Unknown Asset Usage & Condition

What is the situation?

For successful asset management, access to accurate asset usage and condition information is critical. Unknown asset usage and condition introduces risk of inefficient asset usage, unpredicted breakdowns and ineffective planning of maintenance, overhauls and introduction of new assets.

Detailed usage of the asset is difficult to quantify as it is dependent on several factors, such as operating environment and intensity of work delivered. Most of the Network Rail engineering train fleets do not have technological capability to feedback how onerous or simple a shift was. The current level of usage monitoring for some fleets is recording mileage and worked distance. But if achieved in detail can provide a record of key performance indicator achievements from which long-term plans and contractual frameworks can be developed. It would also provide an indication of the assets condition.

Condition of the asset is an important part of the full asset life cycle and provides a tool for proactive action in saving costs and delivering high performance. This is currently achieved through manual inspections within the maintenance plans of the asset. However, there is opportunity to improve the efficiency of condition monitoring through technology developments and process improvements.

Operating an asset without knowing a certain level of usage and condition increases the possibility of safety incidents occurring. This can often occur when trying to meet operational targets where the asset can be utilised close to its limitation without calculated information, risking the chance of in-service breakdown. Hence, to improve the assets safety profile in becomes critical to adopt progressive steps in detailing the knowledge of usage and condition.
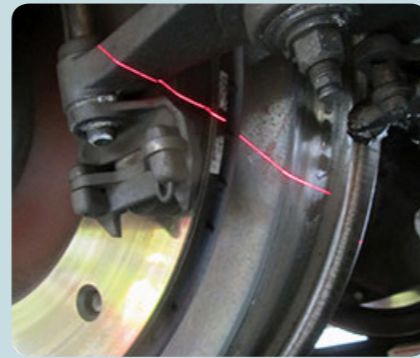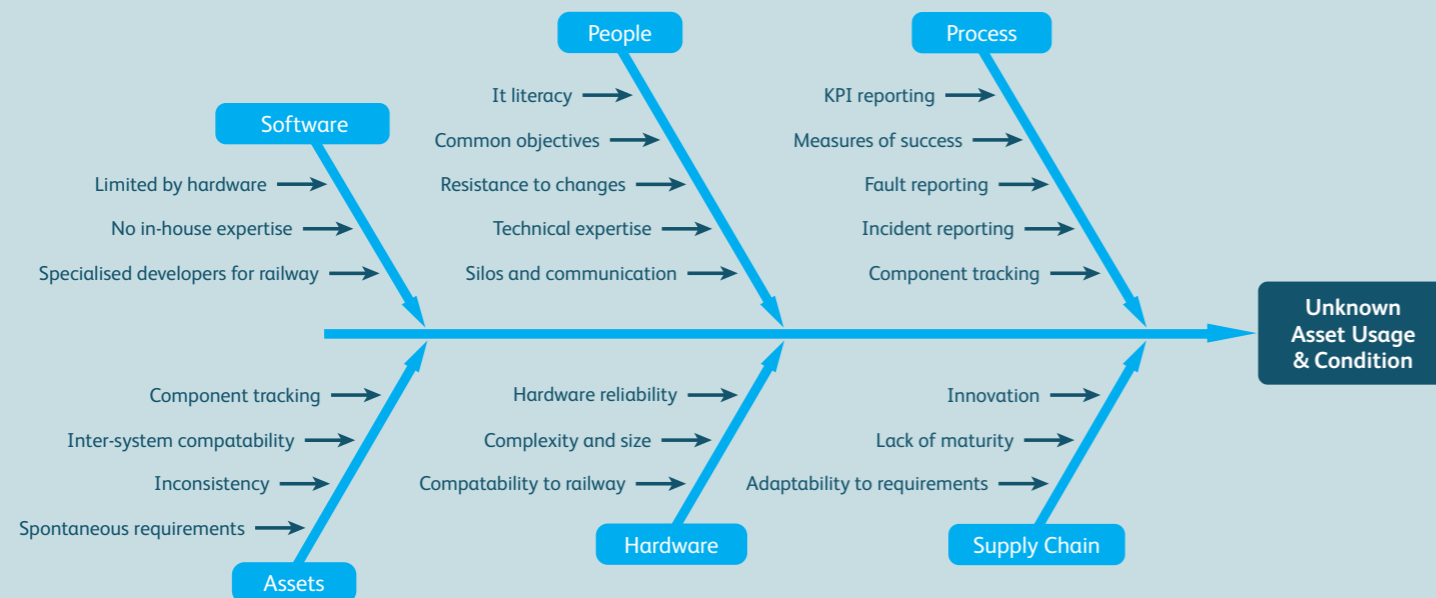
fig1.

fig2.

Analysis of causes

Software
- Limited by hardware
- No in-house expertise
- Specialised developers for railway

People
- It literacy
- Common objectives
- Resistance to changes
- Technical expertise
- Silos and communication

Process
- KPI reporting
- Measures of success
- Fault reporting
- Incident reporting
- Component tracking

Assets
- Component tracking
- Inter-system compatability
- Inconsistency
- Spontaneous requirements

Hardware
- Hardware reliability
- Complexity and size
- Compatability to railway

Supply Chain
- Innovation
- Lack of maturity
- Adaptability to requirements

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Scope

The overall scope of the challenge is to investigate the potential for new technologies and techniques to monitor asset usage and condition.

Additionally, adopt and implement effective asset strategies to enable monitoring of usage and condition, such as deterioration curves to quantify the condition, identify pain areas and action to gain productivity of the asset.

Determine the relationship between condition of the asset to the usage requirements to make informed decisions of utilising the assets to full potential but within safety limits.

Provide adequate training and tools to people working the assets to enable informed decision making.

Priority problems

Specific priority problems	Related goal	Benefit
• Knowing the asset usage and condition to determine the necessary and cost-effective interventions to achieve the predetermined and desired service level and lifetime.	• Improving and utilising the use of current technology and techniques for determining and managing asset usage and condition.	• Return on investment of asset through product life cycle.
• Unknown asset usage and condition - understanding from a cultural point of view why it is important.	• Bring about accepted enhancements, which will ensure productive future use of technology, techniques or changes implemented.	• A technology enabled future allowing for smarter asset management.
• Diversity of the fleets (from age to deliverables) make single solution development difficult.	• Bring about uniformity of systems to implement joint progress across fleet. For example, compatibility of data sets.	• Sustainable use of resource and funds resulting in cost savings.

Specific research needs

- Determination of current techniques to record and predict asset usage.
- Single system for multipurpose condition monitoring.
- Productive use of a single data repository containing; asset specification, usage, condition, maintenance, repairs and failures.
- Understanding current position of asset usage and condition – How much is really known? Can improvements be made and why would they be necessary? When is data too much or not enough?
- Determination of comprise between what can be monitored, what needs to be known and feasibility of what is to be monitored.
- Uniform platform and benchmarks for diverse fleet.
- Adaptability of strategies.

Expected impact & benefits

- Be able to make informed decisions based on analysed and calculated trends.
- More efficient utilization of the assets.
- Better long- and short-term planning of asset investment.
- Improved safety of the asset.