

International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

IP Number: IP 201

Initial Date (DD/MMM/YYYY): 24/Jun/2022

Revision / Date (DD/MMM/YYYY): Rev. 0 / 24/Jun/2022

Effective Date (DD/MMM/YYYY): 01/Oct/2022

Retroactivity (Y/N): N

Title:	Management of AFM/RFM Assumptions
Submitter:	EASA

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

Issue:

From MSG-3 Revision 2018.1, Volume 1 – Fixed Wing Aircraft, Para. 2-3-5.1 (same applies to MSG-3 Revision 2018.1, Volume 2 – Rotorcraft, Para. 2-3-5.1):

2-3-5. Consequences of Failure (First Level)

The decision logic diagram (Ref. [Figure 2-2.1](#)) facilitates the identification of the tasks required. There are four first level questions.

1. Evident or Hidden Functional Failure

QUESTION 1:	IS THE OCCURRENCE OF A FUNCTIONAL FAILURE EVIDENT TO THE OPERATING CREW DURING THE PERFORMANCE OF NORMAL DUTIES?
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This question asks if the operating crew will be aware of the loss (failure) of the function during performance of normal operating duties. Question 1 must be asked for each functional failure of the item being analyzed. The intent is to segregate the evident and hidden functional failures. The operating crew consists of qualified flight compartment and cabin attendant personnel who are on duty. Normal duties are those duties associated with the routine operation of the aircraft on a daily basis.

If there is uncertainty about the frequency of use of certain systems, and assumptions are to be made, then the assumptions made must be recorded in the analysis for later verification. This applies equally to assumptions made concerning tests that are performed automatically by electronic equipment.

NOTE: In order to take credit for tests that are performed automatically by electronic equipment at power up of a system, any assumption that this system is de-powered on a daily basis is to be formalized in the MRB Report Program/Operating rules. Ground crew is not part of the operating crew.

Flight crew "normal duties" are described (in part) in the approved section of the Airplane Flight Manual (AFM) and must be accomplished by the flight crew. Working groups may consider these flight crew checks as part of the operating crew's "normal duties" for the purpose of categorizing failures as evident in the MSG-3 analysis. It should be documented in the analysis whenever credit is taken for such flight crew checks.

Since the AFM is not available during the initial MSG-3 analysis, working groups should document all Level 1 failure analysis that is based on flight crew checks assumed to be included in the approved section of the AFM. Once the AFM is available, all Level 1 analyses based on such assumptions must be verified to ensure that these checks are included in the AFM. Level 1 analysis must be redone for any assumed flight crew check not included in the approved section of the AFM. System failures which are indicated to the operating crew when performing their normal duties shall be considered as evident.

NOTE:	Evidence of AFM tasks which are assumed in the MSG-3 Level 1 analysis submitted to the MRB must be available prior to the MRB Report approval; otherwise, the MSG-3 Level 1 analysis submitted to the MRB must be based on the assumption that these tasks are not part of the crew's normal duties.
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A "YES" answer indicates the functional failure is evident; proceed to Question 2 (Ref. [Heading 2-3-5.2](#)).

A "NO" answer indicates the functional failure is hidden; proceed to Question 3 (Ref. [Heading 2-3-5.3](#)).

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In case AFM/RFM assumptions cannot be verified (due to AFM/RFM not approved), the initial MRBR cannot be approved, unless all the MSG-3 Level 1 analysis based on AFM/RFM assumptions are changed from evident to hidden Failure Effect Category (FEC) route.

Problem:

The MRB Report is often approved before the initial Type Certificate (TC) of the concerned product. Most of the time the initial approval of the AFM/RFM is happening at the same time as the initial TC issuance. Therefore, it is not possible to validate the AFM/RFM assumptions used by MWG during MSG-3 Level 1 analysis. It has the following implications:

- Need to override all MWG discussions to change MSG-3 analyses Level 1 (and Level 2) based on the assumption that these AFM/RFM tasks are not part of the flight crew's normal duties.
- Following the AFM/RFM approval, this could result in reverting back the MSG-3 analyses to the original revision.
In fact, the AFM/RFM assumptions are often based on existing approved AFM/RFM of derivative aircraft/rotorcraft models. This is a time-consuming process.
- Deviations from MSG-3/PPH opening Action Item for post-MRBR approval verification as soon as the AFM/RFM is approved.

There is currently no harmonized approach.

Recommendation (including Implementation):

Amend MSG-3 Revision 2018.1, Volume 1 – Fixed Wing Aircraft, Para. 2-3-5.1 as follows:

1. Evident or Hidden Functional Failure

QUESTION 1: IS THE OCCURRENCE OF A FUNCTIONAL FAILURE EVIDENT TO THE OPERATING CREW DURING THE PERFORMANCE OF NORMAL DUTIES?

This question asks if the operating crew will be aware of the loss (failure) of the function during performance of normal operating duties. Question 1 must be asked for each functional failure of the item being analyzed. The intent is to segregate the evident and hidden functional failures. The operating crew consists of qualified flight compartment and cabin attendant personnel who are on duty. Normal duties are those duties associated with the routine operation of the aircraft on a daily basis.

System failures which are indicated to the operating crew when performing their normal duties shall be considered as evident.

If there is uncertainty about the frequency of use of certain systems, and assumptions are to be made, then the assumptions made must be recorded in the analysis for later verification. This applies equally to assumptions made concerning tests that are performed automatically by electronic equipment.

