Module Overview –
MADe Reliability, Availability & Maintainability

Assess the reliability, availability & maintainability of a system

Key benefits

- Model-based approach
- Consistent process to determine maintenance parameters
- Configuration manage the reliability assessment process
- Identification of poor performing items
- Maintenance decision support

Key features

- Top down reliability approach
- Total lifecycle economic sustainment
- Consistent RCM and BF-RCM process
- Trade study analysis to optimize reliability and maintenance

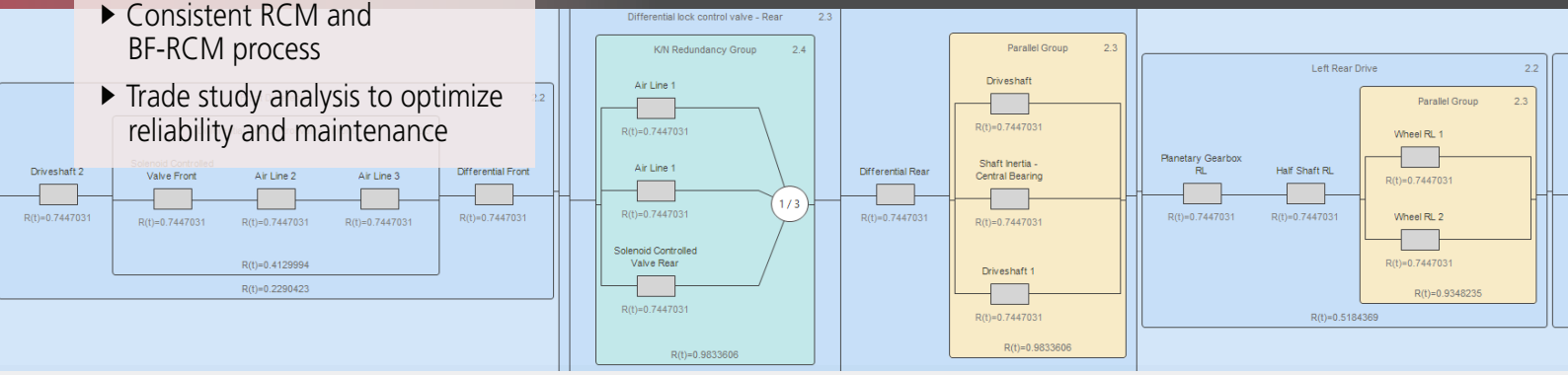
Overview

MADe Reliability, Availability & Maintainability (RAM) module is used to assess when failures in a system are expected to occur, how best to mitigate their risk and how this will impact system cost, safety and availability. To achieve this, the RAM module enables users to apply different reliability analyses to calculate the likelihood of failure at any stage of the product lifecycle. A range of standards compliant with maintenance analysis ensures that the maintenance approach is technically valid and economically justified.

How does MADe RAM work?

RAM analyses the system and proposes an optimized maintenance schedule based on operating parameters. Users input the operational parameters and metrics associated with each component to perform analysis to determine its sustainment cost and maintenance effectiveness.

Reliability-Centered Maintenance (RCM) utilizes the model to assess each components' optimal maintenance strategy. When an existing maintenance action is conducted, Back-Fit RCM (BF-RCM) is utilized to assess the effectiveness of the maintenance action to propose change where necessary.maintenance action to propose change where necessary.



Reliability Editor

The reliability editor allows Weibull or exponential distribution types to determine the probability of failure. The reliability editor allows Weibull or Exponential distribution types to determine the probability of failure. Exponential distribution requires the mean time to failure of the component or the part failure rate and the standard deviation of failure. The Weibull distribution requires the slope, character life and standard deviation (characteristic life) parameters.

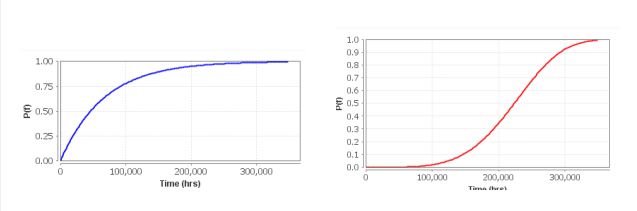


Figure 1: Reliability Editor

Reliability Centered Maintenance / Back-fit RCM

The RCM process follows a series of logic questions to guide the analysis towards the optimal maintenance strategy. The series of decision logic ensures a consistent process is followed for each functional failure. The B-RCM process follows an assessment process to classify and recommend change if necessary based on how each question was answered.

