

HS2 Possessions and Isolations: Safer, Faster and More Efficient

Stuart Smith & Simon Morley

High Speed Two Ltd (HS2)

SUMMARY

For HS2 to meet its Strategic Goals of setting new Health and Safety standards within a Digitally-Enabled infrastructure, we need to be able to take possessions and isolations in a safer, more efficient and faster way than current UK rail methods. This paper describes work done to support the vision of the HS2 Infrastructure Management (IM) Team through the analysis of existing incident data, in order to highlight where current possession and isolation strategies fail, and where HS2 can capitalise on opportunities through system and process design to deliver improvements.

KEYWORDS

Rail, HS2, Safety

Introduction

High Speed 2 Ltd. (HS2) will only have a 5 hour overnight window with no trains running where routine maintenance work can be undertaken on the track environment. It is imperative that as much of this time as possible is used for work, rather than setting up and taking protection of work areas (Possessions) and / or isolating the Overhead Catenary System (OCS). This means that typical ways of taking and giving up possessions and isolations are not viable, and so HS2 are looking to develop ways of working that are faster and more efficient. Obviously, the safety of workers is key across HS2; HS2 are working to develop possessions and isolations management systems that are safe by design, designing out hazards where possible and with reduced reliance on procedural controls and PPE.

HS2 Infrastructure Maintenance (IM) are currently undertaking benchmarking across European IM organisations. Benchmarking was also done by contracting with RSSB, who produced a report looking at the HS2 vision, strategy, concepts, plans and requirements, and benchmarked against existing GB mainline railway, High Speed 1 (HS1), Crossrail, Cambrian line European Rail Traffic Management System (ERTMS) pilot scheme and Digital Railway proposals for future ERTMS deployment on the East Coast Main Line. RSSB were able to analyse the approach of HS2 in the context of operational experience, and to provide conclusions and to identify risks for the HS2 high-level vision.

It was considered by HS2 IM that a weak point in the benchmarking exercise was in the use of operational incident data to identify common failures in existing UK rail possession and maintenance work, which could be used to support the HS2 high-level vision.

This paper describes incident data review work done by HS2 Ergonomics Team to support HS2 IM Team and their aspirations for safer, faster and more efficient possessions and isolations.

Incident data

Data were requested from the Rail Safety and Standards Board (RSSB) Safety Management Information System (SMIS) for incidents tagged with the keywords 'possession' and / or 'isolation'. SMIS data were provided to HS2 covering November 2016 to March 2021, with full-year data existing for 2017-2020. In total over this time period there were 5020 separate incidents provided for analysis.

SMIS data provide plenty of objective data in a standardised format. The data fields of interest for our analysis were around incident descriptions: there are free-form text, with no set structure, wording or field length. In order to make sense of these data a significant degree of re-coding was required. Searches were made on the incident 'description' field, using keywords: keywords were based on the report commissioned by HS2 and produced by RSSB, and followed the relevant Sections of the report, e.g. Operational experience, Awareness of location, isolations, train movements etc.

Key findings of the data analysis

Incident incidences for possessions and isolations were relatively stable, with around 1200 on average per year. Unsurprisingly most incidents were during 23:00 and 06:00, when most work takes place in possessions / isolations, with Sunday seeing more incidents than other days.

34% (1692) of the 5020 incidents had associated injuries, the vast majority of which were minor (such as cuts and sprains). There were 115 major injuries (e.g. fractures, burns, electric shock), and unfortunately one fatality. 5.6% (279) of the 5020 incidents were a Network Rail (NR) Live Saving Rule (LSR) breach, and almost 10% were environmental incidents (such as oil spills).

9.7% (489) of the 5020 incidents were failures in placing or removing protection (i.e. detonators or marker boards). The majority involved protection being placed in the wrong place or facing the wrong way. It was a similar story for placing earthing straps or earths to OCS.

5.3% (265) of the 5020 incidents were considered to be where a defined Safe System of Work (SSoW) was not followed. The top two categories were both LSR breaches: working at height and incorrect paperwork for the job.

21% (1065) of the 5020 incidents involved the movement of vehicles around possessions and worksites (e.g. Road-Rail vehicles; On-Track machines). The majority of these were vehicles striking infrastructure, followed by derailments and point run-throughs.

48% (2430) of the 5020 incidents were not re-classified as they did not cover issues that we were concerned with for this work. Examples include signaller errors, fire, trespass, and vandalism / theft.

Conclusions

The data outputs coupled with the RSSB report for HS2 provide excellent evidence for the approach taken by the HS2 IM Team, that of a focus on health and safety by design; removal of the need to be on or near the track (where possible); and reduced focus on procedural controls and training as risk mitigations.

HS2's high-level vision, to use technology and remote processes as much as possible in implementing possessions and isolations, is the right approach to take. These principles will form a sound basis for developing the technology and procedures for delivering possessions and isolations on HS2, and will support HS2 in making sure that fundamental operating principles are maintained.