

Impact of Hydrogen Standards on the UK Transportation System (iHYLAST)

Executive Summary

Hydrogen fuel has been identified by GB railways as a candidate technology to decarbonise the railway. Efforts in the UK are being mirrored globally, and there are current initiatives to progress the homologation of fuel cell, hydrogen, and line side equipment into the rail sector. These efforts are proceeding in parallel with engineering and manufacturing developments; despite not having global standards and regulations yet. There is a need to develop a framework and understanding to harmonise standards to enable the rapid, safe, and cost-effective demonstration of hydrogen trains and their refuelling infrastructure.

This project was commissioned to map relevant hydrogen standards and regulations and identify the key barriers for the safe demonstration of hydrogen trains in the UK. TRL worked with the University of Birmingham and Durham University to address the following research question:

1. What are the current barriers/challenges faced by the UK market relating to the safe trialling of hydrogen fuel cell trains?

Two approaches were used to address this research question. Firstly, the university of Birmingham carried out a literature review and review of evidence of hydrogen standards and regulations in rail.

Secondly TRL led on a stakeholder engagement workshop to validate some of the initial results of the University of Birmingham's research and investigating potential barriers for demonstration. Policy makers and relevant regulatory bodies could use the findings of this report to address safety issues and potential regulatory needs that will enable the demonstration of hydrogen trains in the UK.

Key findings from the workshop

The responses were analysed using thematic content analysis to produce insights that explain what the gaps in standards and barriers to deployment of hydrogen as a fuel source for trains.

The main themes identified in the workshop related to:

- The current gaps in the safety standards,
- The key safety showstoppers for the demonstration of hydrogen trains,
- The overlaps with other sectors deploying hydrogen fuelled vehicles,
- What the future of hydrogen in rail could look like, and
- People's attitudes regarding the location of the hydrogen fuel cell tanks within the rolling stock.

Conclusions

While there are still many unknowns surrounding the safe deployment of hydrogen trains in the UK due to the lack of global standards and regulations, there is an enthusiasm and desire from relevant stakeholders to pursue this pathway. Several recommendations were made to help expedite the rollout of hydrogen trains, including:

1. Ensure standards and regulations use clear and simple language
2. For timely consultations with appropriate bodies responsible for developing legislation to take place
3. The development of working groups or hydrogen safety rail task forces to better understand what is needed to develop the necessary standards
4. To review the approaches of alternative sectors in the UK have taken to expedite the processes needed to integrate hydrogen in the UK rail network, in particular to work with the Railway and Safety Standards Board in harmonising the efforts across the sector.
5. To review and explore the processes Germany have taken to become the leading country of the deployment of hydrogen trains