International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

IP Number: CIP IND 2019-21 (V1, 2)
Initial Date: 20/Nov/2019
Revision / Date 11/MAR/2020
Effective Date (DD/MMM/YYYY):
Retroactivity (Y/N): N

Title:	In flight loss of Other Structure
Submitter:	RMPIG

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

Issue:

It is mentioned in section **2-4-4; Scheduled Structural Maintenance Development**, that the assessment of structure for selection of maintenance tasks should include the consequences of structural deterioration to continuing airworthiness. “In-flight loss of structural items” is one of the criteria provided.

2-4-4. Scheduled Structural Maintenance Development

The scheduled structural maintenance tasks and intervals are based on an assessment of structural design information, fatigue evaluations, service experience with similar structure and pertinent test results.

The assessment of structure for selection of maintenance tasks should include the following

a. The sources of structural deterioration:
   1. Accidental Damage
   2. Environmental Deterioration
   3. Fatigue Damage

b. The susceptibility of the structure to each source of deterioration.

c. The consequences of structural deterioration to continuing airworthiness
   1. Effect on aircraft (e.g. loss of function or reduction of residual strength).
   2. Multiple damage occurrences.
   3. The effect on aircraft flight or response characteristics caused by the interaction of structural damage or failure with systems or powerplant items.
   4. In-flight loss of structural items.

d. The applicability and effectiveness of various methods of preventing, controlling or detecting structural deterioration, taking into account inspection thresholds and repeat intervals.

e. Details of any SHM applications proposed by the manufacturer.

Problem:

Structural items consist of both SSIs and “Other Structure”. The SSI definition applies to items that contribute significantly to carrying of flight, ground, pressure or control loads and their failure could affect the structural integrity required for the safety of aircraft. Items which do not carry significant flight, ground, pressure or control loads, but which, if lost or failed in flight, may cause indirectly relevant damage to the aircraft and thus could compromise continued safe flight and landing are not fully covered by the SSI definition.

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The selection of such structure items as SSI should be based on inputs from the design office through simulations, safety hazard analysis, fatigue test results, and in-service experience with similar designs. When the Manufacturer design office provides justification that there would be no consequences of structural deterioration to continuing airworthiness, that particular item will be classified as "Other Structure" and will be assessed by the Zonal program.

Recommendation (including Implementation):

To clarify which structure items should be considered as an SSI in cases of in-flight loss of structural items which impact continued airworthiness: Move the previous SSI Assembly note from "b" (Other Structure) to the end of "a" (SSI Definition) and add a 2nd note for clarification of the SSI definition in Section 2-4-1.

FROM:

1. Significant and Other Structure
Structure can be subdivided into items according to the consequences of their failure to aircraft safety as follows

a) A Structural Significant Item (SSI) is any detail, element or assembly, which contributes significantly to carrying flight, ground, pressure or control loads, and whose failure could affect the structural integrity necessary for the safety of the aircraft.

   SSIs must not be confused with Principal Structural Elements, PSE (Section 571 of the applicable certification standard); however, all PSEs must be addressed by the SSIs.

   An SSI can be damage tolerant or safe-life or a combination of both.

b) Other Structure is that which is judged not to be a Structural Significant Item. It is defined both externally and internally within zonal boundaries.

NOTE: When assemblies are selected to be SSI, those elements that form the assembly and comply with the SSI definition need to be included (e.g., single bolt attaching a pylon diagonal brace).

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TO:

1. Significant and Other Structure
Structure can be subdivided into items according to the consequences of their failure to aircraft safety as follows

a) A Structural Significant Item (SSI) is any detail, element or assembly, which contributes significantly to carrying flight, ground, pressure or control loads, and whose failure could affect the structural integrity necessary for the safety of the aircraft.

SSIs must not be confused with Principal Structural Elements, PSE (Section 571 of the applicable certification standard); however, all PSEs must be addressed by the SSIs.

An SSI can be damage tolerant or safe-life or a combination of both.

NOTE (1):	When assemblies are selected to be SSI, those elements that form the assembly and comply with the SSI definition need to be included (e.g., single bolt attaching a pylon diagonal brace).
NOTE (2):	SSI structure also includes any structure that, if failed or detached in flight could, through secondary damage, compromise continued safe flight and landing.

b) Other Structure is that which is judged not to be a Structural Significant Item. It is defined both externally and internally within zonal boundaries.

~~NOTE: When assemblies are selected to be SSI, those elements that form the assembly and comply with the SSI definition need to be included (e.g., single bolt attaching a pylon diagonal brace).~~

NOTE: The original CIP proposal was submitted by Bell

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IMRBPB Position:	
Date:	
Position:	
Recommendation for Implementation:	

Status of the Issue Paper:	☐	Active
	☐	Incorporated in MSG-3 / IMPS (with details)
	☐	Archived