

International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

Initial Date (DD/MMM/YYYY): 14/02/2013

IP Number: 135

Revision / Date (DD/MMM/YYYY): Rev 0 / 30 July 2013

Title: Zonal Analysis for Zones with different levels of Access.

Submitter: EASA, MRB Section

Issue: MSG-3 does already mention "*Multiple zonal inspections may be identified for each zone with those having less frequent intervals requiring increased access requirements.*".

However this often not done by some manufacturers, zones are only analysed for one specific access level and only a single zonal inspection at that specific level is identified.

Problem: So far MSG-3 states "*For a given zone, more than one task may be identified. In this case, the frequency of inspection is inversely proportional to the amount of access required; i.e., the more access required, the less the frequency of inspection.*".

"Multiple zonal inspections may be identified for each zone with those having less frequent intervals requiring increased access requirements."

Currently the Zonal Inspection Requirements of different manufacturers are not well harmonized. Some manufacturers do only analyse zones at a specific level of access, and do only schedule a single zonal task requirement with that access requirement.

Other manufacturers do analyse Zones at several levels of access (or disassembly) and schedule multiple zonal inspections as stated in MSG-3

Both cases may not be appropriate, because either certain items are never analysed and inspected, or access requirements are more penalizing than necessary, causing additional cost and/or additional accidental damage during maintenance (especially during disassembly and reassembly).

It should be the standard for a zonal analysis to determine at how many different levels of access zonal GVI have to be scheduled.

The result of that analysis may of course show, that a single level of access is fully appropriate to maintain the inherent safety and reliability of all items located within a zone and to accept all task transfers from systems/powerplant, structures or L/HIRF.

It may however also demonstrate that the goal of MSG-3 can only be reached if several zonal GVI at different levels of access and different intervals are selected.

See the attached Appendix for more detailed information

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Recommendation (including Implementation):

Proposed changes are (highlighted in red)

Current bullet c (see proposal to swap it with bullet b) deals with the data to be identified for a zone. In this bullet some **guidance should be added** to clarify, that any item located in a zone (i.e. is located within the volume of the full zone) has to be identified, including items which may need to be removed for access. It should also highlight that a zone should be analysed in operational condition with all items installed, not in maintenance condition with certain items removed for access. If more than one level of access is existing for a zone, it should be identified in this step as well. As detailed before, this mainly applies to internal zones of the 100 and 200 Major Zones.

Improve wording of paragraph 2-5-2:

Currently the i.e. remark is saying exactly the same as the sentence before. The paragraph is dealing with Inspection Intervals according to the title, the procedure (bullet c) deals with intervals so the same wording should be used. (i.e. Inspection Intervals instead of Frequency of Inspection). The sentence at the moment states that "the frequency of inspection is inversely proportional to the amount of access required", this statement is not necessarily true, and MSG-3 does not need to state what *is*, but what should be done (MSG-3 is giving guidance, not listing facts). Additionally the analysis and the application of the rating system may result in task intervals which are not proportional to the level of access (e.g. more dust and lint may collect behind fairing panels than on its external surface, hence the enhanced zonal rating for the area behind the panel might be worse than the one for the area which does not require its removal).

Additional Proposals: (highlighted in blue)

Add a remark that the zoning should be done as early as possible in the process and agreed by the ISC to avoid later complications. This is a lesson learned from several recent projects.

Swap steps b and c of the procedure. Actual step c is part of the PPH development and a generic step in the MRB process. Actual step b is part of the individual analysis and a specific step to be performed for each zone. Therefore those two steps should be swapped, making the first two steps part of the PPH approval under ISC responsibility, and the following steps part of the individual analysis to be performed by the working groups.

Add L/HIRF to the list of sources for tasks transferred to Zonal which need to be referenced (bullet k)

Remark:

The according changes are intended to improve future zonal analysis and future task requirements and does not need to be applied retroactively for approved MRBR.

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2-5. Zonal Analysis Procedure

Zonal inspections may be developed from application of the Zonal Analysis Procedure. This requires a summary review of each zone on the aircraft and normally occurs as the MSG-3 analyses of structures, systems, and powerplants are being concluded. These inspections may subsequently be included in the Zonal Inspections.

This Zonal Analysis Procedure permits appropriate attention to be given to electrical wiring installations. Thus, as well as determining zonal inspections, the logic provides a means to identify applicable and effective tasks to minimize contamination and to address significant wiring installation discrepancies that may not be reliably detected through zonal inspection. These dedicated tasks may subsequently be included in the Systems and Powerplant tasks.

In top down analyses conducted under MSG-3, many support items such as plumbing, ducting, Other Structure, wiring, etc., may be evaluated for possible contribution to functional failure. In cases where a general visual inspection is required to assess degradation, the zonal inspection is an appropriate method.

