MADe – FRACAS automation

Leverage model-based analysis to 'close the FRACAS loop'.

Key benefits

- Process driven improvement of sustainment activities
- Consistent taxonomy of failures and maintenance actions
- Analyses based on current data
- Corrective actions based on economic/Safety/Reliability considerations

Key features

- Closed-loop – integrates failure reporting with analysis
- Automation of required engineering analyses
- Traceable decisions on 'corrective action'
- Integrated with the PLM and MMS solutions
- Currency of analysis informed by field data

The Problem: An effective FRACAS process enables the optimisation of maintenance across the product lifecycle. However, a lack of connectivity and consistency between Failure Reporting and Analysis results in 'low confidence' data quality to support decision making on appropriate Corrective Actions. With sustainment as the major cost contributor for complex systems, effectively integrating these steps in the FRACAS is crucial in order to optimise platform availability, Total Cost of Ownership and future redesign activities.

The Solution: MADe "closes the loop" in the FRACAS process by linking failure reporting to failure analyses with a consistent taxonomy for failure and maintenance actions which enables automated updating of the parameters in the MADe system model. Once the MADe model is updated, reviewing and developing appropriate corrective actions based on safety, availability and cost requirements leverage the automated analysis workflows. Integrating the model-based analysis of MADe with the data structures in a Maintenance Management System (MMS) and Product Lifecycle Management (PLM) solution enables an automated, closed-loop FRACAS

Improving data quality / automation to enhance the benefits of a FRACAS

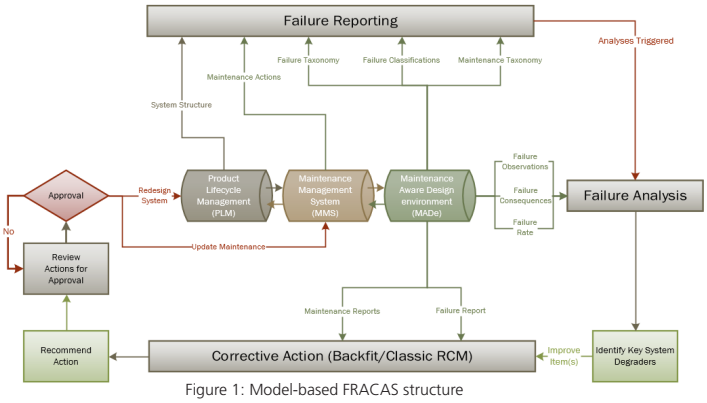


Figure 1: Model-based FRACAS structure

Which analyses are produced in MADe for the FRACAS process?

MADe is used to automate the failure analyses in a FRACAS based on the MADe system model. The model is updated with reliability / criticality parameters derived from the operational / field data captured from maintenance reports and diagnostics, this provides Traceability of the information required to support:

- Reliability Analysis – adjust the failure rate of the items in the system using field data and perform reliability calculations based on the RBD within MADe
- FMECA Analysis – update criticality of the system based on incoming operating data and compare the consequences of failure with previous estimates
- Root Cause Analysis – verify the root cause of the failure utilising MADe's failure dependency mapping, physical failure diagrams, and fault trees
- Reliability Centred Maintenance – establish / optimise the failure mitigation approach

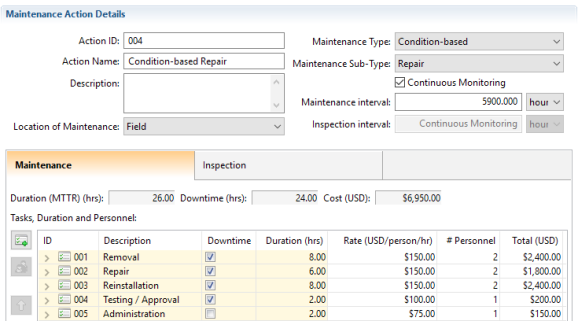


Figure 2: Standardised taxonomy for maintenance actions

How does MADe support a FRACAS?

As reliability and criticality analyses are automated within MADe, they can be used to inform the process of maintenance assessment, and assigning of appropriate corrective actions to mitigate key system degraders. MADe taxonomies of failures and maintenance are used as the basis for the failure reporting process, to enable automatic update of the analysis model (based on design configuration and operating context).

