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SERVICE LETTER B-110

May 8, 2007

FAA APPROVED

SUBJECT: EXHAUST SYSTEM INSPECTION AND REROUTING MAGNETO "P" LEADS

1. INTRODUCTION

There have been several serious accidents caused by exhaust system failures. Typically, the muffler fails at the weld which holds the ball joint to the muffler. The hot exhaust gasses then escape and melt the insulation on wires which are routed thru connector(s) on the left side of the firewall (Models 17-30A, 17-31A and 17-31ATC). These wires include the left and right Magneto "P" Leads (except for those aircraft which have Service Kit 1067: Rerouting Right Magneto "P" Lead installed). When both the left and right magneto "P" leads short to ground, the engine stops.

Airworthiness Directive (AD) 76-23-03 R1 was issued to provide special inspection requirements for the exhaust systems on certain Bellanca models. The AD has not prevented exhaust system failures. The exhaust system has internal welds which are not inspectable without disassembly; the AD did not require same disassembly. Some accidents have occurred with significantly less time since inspection than the required inspection interval. This Service Letter 1) provides detailed inspection procedures (requires some exhaust system disassembly to access all critical welds in the exhaust system), 2) provides new inspection intervals, 3) provides instructions to replace/repair parts that fail the inspection, 4) provides a means by which the owner can upgrade his airplane to a current production exhaust system which is more easily inspected and has a standard annual / 100 hour inspection interval, 5) provides instructions to reassemble the exhaust system, and 6) requires that the Service Kit 1072: Reroute "P" Leads - Magneto be installed.

This Service Letter obsoletes Service Letter B104: Rerouting Right Magneto "P" Lead.

2. AIRCRAFT AFFECTED

The inspection presented in Section 4: EXHAUST SYSTEM INSPECTION of this Service Letter will be accomplished on the following aircraft.

MODELS	SERIAL NUMBERS
17-30	All Serial Numbers
17-31	All Serial Numbers
17-30A	SN 30263-301030
17-31A	All Serial Numbers

Rerouting the Magneto "P" Leads will be accomplished as presented in Section 7: REROUTING MAGNETO "P" LEADS of this Service Letter on the following aircraft except for those which have Service Kit 1067: Rerouting Right Magneto "P" Lead installed prior to the date of this Service Letter.

MODELS	SERIAL NUMBERS
17-30A	SN 30263-30998
17-31A	All Serial Numbers
17-31ATC	All Serial Numbers

3. COMPLIANCE

The inspection presented in Section 4: EXHAUST SYSTEM INSPECTION of this Service Letter will be accomplished within the next 25 hours time in service effective upon receipt of this Service Letter and thereafter at intervals not to exceed 50 hours time in service or the next annual inspection, whichever occurs first. This inspection interval will continue until Exhaust System parts are replaced as indicated in Section 5: REPLACING/REPAIRING EXHAUST SYSTEM PARTS.

Service Kit 1072: Reroute "P" Leads – Magneto will be installed as presented in Section 7: REROUTING MAGNETO "P" LEADS of this Service Letter within the next 100 hours time in service or the next annual inspection, whichever occurs first.

4. EXHAUST SYSTEM INSPECTION

A typical exhaust system is illustrated in Figure 1. The figure has two cut-outs (one forward, one aft) each showing cross-sections thru the muffler assembly centerline. The figure is not drawn to scale and does not include the shroud for the cabin heat exchanger nor the external flange which supports same. The fusion welds to be inspected are shown as small black spots where the weld would be located on the cross-section; the actual welds go all around the tube. Thus, there are six welds which are considered critical and must be inspected. Two external welds join the Muffler Shell to the Forward and Aft Flanges. Four internal welds join: 1) the Forward Tube to the Forward Riser, 2) the Muffler Shell to the Middle and Aft Risers, and 3) the Aft Flange to the Ball Tube. Note - the Forward Riser slip-fits into the Forward Tube.

