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Annual Inspection of Piper PA-28-180; N9520J

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Jack Greenwood
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Marion, IL, 62959
13 May 1997

Dr. Williams
Director
University Honors Program
Mailcode 4520

Dear Dr. Williams,

A few weeks ago you strongly suggested that I provide something in writing regarding the duties I performed for the University Honors thesis. The following is a brief description of my thesis--the Annual Inspection of Piper PA-28-180; N9520J.

All inspection plates, access doors, fairings, and cowling were either opened or removed, and the aircraft and aircraft engine were thoroughly cleaned in accordance with the Cessna Aircraft Maintenance Manual. The aircraft was then inspected in accordance with Federal Aviation Regulations (FAR) Part 43 Appendix D. The checklist used was the Inspection Report PA-28-180 from the Piper Cherokee Service Manual--Interim Revision: February 15, 1995 pages 1F18 through 1G2. After each item of the checklist was inspected (which took approximately thirty-two man-hours), all aircraft inspection plates, access doors, fairings, and cowling were placed in what Cessna considers their correct condition for flight. The post inspection run-up was then performed in accordance with FAR Part 43.15 C 2 with all systems either operating or registering satisfactorily.

Hopefully this information is what you were wanting. And, by the way, **it was truly a pleasure to have you as an instructor**.

Sincerely,

Jack Greenwood

Jack Greenwood

TABLE III-I. INSPECTION REPORT
PA-28-140; PA-28-150, -160, -180; PA-28-235

NOTE

Perform inspection or operation at each of the inspection intervals as indicated by a circle (O).

Nature of Inspection	Inspection time (hrs)			
	50	100	500	1000
A. PROPELLER GROUP				
1. Inspect spinner and back plate.	O	O	O	O
2. Inspect blades for nicks and cracks.	O	O	O	O
3. Inspect for grease and oil leaks.	O	O	O	O
4. Lubricate propeller. (Refer to Service Manual Section VIII of VIIIA)	O	O	O	O
5. Inspect spinner mounting brackets.		O	O	O
6. Inspect propeller mounting bolts and safety. (Check torque if safety is broken)		O	O	O
7. Inspect hub parts for cracks and corrosion.		O	O	O
8. Rotate blades of constant speed propeller and check for tightness in hub pilot tube.		O	O	O
9. Remove constant speed propeller; remove sludge from propeller and crankshaft.			O	O
10. Inspect complete propeller and spinner assembly for security, chafing, cracks, deterioration, wear, and correct installation.		O	O	O
11. Overhaul propeller. (See Note 21)				
B. ENGINE GROUP.				
NOTE: Read Note 5 prior to completing this inspection group.				
CAUTION: Ground Magneto Primary Circuit before working on engine.				
1. Remove engine cowl and inspect for damage (See Note 19)	O	O	O	O
2. Clean and inspect cowling for cracks, distortion, and loose or missing fasteners (See the latest revision of Piper S/L 796) (See Note 23)		O	O	O
3. Drain oil sump. (See Note 6)	O	O	O	O
4. Clean suction oil strainer at oil change. (Inspect strainer for foreign particles)	O	O	O	O
5. Clean pressure oil strainer or change full flow (cartridge type) oil filter element. (Inspect strainer or element for foreign particles)	O	O	O	O
6. Inspect oil temperature sender unit for leaks and security.		O	O	O
7. Inspect oil lines and fitting for leaks, security, chafing, dents and cracks (See Note 8)	O	O	O	O
8. Clean and inspect oil radiator cooling fins.		O	O	O
9. Remove and flush oil radiator.			O	O
10. Fill engine with oil per lubrication chart in Service Manual	O	O	O	O
11. Clean engine		O	O	O
CAUTION: Do not contaminate the vacuum pump with cleaning fluid. (Ref: Latest revision of Lycoming Service Instruction No. 1221.)				