PHMTechnology
www.phmtechnology.com

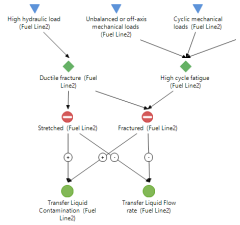
To arrange for a demonstration, please contact us at
info@phmtechnology.com

made
decisions better MADe...

Improving the FRACAS process with MADe

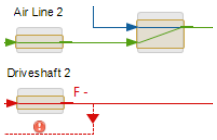
Managing reported failures

Failure Identification



Maintenance Taxonomy

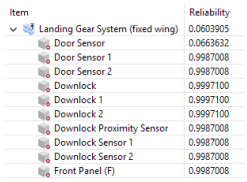
Update Model



1) Observed failures are matched with failures in the MADe model.
2) Identify associated maintenance in MMS.
3) Model is updated to reflect the incoming operational data.

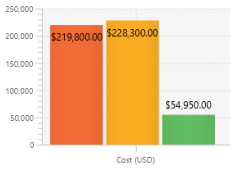
Updating the corrective action

Reliability Analysis

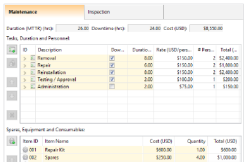


Item	Reliability
Landing Gear System (fixed wing)	0.0603905
Door Sensor	0.0663632
Door Sensor 1	0.9987008
Door Sensor 2	0.9987008
Downlock	0.9997100
Downlock 1	0.9997100
Downlock 2	0.9997100
Downlock Proximity Sensor	0.9987008
Downlock Sensor 1	0.9987008
Downlock Sensor 2	0.9987008
Front Panel (F)	0.9987008

Review Maintenance



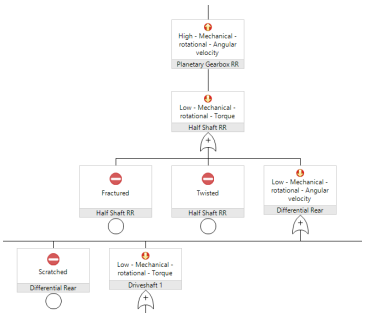
Recommend Action



1) Assess the reliability of current system and its constituent items.
2) Review current maintenance practice and assess for applicability.
3) Analyse and recommend changes to maintenance actions.

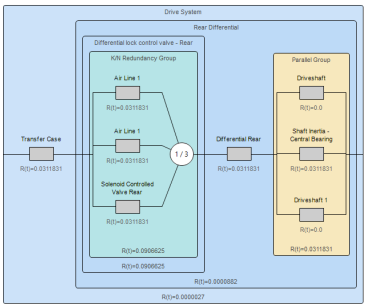
FRACAS Analyses in MADe

Root Cause Analysis



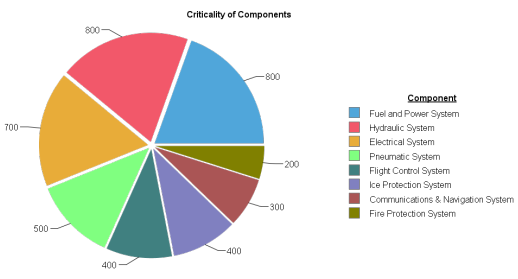
FMECA and FTA automatically generated from the MADe model

RBD



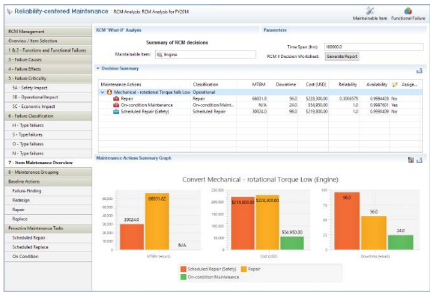
Reliability updated using the RBD system structure

Criticality



Assessment of item and failure criticality

RCM



Identify optimal corrective action

PHMTechnology
www.phmtechnology.com

To arrange for a demonstration, please contact us at info@phmtechnology.com