


EASA	COMMENT RESPONSE DOCUMENT
	<p align="center">EASA PAD No. 13-045 [Published on 12 March 2013 and officially closed for comments on 09 April 2013]</p>

Commenter 1: Monarch Aircraft Engineering – Neil McArthur – 18.03.2013

Comment # 1

MON A300-600 aircraft are post SB A300-53-6131 and have carried out several inspections iaw SB A300-53-6123. Once the PAD is issued as an AD the inspection thresholds will be reduced greatly for MON aircraft and they will operating beyond the new mandated lower intervals.

Before issuance the AD will need to state a grace period for this kind of situation like there is stated for the threshold.

EASA response:

The comment is accepted. The text of the Appendix 2 of the final AD has been modified in order to add the grace period accordingly.

Commenter 2: United Parcel Service, Inc. – Mark R. Hilborn – 04.04.2013

Comment # 2

References:

A. Proposed Airworthiness Directive (PAD) No. 13-045, dated 12 March 2013

B. Airbus Service Bulletin A300-53-6123, Revision 6, dated September 28, 2011

Per Reference (A), EASA has released a proposed airworthiness directive to supersede an existing airworthiness directive maintaining the inspection requirements but at reduced repeat inspection intervals. The interval changes were the result of subsequent fatigue and damage tolerance analysis as part of an Extended Service Goal (ESG2) project. A review of the references identified two items for which United Parcel Services Company (UPS) seeks clarification.

The first item deals with the understanding of “Compliance Time B” as shown in the Proposed AD, Appendix 1. The wording in the Compliance Time B statement is identical to wording in Airbus SB A300-53-6123, Revision 06, paragraph 1.E – Compliance. In the Airbus service bulletin, the wording identifies the 800 FC / 1750 FH period as a “grace period” for aircraft that exceeded the revised intervals (published in SB Revision 06). UPS understands that the service bulletin grace period is applicable to both the threshold and repeat inspection intervals for the inspection. In the proposed AD document, the Compliance Time B is only located in Appendix 1 which covers the inspection threshold values. A similar alternate compliance time, or grace period, does not appear to be present either in Appendix 2 or the proposed

ruling body that addresses aircraft that have exceeded the revised repeat inspection intervals published in Airbus Service Bulletin A300-53-6123, Revision 6. UPS requests that a grace period for aircraft that have had the initial inspection accomplished and have exceeded the revised repeat inspection threshold be established similar to that documented in A300-53-6123, Revision 6, paragraph 1.E – Compliance.

The second item deals with the inspection repeat interval reduction. As noted in the first paragraph, the ruling is being changed to account for additional damage tolerance analysis done in support of the Extended Service Goal (ESG2) evaluation program. **In damage tolerance, the primary factors that influence the inspection repeat interval determination are the type of material the component is fabricated from, the loading spectrum experienced by the component / assembly and the design characteristics of the component in question (fastener holes, potential for damage, changes in thickness, etc). A review of the frame fitting design notes that no characteristics have changed since introduction of production modification 05890S6739 therefore the repeat inspection interval reduction can be concluded to not be the result of a design change.**

Referring Figure 1 [see Appendix] UPS believes that the repeat inspection interval reduction is due to the aircraft operating later in the crack growth life cycle when the rate of propagation may be increasing due to the accumulated service time on the component. As shown in Figure 1, an aircraft with less service time than the original design service goal (DSG) is operating in a region of slow crack growth propagation so longer times between inspections can be accomplished and establish a solid level of safety. This is due to the reduced chance of detecting a crack in the early life of the fatigue life cycle based on the detectable flaw size (a_{det}). Based on fracture mechanic principles, it is logical to anticipate that as the aircraft achieves the original certification DSG, crack growth propagation rate may increase due to the cumulative number of cyclic loading experienced over the aircraft service life. UPS concurs and supports repeat inspection interval reductions as an aircraft ages to ensure the continued airworthiness and safety of the aircraft as well as enhance the timely detection of damage before reaching a critical length (a_{crit}).

However, application of the reduced inspection interval when the aircraft has not reached the DSG does not enhance safety as the chance of detection for a crack prior to reaching the DSG life is low, especially if the inspection is accomplished prior to the discrepancy reaching a detectable length (a_{det}). Based on this understanding of damage tolerance and the determination of inspection intervals, UPS proposes that the repeat inspection interval be based on the aircraft service time relevant to the certification DSG. For an aircraft with less than the DSG service times, the repeat inspection interval should remain at the SB A300-53-6123, Revision 5 intervals. If the aircraft is desired to be operated past the original certification design service goal, the repeat inspection intervals should decrease to the values identified in SB A300-53-123, Revision 6 to account for the increasing crack propagation growth rate and to ensure timely detection of potential damage. Imposing the reduced inspection interval on all aircraft regardless of current service life and prior inspection experience places an undue burden and a risk for inadvertent damage due to the access required to accomplish the inspection.

There are no additional in-service reports or data that supports the proposed inspection interval reductions. We believe that the existing mandated inspection intervals adequately provide for timely detection of possible damage on the fuselage frame FR47 fitting. Reduction of the repeat inspection interval does not enhance the safety of aircraft that currently are not or do not plan to operate beyond the original certification design service goal. Instead, it provides an opportunity for damage to occur to the suspect area or adjacent structure. UPS believes a more consistent and simplified approach of different inspection intervals based on the aircraft operational age, as shown in Figure 1, achieves the safety intent of this ruling and provides a reliable methodology ensuring the continued airworthiness of the A300-600 fleet.

EASA response:

The comment related to item 1 is accepted. The text of the Appendix 2 of the final AD has been modified in order to add the grace period accordingly.

Second, the commenter claims that “repeat inspection interval reduction is due to the aircraft operating later in the crack growth life cycle when the rate of propagation may be increasing due to the accumulated service time” and that “there are no additional in-service reports or data that supports the proposed inspection interval reductions”. Although what the commenter states about the fracture mechanic principles is exact, the commenter may not have been aware of the methodology that was applied by the Type Certificate Holder to demonstrate the extension of the Service Goal. (ESG)

The first ESG was demonstrated by means of additional Fatigue & Damage Tolerance (F & DT) analyses taking into account the whole of FSFT (Full Scale Fatigue Test) cracks and new in-service data, the specific studies for the “Widespread Fatigue Damage”, coupons testing and tear-down of an old aeroplane.

The second ESG (ESG2), in addition to the ESG1 analyses, necessitated updated stress analyses taking into account in-service experience and an improved, i.e. closer-to-reality, fatigue mission, coupons testing and inspection of another representative aeroplane.

It is a more realistic updated fatigue mission coupled with in-service experience that resulted in reduced inspections threshold and intervals. And because the reduced inspections threshold and intervals are based upon the verisimilitude of the F & DT analyses, the safety of all aeroplanes is enhanced.

EASA disagrees with this comment and the AD text remains unchanged.

APPENDIX

FIGURE 1 – Fatigue Crack Growth Life Cycle and Impact on Repeat Inspection Values

Based on fracture mechanic principles, UPS proposes a repeat interval based on the aircraft accumulated service life. As the plane matures, the inspection interval is reduced to enhance detectability due to the increasing crack growth rate.