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NOTE: In order to take credit for tests that are performed automatically by electronic equipment at power up of a system, any assumption that this system is de-powered on a daily basis is to be formalized in the MRB Report Program/Operating rules. Ground crew is not part of the operating crew.

Flight crew "normal duties" are described (in part) in the approved section of the Airplane Flight Manual (AFM) and must be accomplished by the flight crew. Working groups may consider these flight crew checks as part of the operating crew's "normal duties" for the purpose of categorizing failures as evident in the MSG- 3 **Level 1** analysis. It should be documented in the analysis whenever credit is taken for such flight crew checks.

Since the AFM is not available during the initial MSG-3 analysis, **the manufacturer shall propose an appropriate method documented in the "Policy and Procedures Handbook" to adequately cover AFM assumptions and coordinate the follow-up of the AFM modifications with the ISC and MRB until its approval.** ~~working groups should document all Level 1 failure analysis that is based on flight crew checks assumed to be included in the approved section of the AFM.~~ Once the AFM is **approved available**, all Level 1 analyses based on such assumptions must be verified to ensure that these checks are included in the AFM. **This verification activity shall be finalized prior to the entry into service of the aircraft.** Level 1 analysis must be redone for any assumed flight crew check not included in the approved section of the AFM. **Any change affecting the MSG-3 analysis with a direct impact on the MRBR content should be reflected as soon as possible prior to the entry into service of the aircraft.** ~~System failures which are indicated to the operating crew when performing their normal duties shall be considered as evident.~~

~~**NOTE:** Evidence of AFM tasks which are assumed in the MSG-3 Level 1 analysis submitted to the MRB must be available prior to the MRB Report approval; otherwise, the MSG-3 Level 1 analysis submitted to the MRB must be based on the assumption that these tasks are not part of the crew's normal duties.~~

A "YES" answer indicates the functional failure is evident; proceed to Question 2 (Ref. [Heading 2-3-5.2]).

A "NO" answer indicates the functional failure is hidden; proceed to Question 3 (Ref. [Heading 2-3-5.3]).

Amend MSG-3 Revision 2018.1, Volume 2 – Rotorcraft, Para. 2-3-5.1 as follows:

1. Evident or Hidden Functional Failure

QUESTION 1: IS THE OCCURRENCE OF A FUNCTIONAL FAILURE EVIDENT TO THE OPERATING CREW DURING THE PERFORMANCE OF NORMAL DUTIES?

This question asks if the operating crew will be aware of the loss (failure) of the function during performance of normal operating duties. Question 1 must be asked for each functional failure of the item being analyzed.

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The intent is to segregate the evident and hidden functional failures. The operating crew consists of qualified flight compartment and cabin personnel who are on duty. Normal duties are those duties associated with the routine operation of the aircraft on a daily basis.

System failures which are indicated to the operating crew when performing their normal duties shall be considered as evident.

If there is uncertainty about the frequency of use of certain systems, and assumptions are to be made, then the assumptions made must be recorded in the analysis for later verification. This applies equally to assumptions made concerning tests that are performed automatically by electronic equipment.

Ground crew is not part of the operating crew.

Flight crew "normal duties" are described (in part) in the approved section of the Rotorcraft Flight Manual (RFM) and must be accomplished by the flight crew. Working groups may consider these flight crew checks as part of the operating crew's "normal duties" for the purpose of categorizing failures as evident in the MSG-3 ~~Volume 2~~ Level 1 analysis. It should be documented in the analysis whenever credit is taken for such flight crew checks.

Since the RFM is not available during the initial MSG-3 ~~Volume 2~~ analysis, the manufacturer shall propose an appropriate method documented in the "Policy and Procedures Handbook" to adequately cover RFM assumptions and coordinate the follow-up of the RFM modifications with the ISC and MRB until its approval. ~~working groups should document all Level 1 failure analysis that is based on flight crew checks assumed to be included in the approved section of the RFM.~~ Once the RFM is approved available, all Level 1 analyses based on such assumptions must be verified to ensure that these checks are included in the RFM. This verification activity shall be finalized prior to the entry into service of the rotorcraft. Level 1 analysis must be redone for any assumed flight crew check not included in the approved section of the RFM. Any change affecting the MSG-3 analysis with a direct impact on the MRBR content should be reflected as soon as possible prior to the entry into service of the aircraft. ~~System failures which are indicated to the operating crew when performing their normal duties shall be considered as evident.~~

~~NOTE: Evidence of RFM tasks which are assumed in the MSG-3 Volume 2 Level 1 analysis submitted to the MRB must be available prior to the MRB Report approval; otherwise, the MSG-3 Volume 2 Level 1 analysis submitted to the MRB must be based on the assumption that these tasks are not part of the crew's normal duties.~~

A "YES" answer indicates the functional failure is evident; proceed to Question 2 (Ref. [Heading 2-3-5.2]).

A "NO" answer indicates the functional failure is hidden; proceed to Question 3 (Ref. [Heading 2-3-5.3]).

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Amend IMPS Issue 01, Appendix 1 as follows:

3. Systems and Powerplant Analysis Procedures

3.1 General

3.1.1 Handling and Tracking of Tasks Covered by Zonal or between WGs.

3.1.2 Handling and Tracking of Task Transfers amongst Systems and Powerplant WGs

3.1.3 Handling and Tracking of the Assumptions made during MSG-3 analysis

3.1.4 ~~3.1.3~~ Specific Concerns for Rotorcraft Rotor and Drive Systems (if applicable)

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IMRBPB Position:	
Date:	24 June 2022
Position:	Agreed, closed in 2022 meeting as IP 201
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