



Issue Paper (IP)

IP Number: 215

Initial Date (DD/MMM/YYYY): 17/May/2024

Revision - Date (DD/MMM/YYYY): Rev. 0 / 17/May/2024

Effective Date (DD/MMM/YYYY): 16/Jul/2024

Retroactivity (Y/N): N

Title:	SSI analysis organization guideline
Submitter:	RMPIG/MPIG

Applies To:	
MSG-3 Vol 1	
MSG-3 Vol 2	
IMPS	X

Issue:
Missing guidance for SSI analysis organization.

Problem:
<p>Currently, MSG-3 document structures section does not provide clear guidance for analysis organization of SSI(s). Section 2-4-1, subsection (1) contains the definitions of the SSI and explains the difference with PSE and Other Structure but does not provide any guidance on how to organize the analyses.</p> <p>This could lead to overcomplicated analysis, unnecessary increase in task numbers, lower intervals, and access issues.</p> <p>Some examples of possible problems:</p> <ul style="list-style-type: none"> • SSI selected based on manufacturing process drawings. • SSI selected for LH/RH identical structure items and increased task numbers. • SSI selected based on worst material and finish protection rating and penalized the whole area with unnecessary low interval. • SSI boundary selected regardless of different accidental damage sources or environmental conditions and may penalize the whole area with unnecessary low interval. • Separate SSI selected for each component within the same assembly with same ratings, access, and zone, creating extra SSIs and tasks. <p>NOTE: The CIP initially was divided into two parts. The first part A aimed to provide additional clarification for the MSG-3 SSI definition / selection in the related MSG-3 sections. The second part B provided generic guidance on how to organize the SSI analyses. During 2023 IMRBPB Annual Meeting, the IMRBPB voted to add the information reported in the CIP Part B to the existing IMPS Appendix 3, renaming the appendix accordingly. During 2024 IMRBPB Annual Meeting it has been agreed to revise the CIP by removing the content related to the initial part A to allow that the revised CIP and the former part B become the initial source for the revision of the IMPS Appendix 3.</p>



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The issue related to the SSI definition addressed in the initial Part A will be addressed in another CIP.

Recommendation (including Implementation):

For implementation in revised IMPS Appendix 3:

Organizing the analyses of SSI(s) consists of the main steps as follows:

- To analyse structure at the most appropriate level of breakdown in order to avoid unnecessary analysis while being able to properly assign all ratings.
- To inspect the structure with the most effective tasks.

To develop the most efficient scheduled maintenance requirements, the boundaries of SSI analysis can be fine-tuned after they have been selected. The aim is to identify the highest manageable SSI boundary level. i.e., one which is high enough to avoid unnecessary analysis, but low enough to allow the item to be properly analysed and ensure that all ratings can be assigned.

ORGANIZING THE SSI ANALYSES

To organize the SSI analyses in a way to allow to be efficient, several factors including but not limited to Zone, Access, Standard Numbering System (SNS), Material properties/surface protection system, Accidental damage sources, Environment, Potential impact of AD(s) on residual strength, Susceptibility to fatigue, Detectability, Density of the area and, in-service experience from similar designs should be considered.

The aim is to identify the highest manageable SSI boundary level. i.e., one which is high enough to avoid unnecessary analysis, but low enough to allow the item to be properly analysed and ensure that all ratings (Refer to section 2-4-5) can be assigned.

To organize SSI boundaries in order to have efficient tasks analysis, the following criteria should be considered by the MSG-3 analysts when breaking down the aircraft structures into the SSIs:

- Zone: When applicable, the SSI boundary should be harmonized with the zone boundary. This will help the possible transfer of applicable tasks from structures to zonal in the future.
- Access: SSI boundary should be defined in a way that the structure is accessible from the same access point(e.g. below the floor/above the floor). In addition, the analyst should consider system installations, wiring and access panels within a zone, to split the area into more than one SSI, if required.
- ATA iSpec 2200 or S1000D SNS: The ATA chapter should not be the determining factor in setting the boundary of an SSI. Based on the design, there is a possibility that an SSI falls into different chapters or subchapters of SNS.



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- Identical structures for the left and right sides: One SSI should be selected to cover both the left and right sides of the symmetrical structure. Minor differences between the LH and RH could still be covered within one SSI, so long as it does not impact the analysis ratings. If required, separate LH and RH tasks can still be selected to reduce MH requirements per task and facilitate zonal transfer capabilities.
- Material characteristics, and surface protection system: Since the structures ED analysis is a conservative approach by selecting the worst-case scenario, the SSI boundary should be defined in a way that will not penalize the whole area of inspection with a low interval due to one component's material or surface protection system. When beneficial, the part with the lowest material characteristic and/or surface protection ratings may be covered by a separate analysis within the same SSI or in a separate SSI to cover the worst case.
- Corrosion Inhibiting Compound (CIC): Selection of the SSI or analysis boundary should take into account the application of the CIC in production (and/or need for re-application in service). For the areas with CIC application, it may be useful to conduct a separate analysis or select a separate SSI.
- Effects of accidental damage sources and environmental conditions: When applicable, the SSI boundary should be defined in a way that will cover all the structure items with the same vulnerability to accidental damage sources and environmental conditions. When required, a new MSG-3 analysis or a separate SSI and dedicated task may be selected to cover the worst-case, preventing penalizing the whole area with a lower interval.
- Potential impact of AD on residual strength may be used to define the SSI boundary.
- Susceptibility to fatigue: For non-PSE SSIs, the boundary may be determined in accordance with the potential fatigue influence identified by the manufacturer stress engineering.
- Assemblies: when there is an assembly with multiple structure items which have the same material, surface protection ratings, same AD/ED exposure, same access, same ATA chapter, and same zone, it is highly recommended that all the assembly structure items be covered within a single SSI and not multiple SSIs for each component. If assemblies are selected to be SSI, all relevant load bearing elements need to be included and analysed, this may include bearings, bushings, bolts, fasteners, retainers etc. based on the amount of load carried by this element and the effect of failure. Attention should be given to different point of interactions (i.e. the possibility of the Galvanic corrosion, fatigue ... etc.).
- Detectability: Establish the SSI boundaries based on the ability to detect accidental damage or environmental deteriorations to have efficient inspection task level (i.e.; GVI, DET, SDI).
- Density of the area: Establish the SSI boundaries based on the density and restrictions of the area for inspection.
- In-service experience from similar designs: Analyst should always consider any in-service data when establishing the SSI boundary and split the SSI if required.
- Removable structural items: Structures that are removable can be interchanged or can be stored for a long period of time. It is therefore necessary for task threshold and



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interval to be assigned to these items rather than the aircraft. The inspection of removable structural items is controlled by serial number identification or equivalent alternative on the item life card.

NOTE: The original CIP proposal was submitted by Bell and Airbus Canada.



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IMRBPB Position:	
Date:	17 May 2024
Position:	Agreed, closed in 2024 meeting as IP 215
Recommendation for Implementation:	As per effective date

Status of the Issue Paper:	<input checked="" type="checkbox"/>	Active
	<input type="checkbox"/>	Incorporated in MSG-3 / IMPS (with details)
	<input type="checkbox"/>	Archived