

# REFERENCE CASE RAIL



## Investigation of the High-Speed Line between Berlin and Hannover in Germany

Due to the massive flood damage in Germany in June 2013, the German rail company required comprehensive inspection services to assess the degree of the damage and the condition of the high-speed railway track between Berlin and Hannover. That is why they turned to TÜV Rheinland.

### Basic Facts

Client	Deutsche Bahn AG
Timeframe	July 2013 – August 2013
Project location	High-speed line between Berlin and Hannover
Main services	<ul style="list-style-type: none"><li>▪ Railway track inspection</li><li>▪ Ground penetrating radar (GPR) method to evaluate damage assessment</li></ul>

### Initial situation and requirements

The Deutsche Bahn (DB) 6815 high-speed railway is a 258-kilometer railway line linking the German cities of Hannover and Berlin. The entire line was opened officially on 15 September 1998. This line is one of the most significant routes in Germany, as Europe's main east-west corridor for passenger trains.

In June 2013, the Hannover – Berlin high-speed line was overrun and severed for around two months due to flooding of the Elbe River. Particularly affected by the catastrophe was a 6 km-long section of line between Rathenow and Stendal .

In order to start the reconstruction and maintenance processes as soon as possible, the Deutsche Bahn AG entrusted the investigation work to TÜV Rheinland, a leading provider of supervision services for the construction industry. In response to the extraordinary circumstances, our expert team provided state-of-the-art technologies and solutions.

## Solutions, results

As part of TÜV Rheinland's cutting-edge approach, the high-speed line was inspected with ground penetrating radar (GPR) to detect the water content in the subsoil and potential damage resulting from the flood situation. The first measurement took place on July 15, 2013 to determine if water was still present in the line's track system. The track was also examined for washouts (cavities) or depressions due to the flooding.

The GPR method is a fast-moving measurement system with speeds up to 100 km/h and allows for continuous imaging of the subsurface. There are two antenna frequencies used in the measurement to inspect the entire superstructure and substructure to a depth of about 3 - 4 m. The earliest measurements revealed that the water level in the ground was still very high. Later measurements have shown a decrease in the moisture in the ground. Thanks to exemplary cooperation of the parties involved in the project, the Hannover - Berlin high-speed line reopened on November 4, 2013, several weeks earlier than expected.

### Did you know?

Ground penetrating radar is a high resolution, field-portable geophysical method that uses radar pulses to image the subsurface.



### Benefits for the client

TÜV Rheinland provided the client with:

- State-of-the-art technology to save time and money during the investigation.
- Extensive experience in the field of supervision services for the construction industry and railway infrastructure.
- A full range of maintenance-related services from a single source.

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### About TÜV Rheinland:

Founded more than 140 years ago, TÜV Rheinland is a global leader in independent inspection services, ensuring quality and safety for people, the environment, and technology in nearly all aspects of life.

We inspect technical equipment, products and services, oversee projects and help to shape processes for companies around the world. Since 2006, we have been a member of the United Nations Global Compact to promote sustainability and combat corruption.

Our experts offer you a comprehensive range of civil engineering services, all from a single source. Our complete range of services for civil engineering projects and maintenance includes extensive laboratory services, geotechnical consulting, statics calculations, advice on planning for construction, and the preparation of expert damage reports.

With extensive construction industry experience, we can help you to reduce risk, prevent construction errors, control budgets and effectively keep your construction project on schedule. From planning to implementation, we can help you ensure the safety, quality and durability of your structural or civil engineering projects around the world.