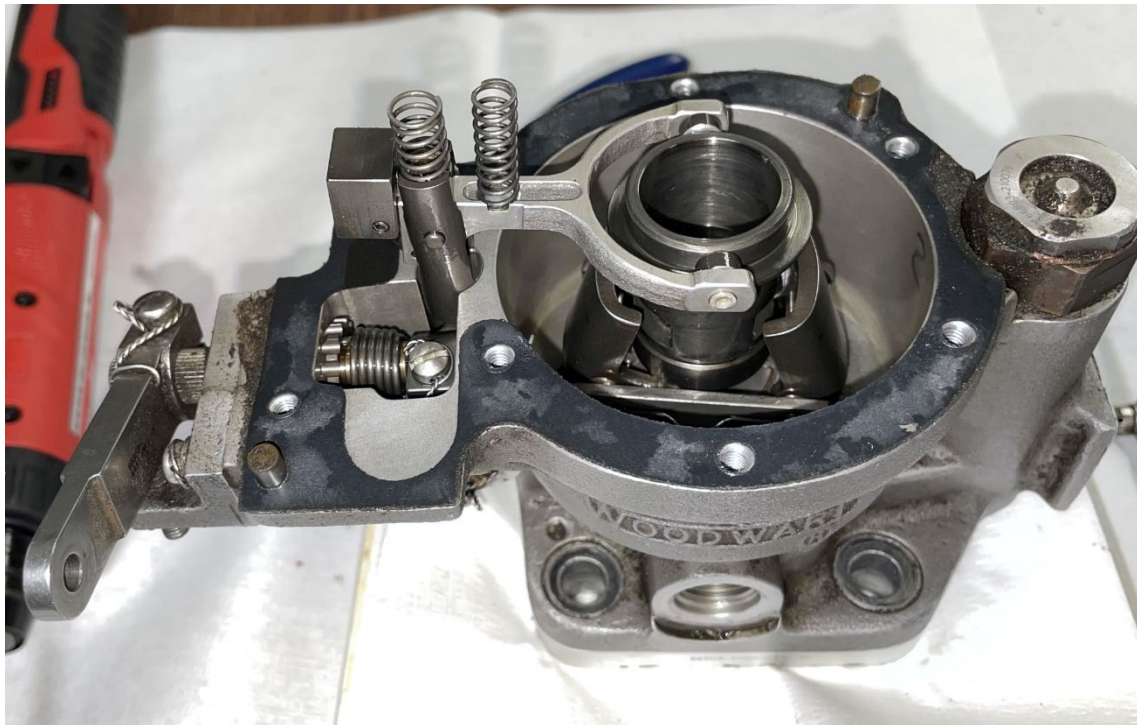


Figure 6 -- Propeller Governor (With Cover Removed)



Figure 7 -- Data Plate

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TEST RECORD FOR TURBOPROP GOVERNOR WITH PNEUMATIC OVERSPEED LIMIT
P/N 8210-140

1. Supply Pressure 40 (40+/-5 PSI 140 oil at 140 deg.F)
2. Relief Valve Pressure at 3000 RPM 350 (340+/-10 PSI)
3. Speed Setting: (150 PSI with flow valve closed)
Max. RPM 3505 (3500+/-5 RPM(102.5%)) 185 control lever angle(185+/-2-1/2 deg.)
Min. RPM 2575 70 control lever angle(70 deg. travel)
70 total travel (70 deg.)
4. Speed setting lever travel from min. RPM to 3400 RPM 62 (62+/-3 deg.)
5. Feather 2445 RPM 75 control lever angle (75 deg. travel).
- 5A. Servo pressure 15 25 PSI max. at lever angle 3 deg. CCW from T.P.5.
6. Travel to Min. stop 91 90+/-2.5 deg. travel from max. RPM stop.
7. Pneumatic Control Valve:
Overspeed Setting 6 (4 PSI +/- .75 Delta P (3710 RPM))
4000 (24.2 PSI Delta P at 3870+/-30 RPM)
4166 (Record RPM at 31.8 PSI Delta P)
4011 (Recheck for hysteresis at 24.2 PSI Delta P)
2 (12 in. of water max. 3555 RPM)

Underspeed Setting 14 (14.0 PSI Delta P +/-1.6 PSI Delta P 3320+/-15RPM)
3468 (Record RPM at 24 PSI Delta P)
2 (12 in. of water max. 3000 RPM)
8. Pump Capacity 7.0 qts./min. (at 150 PSI-3000 RPM-6 qt./min. min.)
9. Internal Leakage 1.0 qts./min. (2.5 qts./min. max.)
10. Control arm set at 185 (185+/-2-1/2 deg.), Reset arm (18+/-5 deg.)
11. Torque check(on bench after test and before lockwiring)
Speed adj. lever screw (33-38 lb.in.) N/A
Air bleed link screw (18-22 lb.in.) N/A
Speed setting stop assy. screws (33-38 lb.in.) N/A
(See Section III.A for proper torques and torquing sequence.)
12. W.G. Co. P/N 8210-140 W.G. Co. Ser. No. 15226599
Technician Matt Jeffers Date 12/03/2024
Sales Order 3980598 Stand 119
13. Check for external leaks NONE

After calibrating
4 4073
4295
4045

AS RECEIVED

Figure 8 -- Bench Test Record