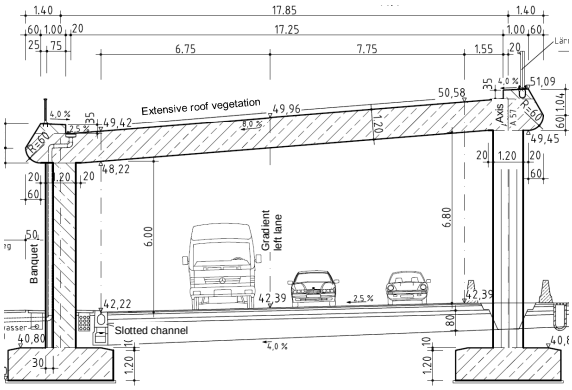
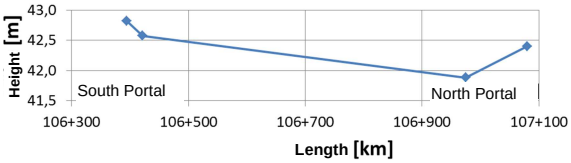
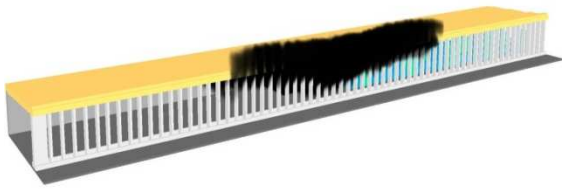
Gallery Dormagen-Horrem (DE)
Risk-oriented safety assessment



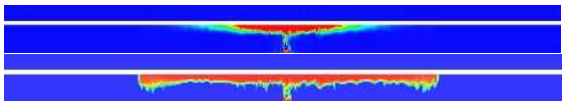
Drawing of the gallery cross section



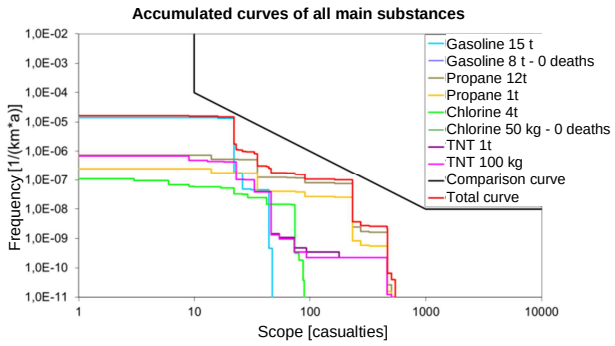
Longitudinal slope course of the Dormagen Gallery



Fire simulation in the Gallery with Fire Dynamics Simulator



Temperature spread (above) and sight opacity (below) after 180 s for a fire of 175 MW



ADR review: accumulated curves of all main substances

Description

The Dormagen Gallery will become a part of the A 57 west of the city of Dormagen and serves as a noise protection for the residential construction adjacent to the highway. The gallery provides a half-side coverage of the A 57 in the direction of Neuss. The planned gallery construction will include three lanes and the entering lane of the junction of Dormagen. The gallery with its length of 686 m has a South-North orientation with longitudinal slopes between -0,5 and +0,9 % and shows a marked transverse roof gradient without lateral beams and an increased ceiling height.

Services

To define constructional aspects for the planning permission, a safety documentation was produced which summarizes the results of the following reviews:

- Quantitative risk analysis
- Expert opinion ADR categorization
- Technical expert opinion on ventilation

In a quantitative risk analysis, the risks for the Gallery Dormagen-Horrem were examined taking account of all safety-relevant planning and traffic factors. The risk calculations were carried out for a planned case and for a reference case as a comparison. The planned case was the gallery as currently planned with four evenly distributed emergency exits. For the reference case, it was assumed that it corresponds to the specifications of RABT.

Within the ADR categorization, the „Procedure for the categorization of street tunnels according to ADR 2007 (BASt)“ was directly applied in level 2a because the QRAM programs on level 1b do not cover the constructional specificities of a gallery construction.

The scope of damage of the fire case scenarios of the risk analysis and of the ADR review was determined by means of a coupling of CFD simulations (Fire Dynamics Simulator) and the HBI evacuation model ODEM.

In the technical expert opinion on ventilation, the necessity of an active tunnel ventilation was examined according to the „Guidelines for the equipment and operation of streets tunnels“.