Gaining a Competitive Edge with RAMS Analysis

Zonegreen were requested by their client to deliver a Depot Personnel Protection System (SMART DPPS™) for a major rail depot. To enable them to achieve their objectives and gain a competitive edge on their product, Wilde carried out a Gap Analysis, as a scoping exercise, followed by a RAMS Analysis study.

Company

Zonegreen is a global provider of complete rail vehicle depot protection systems. Through the implementation of cutting-edge intelligent technologies, such as electronic safety and control systems, plus software and cloud computing solutions, Zonegreen work to protect depot personnel from dangerous environments in a safe and efficient manner.

Challenge

Zonegreen were working on the delivery of a UK-based Depot Personnel Protection System (SMART DPPS™) for their client. This required a Reliability, Availability, Maintainability and Safety (RAMS) Analysis to be undertaken.

Zonegreen already had a significant amount of potentially useful data for the project but its relevance to the new requirement and its location was uncertain. In addition, there was an on-going desire to be able to promote Zonegreen's DPPS product as a SIL 2-classed product which would make it stand out from their competitors.

Zonegreen approached Wilde Analysis for RAMS Analysis support, concentrating on the current project's requirements but ensuring that any work done would also benefit the on-going SIL 2 classification requirement.

> "We relied on **Wilde's expertise** to clearly define the objectives and scope of work for this RAMS GAP Analysis project and they did a very good job to help us.

Control panel (Courtesy: Zonegreen)

Solution

Gap Analysis

Wilde Analysis began by undertaking a Gap analysis. This was a three-day exercise, the main objective being to develop a comprehensive Scope of Work for the RAMS Analysis that was in-line with the identified RAMS budget whilst meeting the RAMS requirements of Zonegreen's contract.

A further key objective was to identify the main RAMS Deliverables and additional effort required to demonstrate that the generic DPPS achieved the SIL2 standard. Also important was the need to provide the necessary RAMS evidence for future projects with minimal additional RAMS work for the specific project needs.

To achieve the above, Wilde Analysis undertook a thorough document inspection and review to determine the current status and completeness of each document and its suitability as evidence to support a RAMS case to SIL2 standard.

A deeper review of certain relevant documents, such as Failure Modes and Effects Analysis (FMEA), fault trees, Safety Plans, etc, was also carried out to determine whether they were appropriate and adequate to provide the necessary evidence.

A RAMS Analysis Scope of Work, broken down into Activities, Labour required to deliver the Activities, and Timescales was delivered.

Derailers (Courtesy: Zonegreen)

RAMS Analyis

Having completed a RAMS Gap Analysis of their Depot Personnel Protection System, the main objective of this further analysis was to develop and generate the appropriate RAMS evidence to support current and future products and to develop a Safety Case to SIL2 requirements.

The RAMS scope of work was proposed in two parts:

1. Reliability and Availability analysis tasks to support current applications and a future SIL2 Safety Case:

- System Availability Analysis
  Reliability and Availability Analysis of DPPS using Reliability Prediction and Reliability Block Diagram (RBD) techniques.
  Deliverable: DPPS Availability Report

- System Failure Modes and Effects Analysis (FMEA)
  Qualitative FMEA of the generic single-lane DPPS to identify safety (single-point) and reliability/availability critical failures. The FMEA was carried out from Functional Block/Equipment level.
  Deliverable: DPPS FMEA Report

2. Safety analysis tasks and generation of a SIL2 Safety Case:

- System Safety Assessment/QRA
  Assessment of the level of Safety achieved by the DPPS design and Qualitative Risk Assessment (QRA) to quantify the residual risk associated with the DPPS and its operation and support in service. Task includes:
  - System Interface Hazard Analysis (IHA)
  - System QRA (using FTA) Hazard Review of Operating and Maintenance Procedures
  - Safety V&V requirements.

  Deliverables: DPPS Safety Assessment Report and DPPS Hazard Log

- Generic System Safety Case
  Prepare and issue DPPS Generic Application Safety Case (GASC) for a generic single-lane system, including any depot-level common equipment (e.g. central monitor/control function), to SIL2 standard.
  Deliverable: DPPS Generic Safety Case Report

Business Benefits

Zonegreen relied on Wilde's expertise to help them define the objectives and scope of the RAMS Gap Analysis. They were required to provide this information to their client as part of a contract, and Wilde's helped them to fulfil this successfully.

This study provides the necessary RAMS evidence for a Generic System Safety Case. Future projects will require minimal additional RAMS work to produce a site Specific System Safety Case.