

Safe and Effective Lineside Inspections

What is the situation?

The management of the lineside principally deals with:

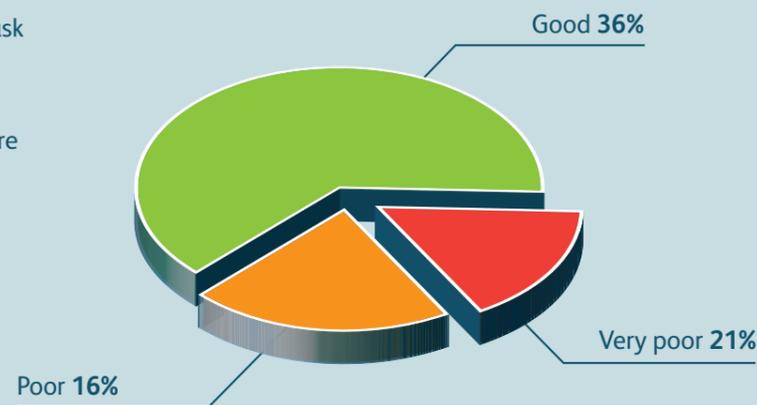
- Management of vegetation along the railway and within the boundary to reduce or avoid risk to the railway.
- Assuring a boundary is provided to satisfy a legal requirement and avoid trespass or incursion.

The current inspection regime for lineside assets is ineffective and inherently elements that are potentially unsafe. Workers are expected to negotiate slopes, barriers, unstable ground, hidden hazards and poor lighting to carry out visual and tactile elements. The topography of the lineside can even prevent access altogether for inspection. Technology could supplement or replace the need for accessing such areas.

The inspection regime does not take advantage of any technology to avoid or reduce reliance on human intervention.

Human factors also play a part. “Familiarity breeds contempt” and the inspectors can accept poor quality data and currently do not challenge the need to improve (the graph below illustrates a scenario, while of considerable concern, is not felt to be accurate). The manual, repetitive and basic nature of the task can lead to the inspection being undervalued.

The lack of full condition assessment, mean interventions are not always made prior to asset failure.



Priority problems

Specific priority problems

- Recording a full assessment of the asset condition and risk during inspection and survey.
- Placing the inspector in a potentially unsafe environment by having to carry out visual and tactile inspections in hazardous environments.

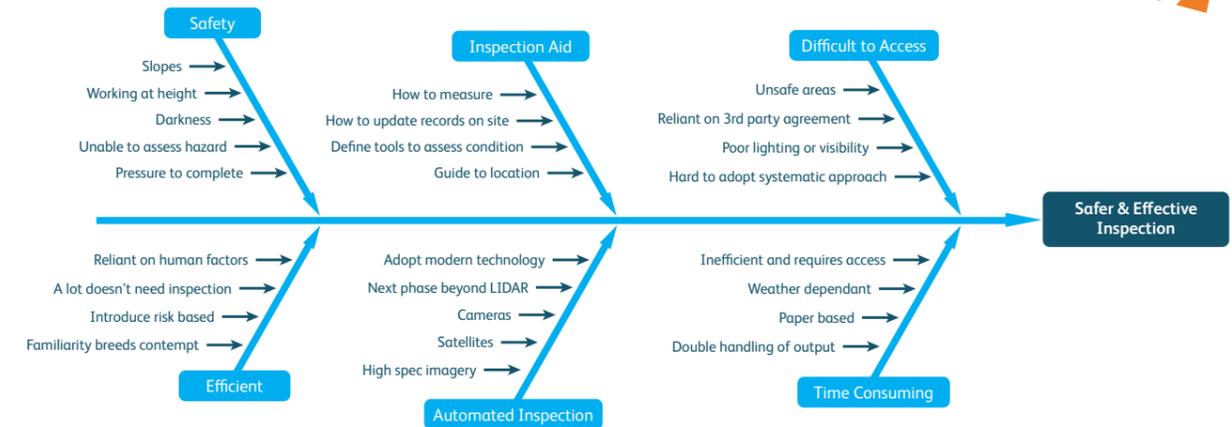
Related goals

- Provide a better understanding of the preventative measures required at the appropriate frequency.
- Use technology to remove exposure and in turn satisfy the safety vision.

Benefits

- Significant reduction in asset failure and reactive maintenance.
- Reduction in financial penalty to the business from performance penalties.
- Reduction in safety risk to the business by providing an enhanced more reliable asset.
- Improved efficiency, better engagement, and improved staff safety.

Analysis of causes



Scope

A core requirement of this challenge is to remove the risk from those carrying out the inspection. Future inspection methods should make use of remote techniques. We need to learn from the inspection regimes used on the same or similar assets. Enabling a thorough assessment that satisfactorily manages safety, financial, performance, environmental and reputational risk.

The extent of a visible asset is limited on a number of inspections as we have to prioritise safety where trying to access the asset and where there is limited time available, productivity. Being more intrusive is more effective and a necessity where tactile assessments are required for the boundary measure. The most challenging element will be if there is an effective alternative to the tactile assessment of boundary measures.

The means of recording output from inspections is inefficient and prone to error as it mainly relies on manual recording and transfers to our asset management system. There are electronic means available to transfer the output directly but these are not widely adopted. The perception is that they are more arduous and result in a loss of productivity. They need to be designed for entry by individuals at the “lower end” of IT literacy and need the scrutiny of experts to make them more user-friendly.

We have started to use Light Detection and Ranging (LiDAR) survey methods to assess the vegetation asset and its risk to the operational railway. It is believed that the potential and limitations of this relatively new method as an aide or replacement for inspection are unexplored. We require expertise to highlight the benefits of the current or new uses and recognise any weaknesses and limitations.

We are particularly in need of expertise to identify a better business change to maximise the use of the output at a level relevant to the business need. We should not limit ourselves to aeroplane, helicopter or drone as a means of capture and any method, with a suitably advanced level of technical readiness, should be considered as an alternative to help meet our challenge. This could include vehicle or satellite based capture and consider direct imagery or analysis with associated reconstruction. Within the business, we have a centrally managed Geographical Information System (GIS) which is branded as ‘Geo-RINM’. The inclusion of items for lineside is currently limited to LiDAR output but the potential needs to be explored so that it aids inspection or it provides and immediate output.

To address these challenges it is expected that R&D actions will need to address the following aspects:

- What examples of alternative and evaluated inspection methods exist within different companies or industries that meet our challenge?
- What experience is there to evaluate different data sources and capture so that inspection regime is enhanced and more effective?
- What experience is there of using ‘data, information, knowledge, wisdom’ principles to enhance inspection methods in line with our lineside challenge?