

RESPONSE TO DOCKET NO. 97-CE-67-AD

FAA Docket Proposal:

Compliance: (a)(1) Repairs : Required to be accomplished at an FAA-approved repair facility .

Writers Discussion:

I believe that this is in reference to exhaust component repairs but if taken literally it also means that such required repair of structural items such as canted bulkheads and engine rails could only be accomplished by a repair station facility.

Writers Recommendations:

I feel that this statement should read .

Exhaust Component Repairs: Required to be accomplished at an FAA-approved repair facility.

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (b)

Writers Discussion:

This inspection differs in time dependant upon exhaust component material type. At the initial point of the inspection process the inspecting personnel will have no idea as to the material of the exhaust. Even if the original aircraft manufacture installed material was Inconel, possible replacement components may be SS. This base line inspection is of extreme importance especially in light of the numerous added models of aircraft where no present inspection is required.

It has been proven that inspection and early detection are paramount to safety and also it is my experience that pressure testing exhaust systems is such a valuable diagnostic tool that it should be used here. Why complicate matters with a separate line item for pressure testing inspection at a different time? Pressure testing adds very little to the cost of inspection when completed in conjunction with a visual inspection so complete a pressure check at each visual inspection.

From all the information that I can find calendar time has only marginal effect on exhaust system degradation. Again why add the cost of a six-month inspection when there is little to gain? Make the time align with other required inspections, in this case the annual.

It is unrealistic to think that time overruns will not occur during the reoccurring inspections. Make a legal allowance for this by allowing 10% time variance to align reoccurring portions of the inspections with other scheduled inspections.

Experience and information from most exhaust experts agree that Inconel has only a slight advantage in failure resistance over SS due to sulfidation and component cracking. At some locations such as metal-to-metal wear areas Inconel is considered inferior in wear resistance. In addition, virtually all the systems in the field are mixed Inconel/SS due to availability of replacement parts. Why complicate requirements and compromise safety by requiring various time limits for reoccurring inspection due to material differences?

Writers Recommendations:

(b) Visual & Pressure Test all affected aircraft. Within next 50 hr. TIS after the effective date of this AD and thereafter at each 50 hr. TIS or at next annual inspection whichever occurs first.

(Note: Reoccurring compliance time may be varied by 10% to align with other scheduled inspections)

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (c)

Writers Discussion:

At the initial point in the inspection process the inspecting personnel will have no idea as to the material type of the exhaust so why complicate with various inspections timetables?

My experience has been that Inconel overboard stacks develop large areas of thinning with pin holes and will fail catastrophically with little warning. This component has proven to be one of the most problem parts due to its proximity to the fuel crossfeed lines and engine mount structures. I have seen dozens of these with home brewed type weld repairs in the mistaken attempt to save money.

REMOVE AND INSPECT THEM ALL!

Writers Recommendations:

(c) Remove the tailpipes and visually inspect for any cracks, corrosion, holes, or distortion.

All affected aircraft:

With the next 100 hr. or at next Annual inspection whichever is first and thereafter at each 100 hr. or each Annual whichever is first. (Reoccurring compliance time may be varied by 10% to align with scheduled inspection) (See paragraph (c) (3) in the body of this AD)

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (d) and Compliance paragraph (d)

Writers Discussion:

Exhaust failures and adjacent structure overheating occur on all aft components. What if a previous elbow or wye pipe failure has affected the inboard beam? My extensive experience in this area has proven that inspection should not be limited to just the outboard beam. Both inboard and outboard engine beams should have detailed inspected.

Inspection criteria seems a little lacking in detail. What each individual deems as corrosion or chaffing may vary widely dependant upon the inspectors experience and or incentive. It should also be noted that the inspection should look for heating of structures other than just the firewall. Localized heating can destroy the structural integrity of the canted bulkhead and engine beams. Inspection criteria for this structural degradation due to heating is currently available from Cessna Aircraft.

Paragraph (1) states evidence of overheating on the firewall, prior to further flight, replace the firewall and the aluminum lines behind the firewall. At no time during my previous experience with this matter has anyone mentioned firewall integrity loss to be a large problem. The firewall itself is not a structural member in this installation. Do you really mean to replace the firewall regardless of condition when an engine beam is replaced? I have researched parts availability of the firewall and have found virtually no new replacement parts exist for any of the affected models. Yes if firewall is damaged it must be repaired or replaced but to require replacement out of hand is not warranted.

The replacement of crossfeed lines may be prudent when firewall heating is evident in light of their aluminum structure which when overheated can cause significant loss of strength and this damage may not be visually apparent.

Writers Recommendations:

Delete firewall replacement statement. Firewall repair or replace if damaged.
Add the wording to inspect all engine beams regardless of position.
Add wording to inspect engine beams for evidence of heat distress and note Cessna Aircraft information availability.
Add more definition possibly by appendix addition for structure corrosion, distress, chaffing inspection.

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (e)

Writers Discussion:

As stated previously pressure testing exhaust systems is such a valuable diagnostic tool and adds very little to the cost of inspection. It should be used any time a visual inspection is required.
Why complicate matters with a separate line item for pressure testing inspection at a different compliance times?

Writers Recommendations:

Delete Inspection (e) incorporate into visual inspection requirements (b)

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (f) Compliance paragraph (f)

Writers Discussion:

Compliance Table (f)
Much too vague as to what parts need to be removed. In the compliance table it states from the slip joints aft but in paragraph (f) it says from the slip joints and aft Does this mean to remove the slip joints or not?The wording aft to all turbo-charger components. Does this mean tailpipes, wastegate bypass elbows, and wastegate overboard stacks? All of these components have a dismal failure rate. Be specific as to what parts are to be removed.

