

HSL-Zuid: innovation and safety

The High Speed Line is a project of 'Rijkswaterstaat', a department of the Ministry of Transport and Public Works, and runs from Amsterdam to Schiphol, Rotterdam, Antwerp, Brussels and Paris, with connections to the Hague and Breda. The High Speed Line connects the Netherlands with the European network of high-speed lines.

As the infrastructure manager ProRail is responsible for the capacity, reliability and safety of the High Speed Line. ProRail also manages the unique Design, Built, Finance and Maintain contract with consortium Infrasppeed.

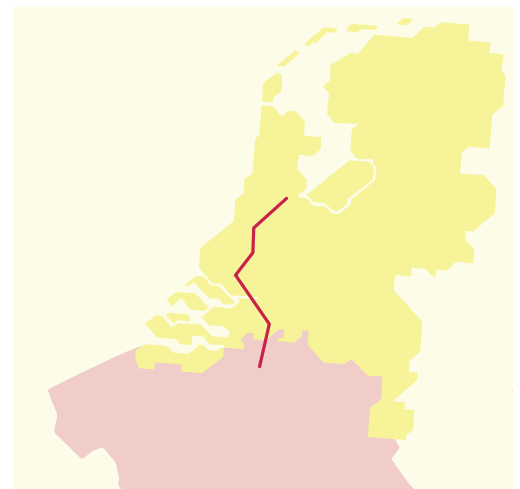
Advanced technology

The HSL-Zuid is constructed in such a way that the risk of accidents, such as derailment and collision, is kept to an absolute minimum. State-of-the-art safety technology, a new operating method, a high-capacity energy supply system (25kV) and the specially designed GSM-R communication system for rail applications all make a substantial contribution this safety.

Innovative systems

ERTMS/ETCS (European Rail Traffic Management System/European Train Control System) ensures the safety of trains on the HSL-Zuid. In practice, the former abbreviation is more commonly used to denote the safety system. This new European standard places the HSL-Zuid at the forefront of European legislation and developments.

All safety systems within the Trans European Network for High Speed lines (zogenaamde TEN netwerk) European Rail Network of High Speed Trains satisfy the same criteria, thereby connecting seamlessly with each other, and allowing trains to pass country boundaries unhindered. This is referred to as interoperability. A speed of 300 km an hour makes it impossible for drivers to read the signals along the track. To address this, ERMTS replaces track signals with cabin signalling. As a result, the driver receives all information about the permitted speed or braking distance on his display. The



system receives this information by means of GSM-Rail (GSM-R), aa mobile network specially developed for rail applications. The new safety systems use the radio as a means of giving instructions to trains (permission to proceed, stopping instructions and driving recommendations). In addition, GSM-R is also intended as a replacement for the large number of current mobile speech and communication systems, including Telerail.

Sophisticated design

Speeds of 300 kilometres per hour are made possible by several unique design aspects of the HSL-Zuid:



- no-recess concrete slab: the concrete rail bed is as stable, horizontal and straight as possible;
- a minimum number of bends and points, and only gentle curves where necessary;
- no single level crossings;
- derailment prevention system: in the event that a high speed train is in danger of derailing, the prevention system keeps the train on the track whereby derailment is virtually eliminated;
- screening off the surroundings by means of sound barriers, fences and ditches, to prevent people or animals from getting onto the track;
- screening off viaducts with fences;
- tunnels which satisfy strict EU legislation and even stricter Dutch legislation; sufficient escape routes, ample escape times, facilities for emergency services and separate tunnel tubes;
- Rheda rails. The ballast-free rail system differs from regular railways in that the rails and sleepers do not rest on a base of stones, but are anchored in concrete slabs. This system is unique in the Netherlands and offers advantages such as: an extremely robust rail system with an extended life cycle and low maintenance.

More information?

For more information please visit www.prorail.nl or call ProRail public contacts on 0900 776 72 45.

'**Innovation and Safety**' forms part of a series of leaflets in which ProRail informs you about the HSL-Zuid. The other titles are: '**Harmonization and Design**' and '**Management and Operation**'.

ProRail

MAKING TRACKS FOR THE FUTURE

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