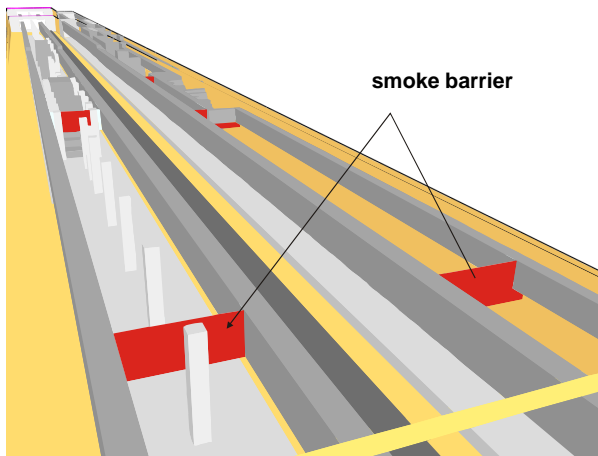
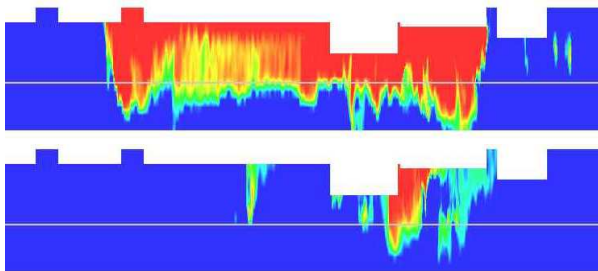




Train station at Brussels airport Zaventem



CFD-model of underground airport station at platform level



Visibility without/with ventilation (top/bottom) along section of platform 10 min after start of fire obtained by CFD-analysis (white line 2.5 m above platform; red colour = visibility < 10 m)

Description

With the so called “Diabolo Project” the train station at the airport Zaventem in Brussels is extended and fully integrated into the national and international railway network. Major elements of the Diabolo Project are the enlargement of the existing underground station, the related change from a stub-end to a through station and the building of new tunnels in direction of Antwerp and the city of Brussels. The new rail line runs in the north-west direction starting from the existing airport station. The tunnel system consists of sections with one double-track, cut-and-cover tunnels and two parallel single-track, bored tunnels. The underground part of the rail system stretches along a distance of 5 km.

The station and the tunnels are equipped with a ventilation system. Draught relief shafts limit air flow velocities on platforms and in stairwells.

Services

HBI Haerter Consulting Engineers provided the following services:

- Specification of design objectives for smoke control in the station in agreement with the fire safety authorities and the client
- Specification of properties of the design fire and definition of relevant incident scenarios including definition of reasonable worst-case boundary conditions
- Specification of comfort limits with respect to maximum acceptable flow velocity of air on platforms and in stairwells
- Sizing and specification of ventilation equipment in tunnel sections (axial fans with Saccardo nozzles and jet fans) by one-dimensional numerical analysis
- Sizing of draught relief shafts by one-dimensional numerical analysis to provide comfortable conditions in the station
- Numerical confirmation of the compliance with the design objectives by three-dimensional CFD analysis
- Specification of fire requirements of civil construction
- Elaboration of the control concept of the tunnel ventilation system