International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

IP Number: CIP IND 2019-19
Initial Date: 8/NOV/2019
Revision / Date: R00 8/NOV/2019
Effective Date (DD/MMM/YYYY):
Retroactivity (Y/N):

Title:	Freeze-Thaw cycle effect
Submitter:	RMPIG

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

Issue:

Freeze-Thaw cycle effect is not applicable to the Helicopters

Problem:

While water ingress is an issue resulting disbond and delamination on helicopter composite parts, freeze/thaw cycles are significantly more severe in the fixed wing world (especially transport aircrafts), as the temperature at their flight altitude can easily reach -40°C, regardless of the temperature on ground. Therefore, they can get a freeze/thaw cycle every flight, unless it is already freezing on ground. Should they perform 2-3 flights per day for the whole year, this comes out to be 730-1095 freeze/thaw cycles per year.

On the other hand, if aircraft stay on ground (or "near" ground), you will get significantly less cycles. According to MIL Handbook 310 (global climatic data for developing military products), you could expect freeze-thaw cycles 337 days annually in regions of high elevations in the tropics (tropical mountains). However, this is an extreme case (even for US DOD). Elsewhere, a much lower number of days annually would be expected.

Helicopters do not fly as high as transport aircrafts. On a cloudless day, you could expect a decrease of 14.77°C per 1,000 feet elevation (as opposed to 15.94°C/1,000 ft for a clouded day). On a 20°C day on ground, you would need to fly at 7,000 feet to get below freezing on a cloudless day.

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Recommendation (including Implementation):

Section 2-3-9; Supplemental analyses for Rotors / Drive systems:

Section 3. Accidental Damage (AD), part (c):

Amend as follows:

c) The timely detection of damage based on the relative rate of growth after damage is sustained and visibility of the MSI for inspection. Assessments should take into account damage growth associated with non-chemical interaction with an environment, such as disbond or delamination growth associated with the water ingress ~~a freeze/thaw cycle~~.

Section 2-4-5; Rating Systems for Structural Significant Items:

Section 1. Rating Accidental Damage, part (c):

Amend as follows:

c) Timely detection of damage based on the relative rate of growth after damage is sustained and visibility of the SSI for inspection. Assessments should take into account damage growth associated with non-chemical interaction with an environment, such as disbond or delamination growth associated with the water ingress ~~a freeze/thaw cycle~~.

Submitted by: Bell

IMRBPB Position:	
Date:	
Position:	
Recommendation for Implementation:	

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