Holistic Asset MANAGEMENT

CASE STUDY

Asset Availability Simulation Modelling Used to Drive Improved Reliability and Performance

HolisticAM partnered with a Melbourne based public transport service provider to develop and deliver fleet Availability Simulation Modelling by using ReliaSoft Weibull++ & BlockSim. The objective was to develop with a baseline availability simulation with a high level of accuracy against actual recorded performance measures. With this level of confidence, future performance predictions were made that identified areas of opportunity for improvements to be made with component reliability and overall fleet availabilities.

In the wake of travel restrictions (Covid-19), our Reliability Specialist seamlessly and successfully engaged with key stakeholders via video conferencing tools, assisting the client in predicting, preventing and managing high levels of lifetime engineering uncertainty and risks of failures during the operation.

Rail Sector

The Challenge

The client required a Fleet Simulation Model that enables future fleet availability results to identify areas of improvement opportunity to drive increased reliability and performance

Support was provided to:

- Enrich and cleanse the fleet work order data to align to a standard set of failure and cause codes.
- Develop availability simulation foundation models that provided a high level of accuracy confidence.
- Apply Repairable System Data Analysis process to measure the failure rates of system components.
- Identify component restoration factors to improve the accuracy of the RDA analysis.
- Predict future performance results of the Fleet Assets through Availability simulation.

The Solution

HolisticAM offered two primary Reliability Engineering services in this project to help the client identify the Availability improvement opportunities: 1) Data Cleansing & Analysis; 2) Availability Simulation Modelling.

Once all fleet work order data was enriched, categorised and validated the Reliability Specialist used ReliaSoft Reliability Software to develop simulation models for foundation fleet availability and future period simulations.

The asset Availability Simulation Modelling services consisted of the following tasks:

- Using ReliaSoft Weibull++ tool to perform Parametric RDA Analysis and identify failure patterns.
- Developing the historical failure data model which reflects the historical performance of light rail assets.
- Utilising ReliaSoft BlockSim tool to perform RBD modelling and predict forecast modelling results.
- Developing comparative analysis reporting of the ReliaSoft models.

More details about Reliability Engineering:
https://www.holisticam.com.au/services/reliability-engineering/

The Results

In the wake of travel restrictions (Covid-19), HolisticAM was able to seamlessly and successfully engage with key stakeholders by using Microsoft Teams video conferencing and Teams Channels.

Fleet availability simulation foundation models were created based on the actual fleet failure data. To achieve a high level of accuracy of the model results, a thorough understanding of the customers component repairable process and the quality of overhaul was required. The ReliaSoft modelling developed utilised Repairable Analysis Data over Weibull Analysis to ensure a realistic and high level of confidence of the calculated in the overall availability results. The end result of the simulation models achieved a level of accuracy within 2% of historical performance results.

With the high confidence levels of the accuracy of the modelling, each fleet availability simulations were run for a future 5-year period. These results predicted fleet availability by month for between 2021 and 2025, indicated sub systems that were impacting overall performance and highlighted major downtime periods as a result of component reliability.

Key deliverables included:

- Work Order Data Cleansing and Enrichment
- Asset Reliability Block Diagrams
- Component Level Weibull Analysis Models (Eta, Beta values)
- Availability Simulation Models
- Reports on Future Performance and Impacts
- Reliasoft Modelling Repositories

ADDED VALUE

In this project, HolisticAM used ReliaSoft Weibull++ and BlockSim software to perform the Parametric RDA Analysis & RBD Modelling. These models will be used as fundamental models for future ongoing analysis and improvement. Since the client recognised the functionality of ReliaSoft software, they also embedded the software tools into their reliability program.