MADe Reliability, Availability and Maintainability

Providing a model-based approach to optimizing maintenance

Benefits

- Enable model-based approach to optimizing maintenance

- Provide a consistent process to determine maintenance parameters

- Configure and manage the reliability assessment process

- Identify poor performing parts

- Support maintenance decisions

Summary

MADe Reliability, Availability and Maintainability (RAM) software is used to assess when failures in a system are expected to occur, how best to mitigate the risk and how this will impact system cost, safety and availability. To achieve this, the RAM module enables users to apply reliability analyses to calculate the likelihood of failure at any stage of the product lifecycle.

There are a range of standards that comply with maintenance analysis, making sure the maintenance approach is technically valid and economically justified.

About MADe

Siemens Digital Industries Software offers MADe (Maintenance Aware Design environment) from PHM Technology for model-based reliability, availability, maintainability and safety (RAMS) analysis. The MADe platform is designed to use a digital twin to identify and mitigate technical risk, optimize the design process, increase availability and promote continuous engineering innovation for complex engineering systems.

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How does MADe RAM work?

RAM is used to analyze systems and propose 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.

The reliability-centered maintenance (RCM) approach uses the model to assess each components' optimal maintenance strategy. When an existing maintenance action is conducted, back-fit RCM (B-RCM) is used to assess the effectiveness of the maintenance action to propose change where and when necessary.
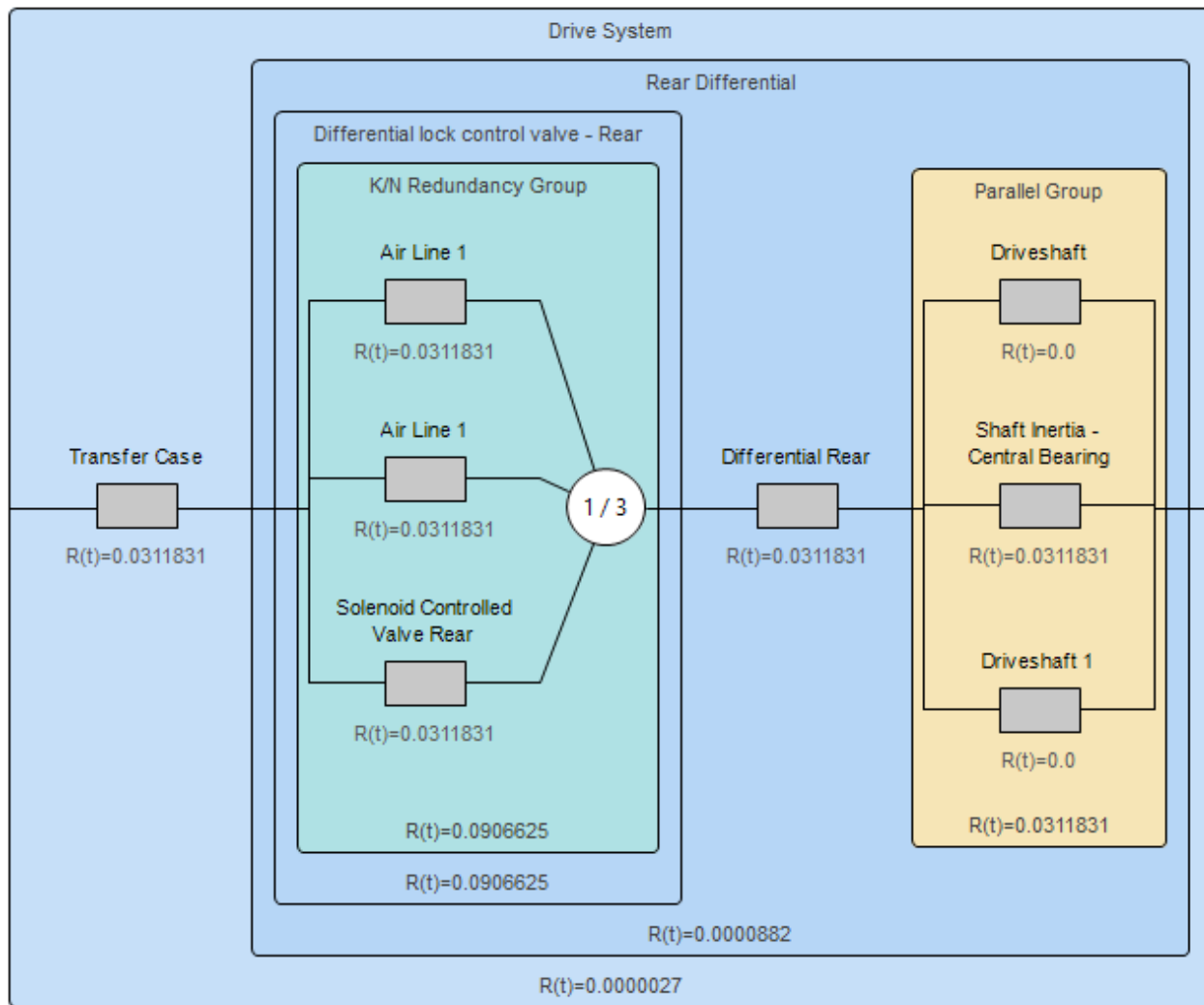
Reliability editor

