International MRB Policy Board

Issue Paper (IP)

IP Number:209
Initial Date (DD/MMM/YYYY): 12/May/2023
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Effective Date (DD/MMM/YYYY): 11/Jul/2023
Retroactivity (Y/N): N

Title:	HUMS Usage Data to Optimize Restoration (Overhaul) & Discard Intervals
Submitter:	RMPIG

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

Issue:

TCHs, operators and Regulators are focused on means to further improve efficiency in the processes in which they contribute. In this regard, enhancements can be made to MSG-3 which currently leads to over maintenance, meaning premature restoration and discard of parts on aircraft.

Problem:

Current MSG-3 methodology and guidelines are such that task intervals for restoration, discard, etc. are selected that can be too restrictive; meaning they are set based on a standard usage profile in a standard environment, etc., which leads to "one-size fits all" maintenance regime that can impose some severe operational restrictions on some operators.

Recommendation (including Implementation):

An update in the MSG-3 methodology with a view moving towards one that is based on an analysis of a variety of usage parameters acquired during flight - not limited to FH - may be used to determine effective restoration (overhaul) and/or discard intervals with a less conservative task interval selection. Such methodology can allow to not over maintain a system.

Current architecture allows for data collection and retrieval that would allow for a more efficient approach to maintaining dynamic components. The ability to track the amount of load applied to dynamic components and the duration of exposure to these loads allows operators to trend wear in a more accurate manner than assuming a direct flight hour / wear relationship.

An example method is detailed in SAE AIR6334 “A Guide to Extending Times Between Overhaul for Rotorcraft Power Train Transmissions Using Monitoring Data”.

Over time the usage history may be used by TCH/OEM engineering, as an important input to the determination of restoration (overhaul) and discard intervals.

This application of HUMS data to support the establishment of restoration (overhaul) and discard intervals is not fully addressed in the MSG-3 Volume 2.

It is proposed to add the following in the MSG-3 Volume 2 text that provides flexibility for OEMs and Operators to co-operate in the application of approved usage data to implement usage-based supplemental restoration (overhaul) and discard intervals.

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In section **2-3-2.** Analysis Procedure, insert the blue text in the next to last paragraph.

> "New technologies such as Health and Usage Monitoring have emerged and matured in the recent years and now propose alternative methods to traditional scheduled tasks. Provided that the Health and Usage Monitoring System is Certified for Credit in accordance with relevant aircraft certification regulations, the outputs may be an option to determine the restoration (overhaul) or discard intervals to reflect the actual usage, detect selected incipient failures for degradation and/or selected aspects of service history considered as initiators or accelerators of degradation."

In section **2-3-8**, sub-section 2 Source of Information, introduce the concept of monitored power usage by adding a bullet (in blue) to the list:

> "The MWG should consider the following in determining the most appropriate task interval:
> - manufacturer's tests and technical analysis
> - manufacturer's data and/or vendor recommendations
> - customer requirements
> - Data from an TCH/OEM approved Helicopter Flight Data Monitoring program acquired before entry into service and after controlled service introduction. Dedicated analysis procedures may need to be referenced in the PPH
> - service experience gained with comparable or identical components and subsystems including regulator approved HUMS usage data
> - 'best engineering estimates"

In section **2-3-8**, sub-section **3** Task Interval Parameters introduce the additional guidance of HUMS usage data as possible metric of interval selection:

> Task intervals are established in terms of the measure of exposure to the conditions that cause the failure at which the task is directed. The most widely used usage parameters are:
> - calendar time
> - flight hours

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- flight cycles
- Engine/APU hours/cycles.
- When a certified for credit HUMS is available relevant Health and usage monitoring system parameter (e.g. power usage metrics for power train assemblies)

Definition to be added to Appendix A Glossary

Helicopter Flight Data Monitoring (HFDM) Programs	Helicopter Flight Data Monitoring (HFDM) is a systematic method of accessing, analyzing and acting upon information obtained from flight data to identify and address operational risks as well as reducing operational cost and enhancing maintenance by eliminating unnecessary inspections.

NOTE: The original CIP proposal was submitted by Helicopter Association International

IMRBPB Position:	
Date:	12 May 2023
Position:	Agreed, closed in 2023 meeting as IP 209
Recommendation for Implementation:	As per effective date

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