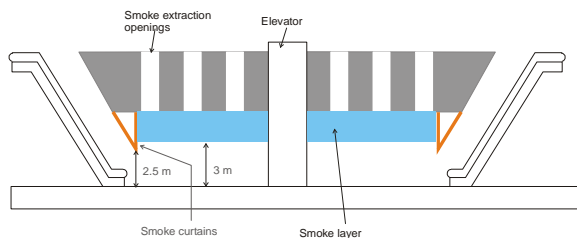
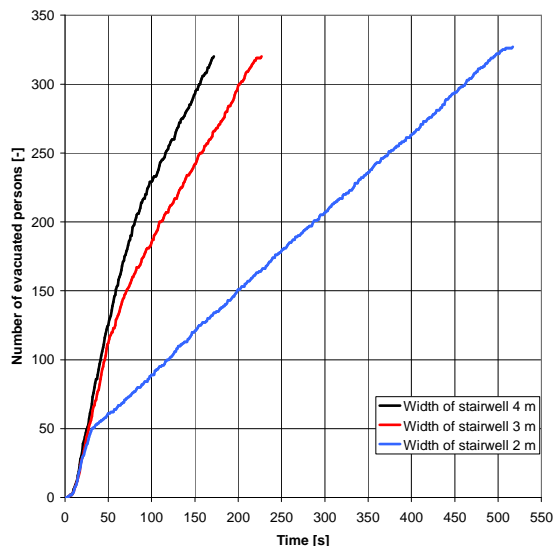


Overview of the tunnel network to be extended and the proposed measures



Underground station with stairway accesses and smoke extraction vents



Results of escape route simulation in the emergency exits

Description

The city of Bonn has planned Hardtberg line as an extension of their existing city railway network. During the previous planning phase, questions about smoke extraction, escape and rescue in the event of a fire in the tunnel have not been resolved.

HBI Haerter Consulting Engineers has been mandated within the preliminary study for the Hardtberg line with the development of a concept for the smoke extraction and the passenger rescue in case of fire. Due to the special boundary conditions of the project additional measures had to be planned for protection of adjacent tunnel sections.

Services

HBI Haerter Consulting Engineers provided the following services:

- Analysis of the safety in the event of a fire on the basis of a comprehensive consideration of the complete system
- Development of a safety philosophy, of safety goals and detailed requirements for ensuring the safety in the event of a fire in the tunnel or in a station taking into account the requirements from the relevant guidelines
- Analysis of the aerodynamic conditions and planning of safety relevant measures in the tunnel and the stations
- Carrying out escape route simulations for the emergency exits
- Specification of requirements for design of the escape routes
- Overall specifications of ventilation measures in the emergency exits and of smoke extraction vents in the underground stations
- Specification of the measures for decoupling of adjacent tunnel section
- Presentation of the further planning steps (detailed design of the ventilation of the emergency exits, verification of the efficiency of the station ventilation, design of smoke extraction shafts)