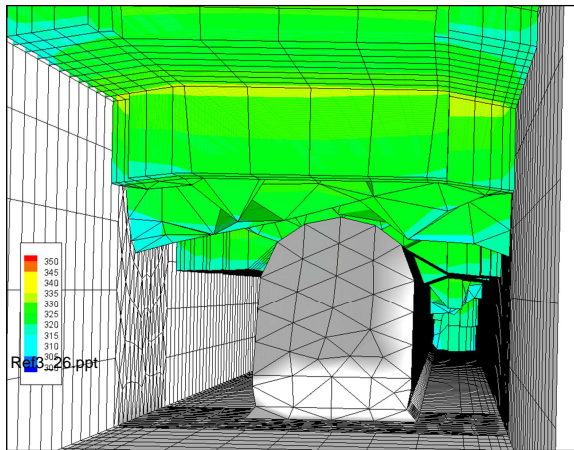


One-dimensional calculation of the transient velocity in the tunnel Groene Hart



Three-dimensional CFD simulation of the smoke and temperature distribution at the rear end of the train



Tunnel Dordtsche Kil

Description

The HSL Zuid project comprises a new high-speed rail line between Antwerpen in Belgium and Amsterdam in the Netherlands. The project is an integral part of the development of an European high-speed railway network and will considerably help to decrease the travel times between the European capitals. The required standards with respect to safety and availability are quite demanding.

HBI Haerter Consulting Engineers was appointed to carry out safety studies for the tunnels Groene Hart, Dordtsche Kil and Rotterdam Noordrand.

As a major result of the investigations, several base documents for the subsequent ventilation design were developed. With respect to safety, concepts and ventilation specification the civil design could be completed.

Services

HBI professional services included the following aspects:

- Definition of emergency scenarios and ventilation goals in co-operation with the customer
- One-dimensional, aerodynamic and thermodynamic simulations to verify and optimise the various proposed ventilation concepts
- Detailed steady and unsteady three-dimensional CFD simulation to assess the escape conditions for the passengers near the train
- Examination of the conformity of the rescue/ escape possibilities versus existing international norms
- Cost analysis and comparison of alternative concepts
- Assessment of tunnel safety in terms of ventilation and rescue