TABLE III-I. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection Time (hrs)			
	50	100	500	1000
B. ENGINE GROUP (cont.)				
12. Inspect condition of spark plugs (Clean and adjust gap as required, adjust *per the latest revision* of Lycoming Service Instruction No. 1042) (See Note 15)		O	O	O
NOTE: If fouling of spark plugs has been apparent, rotate bottom plugs to upper plugs.				
13. Inspect spark plug cable leads and ceramics for corrosion and deposits	O	O	O	O
14. Check cylinder compression (Ref: AC 43.13-1A)		O	O	O
15. Inspect cylinders for cracked or broken fins		O	O	O
16. Inspect rocker box covers for evidence of oil leaks. If found, replace gasket; torque cover screws 50 inch-pounds (See Note 13)	O	O	O	O
NOTE: Lycoming requires a Valve Inspection be made at completion of every 400 hours of operation. (See Note 12)				
17. Inspect ignition harness and insulators (high tension leakage and continuity)		O	O	O
18. Inspect magneto points for condition and proper clearance (Refer to Service Manual Section VIII or VIIIA)		O	O	O
19. Inspect magneto for oil leakage		O	O	O
20. Inspect breaker felts for proper lubrication		O	O	O
21. Inspect distributor block for cracks, burned areas or corrosion and height of contact springs			O	O
22. Check magnetos to engine timing		O	O	O
23. Overhaul or replace magnetos (See Note 7)				
24. Remove air filter and tap gently to remove dirt particles (Replace as required, refer to latest revision of Piper Service Bulletin 975, as applicable.)	O	O	O	O
25. Drain carburetor and clean inlet line fuel strainer	O	O	O	O
26. Inspect condition of carburetor heat air door and box (See Note 14)	O	O	O	O
27. Inspect vent lines for evidence of fuel or oil seepage	O	O	O	O
28. Inspect intake seals for leaks and clamps for tightness	O	O	O	O
29. Inspect all air inlet duct hoses (Replace as required)	O	O	O	O
30. Inspect condition of flexible fuel lines		O	O	O
31. Replace flexible fuel lines (See Note 7)				
32. Inspect fuel system for leaks (See Note 16)	O	O	O	O
33. Clean screens in electric fuel pump(s) and check operation (engine and electric)	O	O	O	O
34. Overhaul or replace fuel pumps (engine driven) (See Note 7)				
35. Remove and clean fuel filter bowl and screen (Clean at least every 90 days) (PA-28-140, -150, -160, -180)	O	O	O	O
36. Inspect vacuum pump and lines		O	O	O
37. Overhaul or replace vacuum pump (See Note 7)				
38. Inspect throttle, carburetor heat, mixture and propeller governor controls for security, travel and operating conditions (Refer to the latest revision of Piper Service Bulletin No. 448 and Service Letter No. 747)		O	O	O
39. Inspect exhaust stacks, connections and gaskets (Refer to Service Manual, Section III) (Replace gaskets as required)		O	O	O
40. Inspect muffler, heat exchange and baffles (Refer to Service Manual, Section III)		O	O	O

TABLE III-1. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection time (hrs)			
	50	100	500	1000
A. ENGINE GROUP (cont.)				
41. Check recommended time for replacement of muffler per Service Manual, Section III		O	O	O
42. Inspect breather tube for obstructions and security		O	O	O
43. Inspect crankcase for cracks, leaks, and security of seam bolts		O	O	O
44. Inspect engine mounts for cracks and loose mountings		O	O	O
45. Inspect all engine baffles		O	O	O
46. Inspect all wiring connected to the engine or accessories	O	O	O	O
47. Inspect rubber engine mount bushings for deterioration (Replace as required)		O	O	O
48. Inspect fire wall seals		O	O	O
49. Inspect condition and tension of alternator drive belt (Refer to Service Manual Section XI)			O	O
50. Lubricate alternator idler pulley (if installed) per lubrication chart in Service Manual Section II		O	O	O
51. Inspect condition of alternator and starter		O	O	O
52. Inspect security of alternator mounting		O	O	O
53 Check air conditioning compressor oil level (See Note 9)		O	O	O
54. Inspect condition of compressor belt and tension (Refer to Service Manual Section XIV)		O	O	O
55. Inspect compressor clutch security and wiring (See Note 10)		O	O	O
56. Inspect security of compressor mounting		O	O	O
57. Check fluid in brake reservoir (Fill as required)	O	O	O	O
58. Lubricate all controls (Refer to Service Manual Section II)		O	O	O
59. Overhaul or replace propeller governor (See Note 7)				
60. Complete overhaul of engine or replace with factory rebuilt (See Note 7)				
61. Reinstall engine cowl	O	O	O	O
C. CABIN GROUP				
1. Inspect cabin entrance, door and windows for damage, operation and security		O	O	O
2. Inspect upholstery for tears		O	O	O
3. Inspect seats, seat belts, security brackets and bolts		O	O	O
4. Check trim operation (See Note 17)		O	O	O
5. Inspect rudder pedals		O	O	O
6. Inspect parking brake and brake handle for operation and cylinder leaks.		O	O	O
7. Inspect control wheels, column, pulleys and cables		O	O	O
8. Inspect flap control cable attachment bolt			O	O
9. Inspect landing, navigation, cabin and instrument lights. (See latest revision of Piper Service Bulletin 975 if the landing light is located in the air filter)	O	O	O	O
10. Inspect instruments, lines and attachments (See the latest revision of Piper Service Bulletin No. 582)		O	O	O
11. Inspect gyro operated instruments and electric turn and bank (Overhaul or replace as required)		O	O	O
12. Replace filters on gyro horizon and directional gyro or replace central air filter		O	O	O
13. Clean or replace vacuum regulator filter		O	O	O