Compliance Paragraph (f)
This portion of the inspection process seems to be one of the biggest problem areas. First there is no distinction for individual exhaust part time in service (TIS). What if several new exhaust components were previously installed as a result of earlier required inspection (b). These parts would then be removed and treated the same as other high time in-service parts.

The inspection requirements of paragraph (f) and (i) seem to be almost the same except for the requirement to identify and the component material and mark it. Why limit inspection (f) to only three locations? Looking at the numbers proves that there will be lengthy backups with this procedure. If spread evenly over the two year time frame with approx 500 working days for these three facilities to complete the inspection it would require each one to complete 4.3 ship sets of exhaust inspections per day! These are small to medium size companies with no way to ramp up to these large numbers overnight. All of the required facilities are west of the Mississippi. How about compliance convenience to the vast numbers of eastern state aircraft?

During conversations with two of the three named repair facilities I have found that they do not know what is expected of them for compliance during this inspection and have had little direction by the FAA. In fact they seem to know only as much as the general public about what to do. If we must send units to a specified location it would seem that it is

imperative that these locations be given very exacting inspection, and compliance criteria. If this criterion is then available why not allow other qualified shops to be included? In the present scenario if Cessna Aircraft wanted to inspect exhaust components on aircraft on which they are the Type Certificate holder and which they produce new exhaust parts for they would not be allowed. This is ludicrous. Serious time delays and backlogs will result if the AD is enacted as written.

Writers Recommendations:

Specify more accurately which parts are to be removed.
Allow parts to be evaluated by any of a number of FAA approved inspection facilities meeting exhaust inspection criteria as specified in a separate inspection document by the FAA. These facilities could also then use this information to accomplish inspections required in paragraph (i)

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (g) Compliance paragraph (f)

Writers Discussion:

With wording as it is stated the first time clamp replacement could be much to long. Present AD 75-23-08R5 allows 400 hr. time in service. Worst case would be AD 75-23-08 clamp could be in service for 399 hr. then new AD would allow 500 additional hours allowing clamp 899 hours time in service. Wording does not allow for various clamp TIS.

Also old AD 75-23-08 only required multi-segment type clamps to be time life limited and then only those from aft engine cylinders to turbocharger inlet. Does this new AD really mean to change all clamps each 500 hr. regardless of clamp style or location? This would add great expense to compliance with little to no added safety benefit.

If only multi-segment clamps are to be replaced it would be wise to incorporate Table I Exhaust Coupling Applicability Chart from previous AD 75-23-08R5. This chart is extremely helpful in identifying required clamp replacements as well as correct part numbers and installation torque values.

In Addition AD75-23-08R5 required a one time replacement of the turbocharger overboard tailpipe multi-segment clamp be replaced with a new style one piece clamp. Also a one-time inspection of certain tailpipe one-piece clamps and tailpipe clearance inspection was required. These requirements have been left out of the proposed AD. Since AD75-23-08R5 would be superseded by this AD these one-time inspections would no longer be required and the old style inferior turbo tailpipe multi-segment clamp would again be OK for use. I understand that most if not all aircraft in the U.S. may have accomplished these inspections and replacements however with the vast numbers of imported aircraft coming from various uncontrolled locations I feel it would be wise to incorporate these requirements into the new AD.

Writers Recommendations:

Compliance table (g)
For all multi-segment clamps as specified in Table II (*This from Coupling Applicability Chart in AD75-23-08R5*)
Prior to 500 hours from previous required clamp replacement by AD75-23-08 and thereafter at intervals not to exceed 500 hours clamp time in service replace multi-segment clamps as required.

Add compliance table line item to incorporate change of old style the turbocharger overboard tailpipe multi-segment clamp be replaced with a new style one piece clamp and

a one-time inspection of certain tailpipe one-piece clamps and tailpipe clearance inspection was required as previously required by AD75-23-08R5.

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (h) Compliance paragraph (h)

Writers Discussion:

Slip joint freedom of movement is one of the most important issues to keep down stream exhaust components from failures. This inspection should be incorporated in the first 100 hour with tailpipe removal (c) and then at each 500 hr. but not to exceed 2 years. In this case it has been found that calendar time and inactivity leads to seized and frozen slip joints. The slip joint angular movement break out torque is of high importance here and in paragraph (h) the joint spring inspection criteria should be stated in addition to in the visual inspection portion in the Appendix. Nowhere does it specifically state that joint springs are required to be reinstalled to a dimension of .051 . Also no mention is made of reassembly of joint with any type of lubrication. Virtually all of the PMA holders recommend this.

Writers Recommendations:

Compliance Table Inspection (h)

Within next 100 hour TIS and thereafter at intervals not to exceed 500 hr. or 2 years.

Compliance paragraph (h)

Inspect for seized or frozen slip joint. Prior to slip joint removal measure the installed length of each joint spring and replace the springs compressed to less than .45 inches. Replace any spring having a free length of less than .57 inches. At reassembly lubricate slip joint with high temperature type anti-seize compound and reassemble slip joint as per Appendix Figure 1 Typical Exhaust Joint Spring Installation.

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FAA Docket Proposal:

Figure 1 Compliance Table Inspection (i) Compliance paragraph (i)

Writers Discussion:

Exhaust components will rarely be serviceable longer than the stated 2,200 hr. The problem I see here is that this inspection requires removal at each 2200 hr. aircraft time with no regard to exhaust component TIS. What about individual components that have been replaced new during other portions of this AD? A 200 hr. old part would need to be removed just the same as a 2,200 hr. part.

Also as stated previously about paragraph (f) it is needed to be more specific as to what parts are to be remove.

Writers Recommendations:

Specify more accurately which parts are to be removed.

At 2,200 Specific Exhaust Component time in Service remove and inspect.

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