

# Understanding Plant Better and Improving Fitness for Purpose



## What is the situation?

As the title of this challenge implies the two interlinked issues that need resolving are:

1.

### Understanding plant better

Plant Safety hazards within each of the main machine type categories are mostly generic. New hazards tend to be driven by changes in task and operator competence rather than the railway environment (which is known, with drastic changes rare). The industry would benefit from the publication of these generic hazards and, where known, task and operator competence dependent ones. This would feed into current industry migration towards Common Safety Methods Risk Assessment.

STE, M&EE, Plant and T&RS have the accountability for making sure a number of services and activities are undertaken to ensure plant safety where we have an engineering responsibility, a big picture holistic model is required to demonstrate effective management of this responsibility.

The currently used tools are:

- Business Critical Rules Bow Ties.
- Enterprise Risk Matrix.

2.

### Improving fitness for purpose

The continuous adaptation of civil-based machinery for rail use always results in reduced production capability per machine and an increase in operational controls, which in-turn, drives an increase in the number of supervisor and controller personnel.

Service and Performance are to be assured in order to meet business objectives. Current isolate tool is the Road Rail Vehicle Performance System (RRVPS) managed by Infrastructure Projects.

Determining our Rail Infrastructure business needs by matching plant capability to maintenance, renewals and upgrade project tasks needs to be brought into the 21st Century.

This would in turn drive:

- Choosing the best machine for the job (more holistic planning mentality).
- Better planning that's easier and, as a result, cheaper.
- Earlier booking (cheaper because less late booking).
- Understanding plant shortages (reduce our internal functions being played against each other, further driving up costs).



## Priority problems

### Specific priority problems

- Planning (B).
- Safety Risk Model (C).
- Plant Strategy (F).
- Functional Definition (E).
- Supply Chain (D).
- Design for Reliability (A).

### Related goals

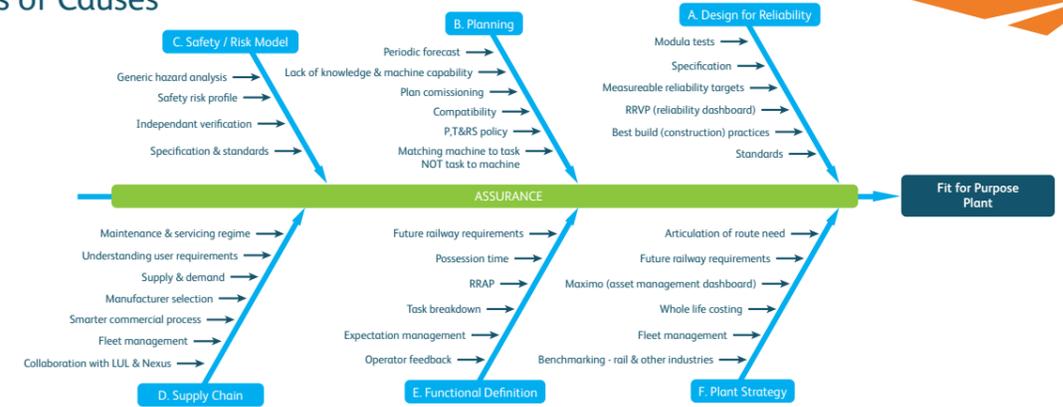
- Improve planning and plant selection.
- To improve the visibility of compliance to legislation.
- Route-driven demand for plant.
- Matching current and future business functional needs to plant capability.
- Developing mature supply chain that is aligned to NR business safety and performance needs.
- Upstream management of performance.

### Benefits

- Avoid Plant incidents due to plant selection mismatch.
- Avoid Plant related Safety Improvement Notices.
- Route assessment of current plant usage and management capability and alignment to performance targets leading to the articulation of current and future plant need.
- Database linking business functional needs to plant capability.
- Single-minded leadership of supply chain.
- Feedback loop and continuous improvement of plant performance within the design.



## Analysis of Causes



## Scope

A Plant Safety Risk and Reliability Model (PSR&RM) would help lead and drive the railway industry plant community to achieve continuous improvement in the health and safety and performance. To facilitate this, an understanding of the overall risk level, risk profile, and the demand of railway plant is essential. The functions of the PSRM would be:

- Risk Profile Tool.
- Risk Management Tool.
- Reliability and Performance Tool.
- Functional Requirements Tool.
- Plant Strategy Tool.

The PSR&RM could be a quantitative or qualitative representation of potential safety and reliability incidents resulting from operation and maintenance. Comprising of individual models each representing the plant families, underpinning upstream and downstream assurance activities.

Where possible PSR&RM would be populated using the rail industry's related incident data. The PSRM would also include predictions of the risk contribution from low frequency and potentially high-consequence safety and reliability incidents. Where data is scarce, the model will be populated by expert judgement from technical specialists and plant managers.



## Model requirements

- Sophisticated modular model and management system, capable of enabling a record of business as usual activities. For example the effect of a standards update or the impacts of increased assurance activities on control measures.
- Must be Common Safety Methods-Risk Assessments and Evaluation (CSM-RA) compatible.
- Must be compatible with existing NR functional requirement capture systems such as DOORs.
- Cyber security.
- Smart search and category algorithm, enabling easy rearrangement, navigation and grouping of plant types, safety measures and reliability parameters.



## Expected impact & benefits

- **PSR&RM Risk Profile Tool**  
(A risk profile tool would contain risk information and risk profiles derived from the PSRM. It may include tables of frequency and consequence data from the PSRM so users can improve their risk understanding and management).
- **PSR&RM Risk Management Tool**  
(A risk management tool for industry stakeholders, quantifying the significant causes and consequences associated with each identified hazardous event. This would enable users to identify key areas of risk associated with their operations and to prioritise their investment in safety, using a risk-based approach).
- **PSR&RM Reliability and Performance Tool**  
(A reliability and performance tool to define reliability targets and link reliability requirements to performance).
- **PSR&RM Functional Requirements Tool**  
(A Functional Requirements tool holding all business activities requiring Plant solution. A database for linking business requirements to plant capability).
- **PSR&RM Plant Strategy Tool**  
(Route-driven and centrally authorised company strategy spelling out business plant needs).