

## BRIEFING:STANDARDS

# HS2 project creates and updates British standards and guidance to improve delivery

**Inefficient and inconsistent use of codes, standards and guidance documents can hamper effective delivery of infrastructure projects. Colin Rawlings of CH2M/High Speed Two Ltd (HS2) summarises initiatives taken on the project to deliver new and updated standards and guidance.**

In 2014, High Speed Two Ltd (HS2) was specifically tasked with generating savings for the £55.7 billion government-funded rail project through creating and updating UK civil engineering standards and guidance documents (Wilson *et al.*, 2015).

In fulfilling the task, HS2's efficiency challenge programme team worked closely with BSI, Ciria, the British Tunnelling Society, Temporary Works Forum and Institute of Concrete Technology.

Workshops were held at BSI and Ciria offices with industry representatives in 2014 to identify potential documents and topics, after which steering group members – including contractors, consultants, clients and other organisations – produced the initial drafts.

The documents were then sent out for consultation, both within the UK and internationally, ensuring they all have wide industry support.

### New publicly available specifications

Four new publicly available specifications (PAS) have been produced. PAS 8820 (BSI, 2016a) (also sponsored by David Ball Group and Hanson UK) covers the performance of alkali-activated cementitious materials in low-carbon dioxide cements and concretes.

PAS 8812 (BSI, 2016b) gives guidance on the application of European standards to the design of temporary works, promoting consistency and removing uncertainties for temporary works designers, while PAS 8811 (BSI, 2017) covers major infrastructure client procedures to provide a unified approach to client involvement in temporary works across all stages.

PAS 8810 (BSI, 2016c) fills a gap in the industry to cover the design of precast



HS2 has delivered new and updated civil engineering standards and guidance to improve efficiency

concrete segmental tunnel linings, introducing some standardisation and consensus of design requirements.

### Updating standards to Eurocodes

Three existing British standards were updated to comply with Eurocodes, including providing non-contradictory, complementary information for use with other Eurocodes and their UK national annexes.

BS 8002 (BSI, 2015a) now provides guidance on the selection of Eurocode design parameters for soils and model factors to be applied to prop loads and has been updated to cover advances in retaining structure technology.

BS 8004 (BSI, 2015b) now provides Eurocode design parameters for soils, guidance on spread and pile foundation design and has been updated to cover advances in foundation technology. Definitions were included for various reports.

Finally, BS 8081 (BSI, 2015c) now provides recommendations for the design, construction, stressing, testing, monitoring and maintenance of grouted anchors as defined in Eurocodes.

### Updated guidance document

Ciria's *Guidance on Embedded Retaining Wall Design* (Ciria, 2017) has been updated to satisfy Eurocode requirements and presents a clear, unambiguous method for the application of the observational method. Ground types have been extended, case studies added and the need for a representative ground model stressed.

HS2's aim is that the new and updated standards and guidance documents will also benefit other major clients and major infrastructure projects, such as Highways England, London Underground, Transport for London, Network Rail, National Grid, Thames Tideway, Crossrail 2 and internationally.

In addition to their impact upon efficiency, the standards and documents provide sustainability and innovation in line with the government's construction strategy.

### References

- BSI (2015a) BS 8002:2015: Code of practice for earth retaining structures. BSI, London, UK.
- BSI (2015b) BS 8004:2015: Code of practice for foundations. BSI, London, UK.
- BSI (2015c) BS 8081:2015: Code of practice for grouted anchors. BSI, London, UK.
- BSI (2016a) PAS 8820: Construction materials – Alkali-activated cementitious material and concrete – Specification. BSI, London, UK.
- BSI (2016b) PAS 8812: Temporary works – Application of European standards in design – Guide. BSI, London, UK.
- BSI (2016c) PAS 8810: Tunnel design – Design of concrete tunnel linings – Code of practice. BSI, London, UK.
- BSI (2017) PAS 8811: Temporary works – Major infrastructure client procedures – Code of practice. BSI, London, UK.
- Ciria (2017) *Guidance on Embedded Retaining Wall Design*. CIRIA, London, UK, C760.
- Wilson S, Grose B and Rawlings C (2015) Improving infrastructure delivery through better use of standards. *Proceedings of the Institution of Civil Engineers – Civil Engineering* **168(1)**: 9, <http://dx.doi.org/10.1680/jcien.2015.168.1.9>.