2-5-1. Procedure

The following procedures may be used

- a. Divide the aircraft externally and internally into zones as defined in [\[ATA iSpec 2200\]](#), (formerly ATA Spec 100)
Note: As the zoning of the aircraft is required for any analysis (systems/powerplant, structures and L/HIRF) and later changes will have an impact on those, this step should be performed as early in the process as possible and agreed by the ISC.
- b. Develop rating tables to determine the repeat interval for a zonal inspection. Rating tables will permit the likelihood of accidental damage, environmental deterioration and the density of equipment in the zone to be taken into account.
- c. For each zone, prepare a work sheet that identifies data such as: zone location, **zone boundaries**, access (e.g. **doors, panels, linings, insulation blankets**), approximate size (volume), systems and components installed, typical power levels in any wiring bundles, features specific to L/HIRF protection, etc. In addition, assess potential for the presence of combustible material, either through contamination (e.g., dust and lint) or occurring by design (e.g., fuel vapor). **This assessment shall be made in operational condition with all systems, components, interior, linings, insulation blankets etc. installed.**
- d. For all zones containing systems installations, perform a standard zonal analysis using the rating tables from paragraph (b.) to define the extent and interval of zonal inspection tasks. Multiple zonal inspections may be identified for each zone with those **requiring increased access typically resulting in less frequent inspection intervals due to the better ratings (e.g. less accidental damage risk, better visibility).**

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- e. Identify zones that both contain electrical wiring and have potential for combustible material being present. **Any area and item within a zone needs to be considered including items removed for access (e.g. EWIS attached to cabin interior panels, combustible material being present on top of galleys, lavatories).** For those zones, perform an enhanced zonal analysis that permits the identification of stand-alone inspection tasks that allow appropriate attention to be given to deterioration of installed wiring and electrical wiring interconnection system (EWIS), in particular for wiring in close proximity (i.e., within 2 inches or 50 mm) to both primary and back-up hydraulic, mechanical, or electrical flight controls, and tasks that minimize contamination by combustible materials, if applicable and effective. **Credit may be taken for cleaning during scheduled and/or unscheduled maintenance tasks following a "clean as you go" policy.** Rating tables addressing the potential effects of fire caused by a wiring/EWIS failure on adjacent wiring and systems (e.g., the risk to aircraft controllability), the size of the zone and the density of installed equipment may be used to determine the inspection level. General Visual Inspections may be found effective for the complete zone. Detailed Inspections may be found applicable and effective for specific items in a zone. Interval determination may be accomplished using rating tables that consider accidental damage and environment.
- f. Detailed Inspections, stand-alone GVIs, and tasks to minimize contamination, arising from paragraph "e" should be included in the Systems and Powerplant tasks. Since these tasks are not specific to the routine ATA-defined systems and do not have a Failure Effect Category, introduction in a dedicated section is suggested, for example, under ATA 20.
- g. General Visual Inspections arising from the enhanced zonal analysis (paragraph e.) may be compared with the Zonal Inspections determined from the standard zonal analysis (paragraph d.). The former may be considered fully covered by the zonal inspection if the access requirement is the same and the proposed interval is at least as frequent. Otherwise, a stand-alone GVI should be included with the tasks identified in paragraph (f.).
- h. General Visual Inspections arising from the systems, powerplants and structures may be compared with the Zonal Inspections determined from the standard zonal analysis (paragraph d.). Work sheets should record the interval proposed in the originating analysis. These GVIs may be considered fully covered by the zonal inspection if the access requirement is the same and the proposed interval is at least as frequent. Otherwise, a stand-alone GVI should be included within the MSI or SSI from which it was identified.
- i. General Visual Inspections arising from the analysis of L/HIRF may be compared with the Zonal Inspections determined from the standard zonal analysis (paragraph d.). These GVIs may be considered fully covered by the zonal inspection if the access requirement is the same and the proposed interval is at least as frequent. Otherwise, a stand-alone GVI should be included within the Systems and Powerplants tasks as described in [\[Subject 2-6-1\]](#).
- j. Visual Checks may be considered covered by the Zonal Inspections provided that the Systems Working Group that identified them consider that the failure would be noted and addressed during a zonal inspection. Otherwise, the task should remain in the Systems and Powerplants tasks where specific attention can be drawn to the item.
- k. All tasks developed through application of the standard zonal analysis (paragraph d.) should be included in the Zonal Inspections. For accountability purposes, any General Visual Inspection or Visual Check originating from application of systems, powerplant, ~~or~~ structures or L/HIRF analyses should be referenced in the MRB Report zonal task. To avoid giving unjustified attention to these items, this should not be indicated on task/work cards.
- l. All EZAP-derived stand-alone tasks (GVI or DET) should be uniquely identified in the data documentation for traceability during future changes. This is intended to prevent the inadvertent deletion or escalation of an EZAP-derived stand-alone task without proper consideration of the risk basis for the task and its interval.

A typical logic diagram is depicted in [\[Figure 2-5-1.1\]](#) and [\[Figure 2-5-1.2\]](#). This is provided as a guide and may be customized to reflect individual company policies and procedures.

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2-5-2. Zonal Inspection Task Intervals

Accomplishment intervals are based on hardware susceptibility to damage, the amount of activity in the zone, and operator and manufacturer experience with similar systems, powerplants and structures. When possible, intervals should correspond to those selected for targeted scheduled maintenance checks.

For a given zone, more than one task may be identified. In this case, the frequency of inspection **will normally be** inversely proportional to the amount of access required; i.e., the more access required, the **longer** the inspection **interval**.

<p style="text-align: center;">IMRBPB Position:</p>
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<p>Date: 30 JULY 2013</p>

<p>Position: Proposed Changes accepted by Policy Board</p>

Status of Issue Paper (when closed state the closure date): Closed as IP 135 July, 30 2013

Recommendation for implementation: Implementation into MSG-3 Volume I and II at next revision.

Important Note: The IMRBPB positions are not policy. Positions become policy only when the policy is issued formally by the appropriate National Aviation Authority.