The reliability editor allows Weibull or exponential distribution types to determine the probability of failure. The exponential distribution is calculated from 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, characteristic life and standard deviation parameters.
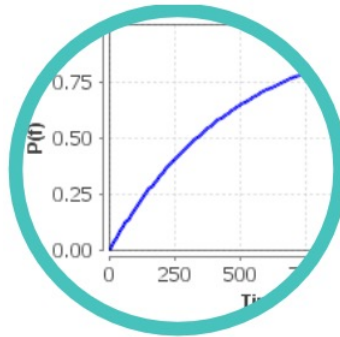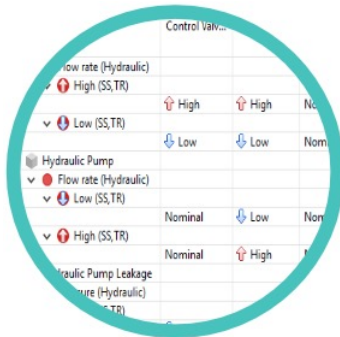

Reliability-centered maintenance/B-RCM

The RCM process follows a series of logic questions to guide the analysis toward the optimal maintenance strategy. The decision logic series follows a consistent process 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.

Maintenance cost estimates

The 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.

Outputs

- Fault tree analysis (hardware)
- Reliability allocation
- Reliability-centered maintenance (RCM II / MIL / MSG)
- Backfit RCM following Naval Sea Systems Command (NAVSEA) workflow
- Reliability block diagram
- Maintenance cost estimates

Features

- Reliability editor
- Maintenance task analysis
- Monte Carlo simulation
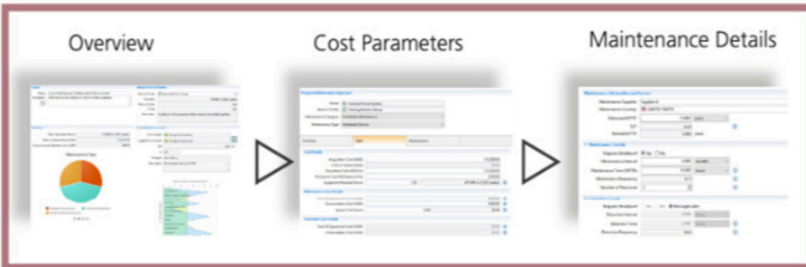- Weibull distributions
- Exponential distributions

Reliability Allocation

Assign reliability · Allocate weighting · Apply to Model

Reliability-Centered Maintenance

Cost parameters · Item Maintenance overview · Criticality Charting

Maintenance Cost Estimate

Overview · Cost Parameters · Maintenance Details

Reliability Block Diagram

RBD · Reliability Editor · Monte Carlo Simulation