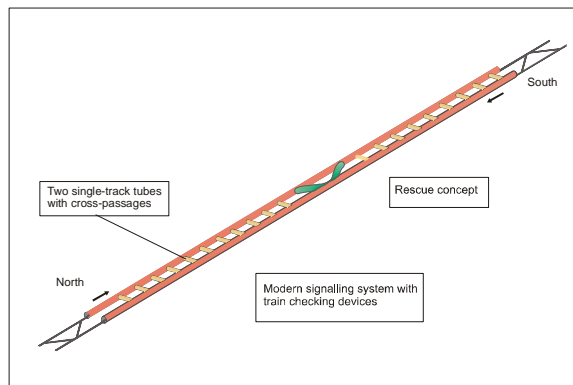
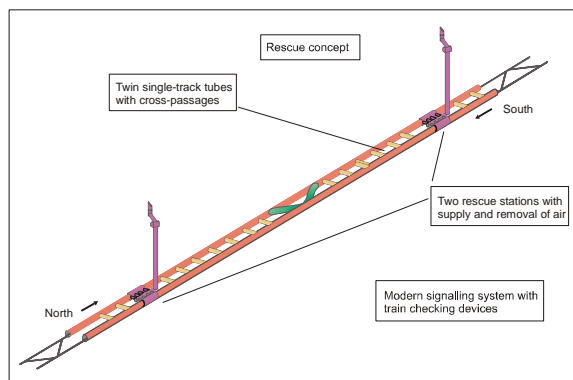


Iterative process for safety planning of long railway tunnels



Guadarrama tunnel with two single-track tubes with cross-passages



Guadarrama tunnel with two single-track tubes with cross-passages and two rescue stations

Description

The Guadarrama tunnel forms part of a high-speed railway line between Soto del Real and Segovia in Spain. The tunnel has a length of approximately 25 km and is built with two single-track tunnels. The tunnel will be used for passenger trains only.

HBI Haerter Consulting Engineers was mandated to critically analyse the design concepts for safety and ventilation, which were submitted by different consortia. The work of HBI formed an important input for the subsequent ventilation design in terms of safety relevant issues, conceptual considerations and specifications of the ventilation equipment.

Services

HBI Haerter Consulting Engineers provided the following services:

- To review and to evaluate the safety and ventilation concepts from the consortia with regard to safety and smoke control
- To illustrate the procedure for the safety verification and risk analysis on the basis of a safety philosophy and the safety objectives, proposed by the client
- To work out the necessary safety measures related to the civil construction, train operation, the rescue, train control and protection
- To illustrate alternative concepts taking into account the design works in the field of safety of long railway tunnels in Europe (for instance the new Alpine base tunnels of Gotthard and Loetschberg, the Channel Tunnel between England and France)
- To evaluate of the different concepts considering the aspects of safety in case of emergency, operation and costs
- To recommend major safety equipment
- To develop optimised ventilation concepts