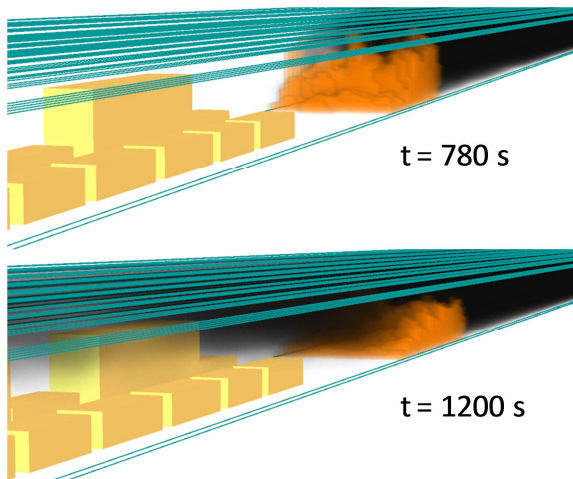
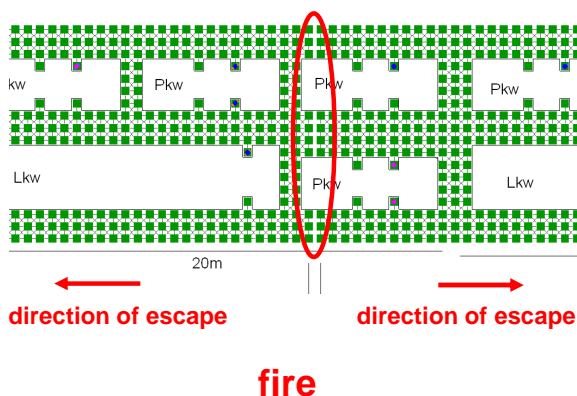




Weser Tunnel western portal



CFD calculation of smoke propagation following a tunnel fire scenario



Tunnel fire egress model

### Description

The Weser Tunnel is situated on the German federal road B 437. It serves as a crossing under the river Weser. The tunnel was opened to traffic in 2004.

The Tunnel is 1645 m long, consists of two tubes with two lanes each. It is used for uni-directional traffic, only. From the western portal towards east, the first 889 m long tunnel section has a longitudinal gradient of -3,53 %, followed by a second section of +5,00 % gradient.

There are no additional entry or exit ramps. The tunnel system includes four egress passages in addition to the tunnel portals with a distance between egress doors of approx. 330 m.

### Services

HBI Haerter Consulting Engineers was employed to evaluate the Weser Tunnel's risk category for the transport of hazardous goods according to the regulation ADR 2007.

The procedure for the categorisation of hazardous goods is divided into two stages. The evaluation for the B437 Weser Tunnel was done according to stage 2a.

It was recommended to give the B 437 Weser Tunnel a rating according to category A, i.e. without limitations for transports of hazardous goods in the tunnel. The recommendation was based on the evaluation of consequences with respect to fatalities due to an incident in the tunnel involving hazardous goods.

The incident consequences were defined as number of fatalities in various incident scenarios under consideration. Consequences were calculated using complex computer models, such as CFD flow models and egress models. The probabilities of these incident scenarios were calculated using event tree models.

The main aspects of the event tree are:

- capacity of transport
- time of day
- tunnel closures
- people involved
- type of ignition
- traffic situation
- ventilation operation
- assisted escape