TABLE III-I. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection Time (hrs)			
	50	100	500	1000
C. CABIN GROUP (cont)				
14. Inspect altimeter (Calibrate altimeter system in accordance with FAR 91.170 if appropriate)		O	O	O
15. Check operation of fuel selector valve (See Note 18)		O	O	O
16. Check operation of fuel drain (PA-28-235)		O	O	O
17. Inspect condition of heater controls and ducts		O	O	O
18. Inspect condition and operation of air vents		O	O	O
19. Inspect condition of air conditioning ducts		O	O	O
20. Remove and clean air conditioning evaporator filter		O	O	O
D. FUSELAGE AND EMPENNAGE GROUP				
1. Remove inspection plates and panels		O	O	O
2. Inspect baggage door, latch and hinges for operation and security		O	O	O
3. Inspect battery, box and cables (Inspect at least every 30 days. Flush box as required and fill battery per instructions on box)	O	O	O	O
4. Inspect electronic installation		O	O	O
5. Inspect bulkheads and stringers for damage		O	O	O
6. Inspect antenna mounts and electric wiring		O	O	O
7. Inspect air conditioning system for freon leaks		O	O	O
8. Check freon level in sight gauge of receiver-dehydrator (Refer to Service Manual, Section XIV	O	O	O	O
9. Inspect air conditioning condenser air scoop rigging (Refer to Service Manual, Section XIV)	O	O	O	O
10. Inspect fuel lines, valves, and gauges for damage and operation		O	O	O
11. Clean screens in fuel pumps (PA-28-235 only)		O	O	O
12. Inspect fuel valve drain lever cover for security and door for proper operation (PA-28-235 only)	O	O	O	O
13. Remove, drain and clean fuel strainer bowl and screen located in bottom of selector valve (Drain and clean at least every 90 days) (PA-28-235)	O	O	O	O
14. Inspect security of all lines		O	O	O
15. Inspect vertical fin and rudder surfaces for damage		O	O	O
16. Inspect rudder hinges, horn and attachments for damage and operation		O	O	O
17. Inspect rudder control stop to insure stop has not loosened and locknut is tight		O		
18. Inspect vertical fin attachments		O	O	O
19. Inspect rudder hinge bolts for excess wear (Replace as required)		O	O	O
20. Inspect stabilator surfaces for damage		O	O	O
21. Inspect stabilator, tab hinges, horn and attachments for damage and operation		O	O	O
22. Inspect stabilator control stops to insure stop has not loosened and locknut is tight		O		
23. Inspect stabilator attachments (see latest Piper Service Bulletin 856)		O	O	O

