

International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

IP Number: CIP IND 2020-02 (V3)

Initial Date (DD/MMM/YYYY): 07/JAN/2020

Revision / Date (DD/MMM/YYYY): 02/FEB//2022

Effective Date (DD/MMM/YYYY):

Retroactivity (Y/N): N

Title:	HUMS Usage Data to Increase 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 to address for instance commenters who claim the power train restoration (overhaul) intervals may be based upon actual usage, as opposed to current reliance on flight time alone.

Problem:

Currently available usage monitoring technologies are not fully addressed in the MSG-3 document. For instance, the document does not allow to take benefit of the application of power usage history (torque time histories) as a potential power train usage parameter that can be processed to produce a power usage metric, a metric that allows the TCH to establish a restoration (overhaul) interval in terms of the flight time that may be accrued while not exceeding a supplemental usage limit.

Over time, the analysis of cumulated usage in context with in-service inspection results may be used to increase restoration (overhaul), and discard intervals tracked in terms of flight time. For instance, this co-mingled application of two usage metrics allows the TCM to establish restoration (overhaul) intervals based upon the flight time required to accrue the maximum power usage that will preclude significant degradation. This method is detailed in SAE AIR6334 “A Guide to Extending Times Between Overhaul for Rotorcraft Power Train Transmissions Using Monitoring Data”

In the near future, the TCH/OEM may establish HFDM program criteria for moderated use. These criteria may include standard operating procedures (SOPs) for moderate operations. The SOPs for moderated use may preclude a majority if not all of the worst-case flight manoeuvres and flight conditions that are typically referenced in the traditional CWC analysis.

The TCH/OEM may require a participating Operator to deliver specific set of HFDM usage to the TCH/OEM and/or to the assigned Regulators to demonstrate compliance with the Moderate SOPs. Over time the usage history may be used by TCH/OEM engineering, as an important input to the development of initial and final 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.

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Recommendation (including Implementation):

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.

- 1) 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 **revise the initial 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.”

- 2) 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 **and data from an TCH/OEM approved Helicopter Flight Data Monitoring program acquired during 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 during the optimization phase**
- "best engineering estimates”

- 3) In section **2-3-8**, sub-section 4 Task Interval Selection Criteria, introduce the additional guidance of HUMS usage data as possible metric of interval selection:

Restoration, Discard (failure avoidance):

- Intervals should be based on the "identifiable age" when significant degradation begins and where the conditional probability of failure increases significantly.
- Vendor recommendations based on in-service experience of similar parts should also be taken into consideration.
- A sufficiently large proportion of the occurrences of this failure should occur after this age to reduce the probability of premature failure to a level that is tolerable.

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- When a certified for credit HUMS is available, the restoration/discard interval can be linked to the relevant Health and usage monitoring system parameter (e.g. power usage metrics for power train assemblies)

4) 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:

Position:

**Recommendation for
Implementation:**

**Status of the Issue
Paper:**

Active

Incorporated in MSG-3 / IMPS (with details)

Archived