Editorial

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HS2, the new rail line connecting the North of England and the Midlands with London, is without doubt one of the largest infrastructure projects in Europe. The intention of the project promoter is that the construction of this new high-speed line will release much needed capacity on the existing network.

The United Kingdom is committed to reaching net zero carbon dioxide in 2050 (Skidmore, 2019); transport, along with other sectors, must develop strategies to meet this non-negotiable target. It is recognised that some sectors, particularly aviation and agriculture, will only achieve this target by offsetting their emissions, and the capability to do this is limited. In consequence, land transport must achieve gross zero carbon dioxide emissions.

It is accepted that rail will play an essential role in ‘decarbonising’ passenger journeys and freight deliveries (Pantelidou *et al.*, 2016). In addition to delivering carbon dioxide reductions, shifting freight from road to rail, and shifting private vehicle use towards greater public transport and active travel, will help reduce emissions and improve quality of life (ICE, 2020). However, in order to deliver this modal shift more capacity is required on the existing network, and hence the significance of the HS2 project.

The development of the HS2 project has not been without controversy; it has engaged the public interest and generated polarised views on certain aspects. The purpose of this themed issue is not to comment on these areas of difference, nor to endorse the scheme. It is intended to describe, for the record, the evolution of the project from its inception in 2009 to the granting of Royal Assent to the legislation which authorises the construction of phase 1, the High Speed Rail (London – West Midlands) Act 2017.

The papers presented in this issue have been written by the team involved in developing the project and cover its evolution from an indicative route to a mature scheme with the statutory powers to deliver a working railway. In addition to papers

describing the technical aspects of fixing the route and developing the design, there are important contributions on the preparation of the legislation and its passage through parliament.

‘HS2 railway, UK – why the country needs it’ (Munro, 2021) describes the rationale behind HS2. It highlights the project’s ambitious aspirations to set and achieve high standards across all aspects of the project – in many cases in excess of legal requirements and industry norms.

In the early stages of the project a number of options were developed for the route, and for stations to be served by the new railway. This process is described in ‘HS2 railway, UK: route optioneering’ (McNaughton and Banks, 2021). From this optioneering process emerged the now familiar ‘Y-shaped’ network linking London to the West Midlands, the North-west and the North-east.

The HS2 project is pushing at the bounds of current technology, with an operating speed (360 km/h) that is higher than most other high-speed networks. Some of the challenges are set out in ‘HS2 railway, UK – route development to hybrid bill: technical and operational requirements’ (Smart and Irwin, 2021). The authors describe a number of aspects including:

- tunnel cross-section – and its impact on passenger comfort
- micro-pressure waves – which can generate significant noise
- Rayleigh waves – seismic waves that propagate in the near surface causing track and ground displacements (Gunn *et al.*, 2015).

It is inevitable that a project the size of HS2 will have a significant impact on the environment through which it passes. In our next paper, ‘HS2 railway, UK – route development to the hybrid bill: the environmental statement’ (Bonard *et al.*, 2021), the authors confirm that HS2 required one of the largest environmental statements ever produced. The paper outlines

the range and scope of the information in the environmental statement, including:

- likely effects
- potential mitigations
- a definitive list of the property required for the project.

‘HS2 railway, UK – route development to hybrid bill: a collaborative approach’ (Blight, 2021) explains the stages in the development of the design and the environmental statement. Collaborative working was essential to coordinate the many work streams. This collaboration, together with the use of consistent and common documents, processes and procedures, enabled HS2 to complete the development phase quicker than other significant new rail projects.

Consultation with local authorities, property owners and other stakeholders was an essential part of the scheme development and is described in ‘HS2 railway, UK – route development to hybrid bill: consultation’ (Miller, 2021). Consultations included, amongst others:

- route options
- the environmental statement
- property hardship scheme.

Case studies were produced to demonstrate changes made in response to consultation.

In ‘HS2 railway, UK – the hybrid bill’ (Podkolinski, 2021) the author explains why an act of parliament was required, and gives the historical perspective. The scope of the hybrid bill submitted was a balance between minimising the impact on the rights of individuals to the quiet enjoyment of their property and providing the necessary flexibility for the process of detail design.

Finally, ‘HS2 railway, UK – the parliamentary process to Royal Assent’ (Lagerweij and Knight, 2021) describes the exacting requirements of the parliamentary procedures for considering the hybrid bill. An important aspect of the process was the giving of assurances and undertakings, by means of which petitioners’ agreement was obtained, and objections withdrawn.

The papers that comprise this themed issue contain numerous examples of good practice which will benefit the development of the second phase of HS2, and other future projects.

We are only a little way in to the HS2 journey: whilst preliminary works, including some high-profile demolitions around Euston Station, London, have been underway for several years, the final decision to go ahead with construction

of phase one was only made on the 15th of April, 2020 (Stephenson, 2020). As phase one progresses we can expect this challenging and fascinating project to generate further papers describing the design and construction.

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