TABLE III-1. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection time (hrs)			
	50	100	500	1000
D. FUSELAGE AND EMPENNAGE GROUP (cont.)				
24. Inspect stabilator and tab hinge bolts and bearings for excess wear (Replace as required)		O	O	O
25. Inspect stabilator trim mechanism		O	O	O
26. Inspect aileron, rudder, stabilator, stabilator trim cables, turnbuckles, guides and pulleys for safety, damage and operation (See Note 24)		O	O	O
27. Check all cable tensions (use tensiometer, see Note 20)		O	O	O
28. Clean and lubricate stabilator trim drum screw			O	O
29. Clean and lubricate all exterior needle bearings				O
30. Lubricate per lubrication chart in Service Manual	O	O	O	O
31. Inspect rotating beacon for security and operation		O	O	O
32. Inspect security of Autopilot bridle cable clamps (See Note 11)		O	O	O
33. Inspect all control cables, air ducts, electrical leads, lines, radio antenna leads and attaching parts for security, routing, chafing, deterioration, wear and correct installation		O	O	O
34. Inspect E.L.T. installation and condition of battery and antenna (See the latest revision of Piper S/L No. 820)		O	O	O
35. Reinstall inspection plates and panels		O	O	O
E. WING GROUP				
1. Remove inspection plates and fairings		O	O	O
2. Inspect surfaces and tips for damage, loose rivets, and condition of walk-way		O	O	O
3. Inspect aileron hinges and attachments		O	O	O
4. Inspect aileron control stops to insure stop has not loosened and lock nut is tight		O		
5. Inspect aileron cables, pulleys and bellcranks for damage and operation		O	O	O
6. Inspect flaps and attachments for damage and operation		O	O	O
7. Inspect condition of bolts used with hinges (Replace as required)		O	O	O
8. Lubricate per lubrication chart in Service Manual (Section II)	O	O	O	O
9. Inspect wing attachment bolts and brackets (See Note 18)		O	O	O
10. Inspect fuel tanks and lines for leaks, water and contamination (See Note 18)		O	O	O
11. Fuel tanks marked for capacity		O	O	O
12. Fuel tanks marked for minimum octane rating		O	O	O
13. Inspect fuel cell vents (See Note 18)		O	O	O
14. Inspect all control cables, air ducts, electrical leads, lines and attaching parts for security, routing, chafing, deterioration, wear and correct installation		O	O	O
15. Reinstall inspection plates and fairings		O	O	O

TABLE III-1. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection Time (hrs)			
	50	100	500	1000
F. LANDING GEAR GROUP				
1. Inspect oleo struts for proper extension per Service Manual (Check fluid level as required)	O	O	O	O
2. Inspect nose gear steering control and travel		O	O	O
3. Inspect wheels for alignment		O	O	O
4. Put airplane on jacks		O	O	O
5. Inspect tires for cuts, uneven or excessive wear and slippage		O	O	O
6. Remove wheels, clean, check and repack bearings		O	O	O
7. Inspect wheels for cracks, corrosion and broken bolts		O	O	O
8. Check tire pressure per Service Manual	O	O	O	O
9. Inspec. brake lining and disc for condition and wear		O	O	O
10. Inspect brake backing plates for condition and wear		O	O	O
11. Inspect brake lines		O	O	O
12. Inspect shimmy dampener		O	O	O
13. Inspect gear forks for damage		O	O	O
14. Inspect oleo struts for fluid leaks and scoring		O	O	O
15. Inspect gear struts, attachme[illegible] torque links, and bolts for condition and security		O	O	O
16. Inspect all hydraulic lines, electrical leads, and attaching parts for security, routing, chafing, deterioration, wear and correct installation		O	O	O
17. Lubricate per lubrication chart in Service Manual	O	O	O	O
18. Remove airplane from jacks		O	O	O
G. FLOAT GROUP				
1. Inspect float attachment fittings		O	O	O
2. Inspect floats for damage		O	O	O
3. Inspect pulleys and cables		O	O	O
H. OPERATIONAL INSPECTION				
1. Check fuel pump and fuel tank selector (For PA-28-235, See the latest revision of Piper Service Bulletin No. 519)	O	O	O	O
2. Check fuel quantity, pressure and flow readings	O	O	O	O
3. Check oil pressure and temperature	O	O	O	O
4. Check alternator output	O	O	O	O
5. Check manifold pressure	O	O	O	O
6. Check alternate air	O	O	O	O
7. Check parking brake	O	O	O	O
8. Check vacuum gauge	O	O	O	O
9. Check gyros for noise and roughness	O	O	O	O
10. Check cabin heater operation	O	O	O	O

TABLE III-1. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

Nature of Inspection	Inspection Time (hrs)			
	50	100	500	1000
H. OPERATIONAL INSPECTION (cont)				
11. Check magneto switch operation	O	O	O	O
12. Check magneto RPM variation	O	O	O	O
13. Check throttle and mixture operation (See the latest revision of Piper Service Bulletin No. 448)	O	O	O	O
14. Check propeller smoothness	O	O	O	O
15. Check propeller governor action	O	O	O	O
16. Check engine idle	O	O	O	O
17. Check electronic equipment operation	O	O	O	O
18. Check operation of Autopilot, including automatic pitch trim, and Manual Electric Trim (See Note 22)	O	O	O	O
19. Check air conditioner compressor clutch operation	O	O	O	O
20. Check air conditioner condenser scoop operation	O	O	O	O
I. GENERAL				
1. Aircraft conforms to FAA Specification	O	O	O	O
2. All latest FAA Airworthiness Directives complied with	O	O	O	O
3. All latest Manufacturer's Service Bulletins and Letters complied with	O	O	O	O
4. Check for proper Flight Manual	O	O	O	O
5. Aircraft papers in proper order	O	O	O	O

