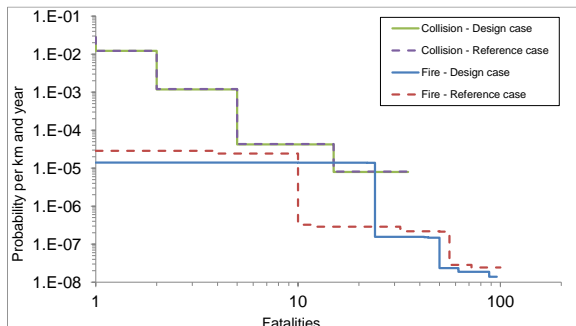


Frankenschnellweg Nuremberg, entry and exit ramps



Fire Scenario in Uni-directional Traffic



F/N-curves for collision and fire

## Description

The Frankenschnellweg forms an urban road connection between the Highway intersections Nuremberg/Furth and Nuremberg/Harbour. It forms an important local distributor and connector road for the urban area of Nuremberg.

The road tunnel is part of the Frankenschnellweg extension which allows an intersection-free traffic-flow connection towards the center of Nuremberg. The tunnel consists of two tubes and is used in uni-directional traffic. There are entry and exit ramps in the center part of the tunnel. The main tunnel is designed for a posted speed of 70 km/h.

The tunnel ventilation concept is based on a mechanical longitudinal ventilation system with jet-fans.

In order to improve the fire detection system beyond the current standard in Germany, the system of turbidity sensors installed for normal ventilation is used for smoke detection as well as automatic video image analysis for fire and for smoke detection.

## Services

For the Frankenschnellweg Tunnel in Nuremberg HBI Haerter conducted a quantified risk analysis QRA.

The scope included the following steps

- System description and definition for reference case and design case including measures to improve the risk profile
- Development of event trees for "Collision" and "Fire"
- Aerodynamic analysis in the tunnel network
- Numerical calculation of smoke propagation and smoke hazards
- Evacuation simulation for the assessment of extent of damage
- Risk analysis and documentation for the scenarios "Collision" and "Fire"
- Safety analysis based on a comparison of design case and reference case
- Verification of the design meeting the safety level according to the RABT-2006 standard