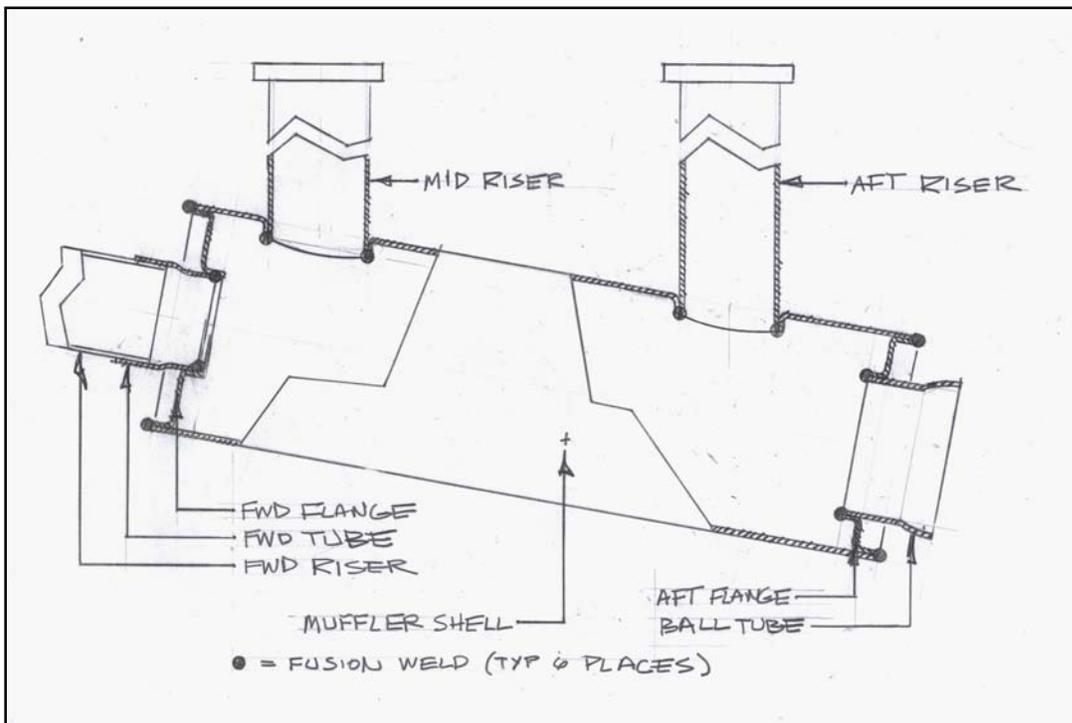


Figure 1: Typical Exhaust System
(Left side Looking Inboard)

The welds, tubes, and flanges must be inspected closely all the way around same welds, tubes, and flanges. Any exhaust deposits and/or corrosion should be removed to facilitate the inspection. If there is any visible abnormality which suggests that a crack is present, follow the visual inspection with a more detailed inspection such as a dye-penetrant inspection or remove the muffler in its entirety and pressure-test the muffler using soap bubbles to detect a leak/crack. The muffler fails the inspection and is considered defective and unusable if any cracks or other defects such as excessive wear are found. The inspection will be accomplished to the following procedure.

1. Remove the heat exchanger shroud.
2. Visually examine the two external welds which connect the Muffler Shell to the Forward and Aft Flange's. Look at the weld itself and where the weld ends. Visually examine the Forward and Aft Flanges for cracks, taking special notice at the flange radius.
3. Visually examine the slip-fit joint between the Forward Riser and the Forward Tube for wear and/or cracks in same parts; remove the Forward Riser if necessary.
4. Disconnect and remove the tail pipe assembly.
5. Use a light and inspection mirror to look into the muffler thru the inside of the Ball Tube and examine the internal welds which attach the Forward Flange to the Forward Tube and Aft Flange to the Ball Tube for cracks. Look at the welds themselves and where they end. Visually examine the interior surfaces of the Forward and Aft Flanges for cracks, taking special notice at the flange radius.
6. Use a light and inspection mirror to look into the muffler thru the inside of the Ball Tube and examine the internal welds which attach the Middle and Aft Risers to the Muffler Shell for cracks. Look at the welds themselves and where they end. Visually examine the interior surfaces of the Riser Tubes for cracks. Visually examine the radius of the Muffler Shell adjacent to the weld for cracks.
7. Spray the outside of the muffler at the riser and ball joint attachment welds with a penetrating oil. If there is a crack around the risers or the ball joint the penetrating oil will quickly move thru the crack and a wet spot will appear inside the muffler.
8. Inspect the inside and outside surface of the Muffler Shell for visible cracks. Some mufflers may have various devices welded to the shell to increase heat transfer to the airplane's cabin heater system. Closely examine the welds which attach these devices for cracks in the welds or Muffler Shell.
9. Inspect the tail pipe. Inspect the ball joint and clamp assembly for surface abnormalities such as galling and/or excessive wear. Rework the ball joints as required to correct the noted discrepancies.

Some mufflers have internal diffusers which are not shown in the figure. Check the condition of the diffuser. If it is deteriorated, part or all of it may dislodge and restrict the exhaust flow. If the diffuser prevents inspection of all internal welds, remove the muffler in its entirety and pressure-test the muffler using soap bubbles to detect any cracks.

Mufflers in Model 17-30A SN 30906 and up have a slip joint for the middle riser tube which is not shown in the figure. The slip tube has an internal weld which must be inspected along with the slip-joint.

Some Model 17-31A tailpipes included a "resonator can" which had a perforated pipe inside the "can". Use a light to look inside the tailpipe to verify that the perforated portion of the tailpipe is in good condition. If the perforated portion of the tailpipe is deteriorated, part or all of it may dislodge and restrict the exhaust flow.

Some exhaust assemblies do not have a ball joint. Take special care to replicate the original installation during reassembly. Some of these aircraft may be modified per Service Kit # 1010: Tailpipe Rework and Adjustment which reinforced the muffler aft flange and added a welded-on patch to the tailpipe just aft of the muffler.