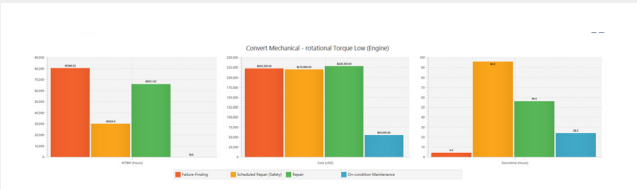


Figure 2: Item maintenance overview

Maintenance Cost Estimates

Maintenance cost estimate allows sustainment costs and maintenance types to be assigned to compute economic impact over the life of the system. The analysis allows 'what-if' scenarios to be applied to compare economic differences when alternative maintenance is selected.

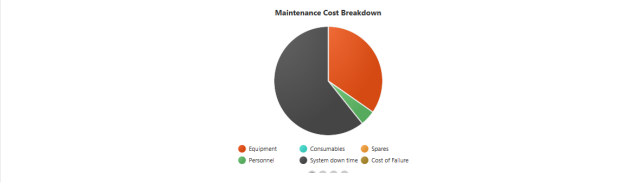


Figure 3: MCE Cost Breakdown

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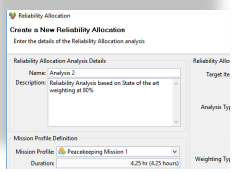
MADe Module: Reliability, Availability & Maintainability

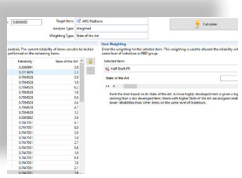
Functionality

Reliability Allocation

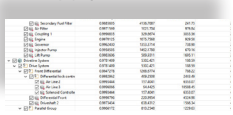
Assign reliability



Allocate weighting

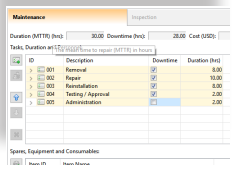


Apply to Model

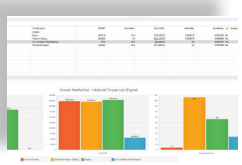


Reliability-Centred Maintenance

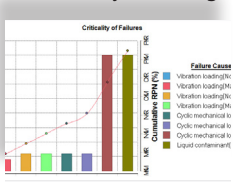
Cost parameters



Item Maintenance overview

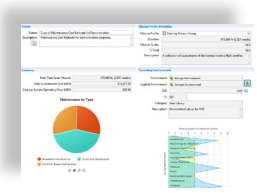


Criticality Charting

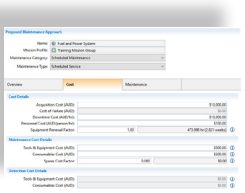


Maintenance Cost Estimates

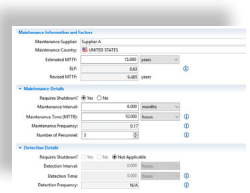
Overview



Cost Parameters

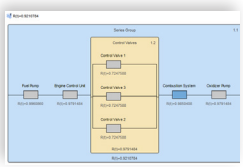


Maintenance Details

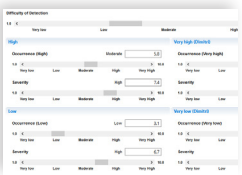


Reliability Block Diagram

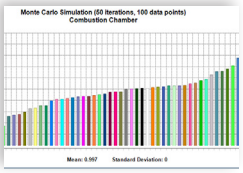
RBD



Reliability Editor



Monte Carlo Simulation



Outputs

- **Fault Tree Analysis (Hardware)**
- **Reliability Allocation**
- **Reliability- Centered Maintenance** (RCM II / MIL / MSG)
- **Back-Fit RCM** (NAVSEA workflow)
- **Reliability Block Diagram**
- **Maintenance Cost Estimates**

Features

- **Reliability Editor**
- **Maintenance Task Analysis**
- **Monte Carlo Simulation**
- **Weibull Distributions**
- **Exponential Distributions**

Other Modules

- MADe Modelling
- MADe SRA – Safety and Risk Assessment
- MADe PHM – Prognostics and Health Monitoring

Licensed Plugin

- Teamcenter Import

Minimum System Requirements	
Processor	32-bit, AMD Athlon II X2 or Intel Core i3 2.8 GHz
RAM	4GB
Hard disk	1GB for installation, 2GB additional free space for saving projects and related files
OS	Windows XP Service Pack 2
Resolution	1366x768 High Definition screen resolution
Java	Java 8 Standard Edition (bundled)

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