TABLE III-I. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

NOTES:

1. Refer to the last card of the Piper Parts Price List - Aerofiche, for a checklist of current revision dates to Piper Inspection Reports and Manuals.
2. All inspections or operations are required at each of the inspection intervals as indicated by a (O). Both the annual and 100 hour inspections are complete inspections of the airplane, identical in scope, while both the 500 and 1000 hour inspections are extensions of the annual or 100 hour inspection, which require a more detailed examination of the airplane, and overhaul or replacement of some major components. Inspections must be accomplished by persons authorized by the FAA.
3. Piper Service Bulletins are of special importance and Piper considers compliance mandatory.
4. Piper Service Letters are product improvements and service hints pertaining to servicing the airplane and should be given careful attention.
5. Inspections given for the power plant are based on the engine manufacturer's operator's manual for the particular airplane. Any changes issued to the engine manufacturer's operator's manual shall supersede or supplement the inspections outlined in this report.
6. Intervals between oil changes can be increased as much as 100% on engines equipped with full flow cartridge type oil filters, provided the element is replaced each 50 hours of operation and the specified octane fuel is used. Should fuel other than the specified octane rating for the power plant be used, refer to latest revision of Lycoming Service Letter No. L185 for additional information and recommended service procedures.
7. Replace or overhaul as required or at engine overhaul. (For engine overhaul, refer to latest revision of Lycoming Service Letter No. L201.)
8. Replace flexible oil lines as required, but no later than 1000 hours of service.
9. The compressor oil level should not be checked unless a freon leak has occurred which requires an addition of freon to the system.
10. Clean any traces of oil from the clutch surface.
11. Check security and condition of Autopilot servo bridle cables, clamps, and shear pin in accordance with the latest revision of Piper Service Letter No. 695.
12. At every 400 hours of engine operation, remove the rocker box covers and check for freedom of valve rockers when valves are closed. Look for evidence of abnormal wear or broken parts in the area of the valve tips, valve keeper, springs and spring seat. If any indications are found, the cylinder and all of its components should be removed (including the piston and connecting rod assembly) and inspected for further damage. Replace any parts that do not conform with limits shown in the latest revision for Special Service Publication No. SSP 1776.
13. Check cylinders for evidence of excessive heat indicated by burned paint on the cylinders. This condition is indicative of internal damage to the cylinder and, if found, its cause must be determined and corrected before the aircraft is returned to service.

    Heavy discoloration and appearance of seepage at the cylinder head and barrel attachment area is usually due to emission of thread lubricant used during assembly of the barrel at the factory, or by slight gas leakage which stops after the cylinder has been in service for awhile. This condition is neither harmful nor detrimental to engine performance and operation. If it can be proven that leakage exceeds these conditions, the cylinder should be replaced.
14. Check throttle body attaching screws for tightness; the correct torque for these screws is 40 to 50 inch-pounds.
15. When using alternate fuels, refer to the latest revision of Lycoming Service Letter No. L185 for additional information and recommended service procedures.
16. Replace fuel tank vent line flexible connections as required, but no later than 1000 hours of service.
17. If airplane has electric trim system refer to the latest revision of Piper S/B556.

TABLE III-I. INSPECTION REPORT (cont)
PA-28-140; PA-28-150, -160, -180; PA-28-235

NOTES:

18. Refer to and comply with Piper Service Bulletin No. 571A. Replace flexible fuel tank supply hose at time of engine overhaul.
19. Refer to the latest revision of Piper Service Bulletin No. 580.
20. Maintain cable tensions specified in Section V of Service Manual.
21. Refer to the latest information for the particular propeller being inspected:
    McCauley Service Bulletin No. 137.
    Hartzell Service Letter No. 61.
    Sensenich Propeller Bulletin No. RBHR-978 or R-14 and AD69-9-5 for PA-28-180 aircraft with Lycoming 0-360-A3A engines and M76EM Sensenich propellers, built up to and including 1969.
22. Refer to Flight Manual Supplement for preflight and flight check, for intended function in all modes.
23. Inspect Teflon bushing (lower to upper cowling attachment) for condition at each 100 hours. Replace bushing on condition, but no later than 500 hours time in service. Inspect pin for condition and replace as necessary.
24. If not already installed, add access panels, see Paragraph 4-57a. Inspect stabilator control cables, see Paragraph 3-11a.