Some Model 17-30A mufflers may be modified per Service Kit # 1049: Rework Muffler Clamp which installed a clamp on the forward riser slip joint.

If any cracks or other defects are found, the muffler and tailpipe assemblies must be replaced/repared according to the requirements of Section 5: REPLACING/REPAIRING EXHAUST SYSTEM PARTS. If no cracks or other defects are found, the muffler and tailpipe assemblies may be reassembled according to Section 6: REASSEMBLY IF NO CRACKS ARE FOUND.

5. REPLACING/REPAIRING EXHAUST SYSTEM PARTS

If any cracks or other defects are found, the muffler assembly must be replaced, reconditioned or repaired prior to further flight according to the following options. Note that Options #1 and #2 provide new ball joints which require that the muffler and tailpipe assemblies be matched; the entire muffler and tailpipe assembly must therefore be replaced.

Option # 1

Replace the entire defective left and/or right muffler and tailpipe assembly(ies) with the following new Bellanca/AALLC parts. Contact Bellanca/AALLC for availability and price information. Take note of the airplane's model / serial number, date of manufacture and configuration of the muffler and tailpipe (E-Mail photos) to facilitate matching the tailpipe support which varies and is not serialized.

MODEL	SERIAL NUMBERS	PN LEFT SIDE		PN RIGHT SIDE	
		MUFFLER	TAIL PIPE	MUFFLER	TAIL PIPE
17-30	All Serial Numbers	201147	201149	201148	201150
17-31	All Serial Numbers	201151	201153	201152	201154
17-30A	30263-30905	201147	201149	201148	201150
17-30A	30906-301030	201144	201047-20	201145	201048-20
17-31A	All Serial Numbers	201151	201153	201152	201154

Option # 2

Send the entire defective left and/or right muffler and tailpipe assembly(ies) to the Bellanca/AALLC FAA Repair Station BNXR512X to be reconditioned to the new Bellanca/AALLC parts. Contact Bellanca/AALLC for scheduling and price information.

Option # 3

Recondition or Repair the defective left and/or right muffler and tailpipe assembly(ies) to their original configuration using FAA approved methods and materials. See FAA Advisory Circular 43.13-1: Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair.

If Option # 1 and/or Option # 2 is/are chosen and the entire exhaust system (muffler and tailpipe, left and right sides) is replaced with new and/or reconditioned parts, the 50 hour inspection interval and exhaust system disassembly presented herein is no longer applicable and the aircraft exhaust system may be inspected using standard methods as required by 100 hour / annual inspections. If Option # 3 is chosen, the inspection presented in Section 4: EXHAUST SYSTEM INSPECTION of this Service Letter will continue at intervals not to exceed 50 hours time in service or the next annual inspection, whichever occurs first.

6. REASSEMBLY IF NO CRACKS ARE FOUND

If no cracks or other defects are found, the muffler and tailpipe assemblies may be reassembled using the following procedure.

1. Reassemble the ball joint. Tighten the ball joint clamp only enough to insure that it is free to move up/down and left/right without more than a few inch-lbs of torque but not so loose that there is significant (a few thousandths of an inch) free play in the joint. If the ball joint is too tight, the Aft Flange and its welds will be subject to significant fatigue stresses and will be more susceptible to cracking. If the joint is too loose, the ball joint will wear. Secure the ball joint clamp bolt(s) as required.
2. Connect/secure the tailpipe attachment(s).
3. Install/secure the heat exchanger shroud.

7. REROUTING MAGNETO "P" LEADS

Install Bellanca/AALLC Service Kit 1072: Reroute "P" Leads – Magneto following instructions in the kit itself. The Service Kit removes both right and left "P" Leads from their common routing thru the connector on the left side of the firewall and routes them separately thru the upper right and upper left portions of the firewall away from the exhaust system. The new "P" Leads are made with high temperature insulated wires and include a fire resistant cover.

The new SK1072 obsoletes SK1067. The primary difference between the two Service Kits is SK1067 only removed the right "P" Lead from the common firewall connector whereas SK1072 removes and separates both "P" Leads. Owners may choose to upgrade their SK1067 to SK1072.

Installation of SK1067 or SK1072 does not remove the hazard of an engine compartment fire resulting from an exhaust system failure, it only provides a short amount of additional time to get the aircraft on the ground after the first symptoms of a fire (primarily heat and/or smoke) occur. Other components in the engine compartment will eventually fail and stop the engine. It is most important to perform a proper inspection of the exhaust system and upgrade the exhaust system compliant with this Service Letter.

8. QUESTIONS

The inspection and corrective action described herein applies to most production aircraft as they were manufactured at the factory. It may not apply directly to aircraft which have been repaired or field modified, or a few production aircraft which incorporated alternate designs. Contact Bellanca/AALLC if you have any questions concerning this Service Letter.

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