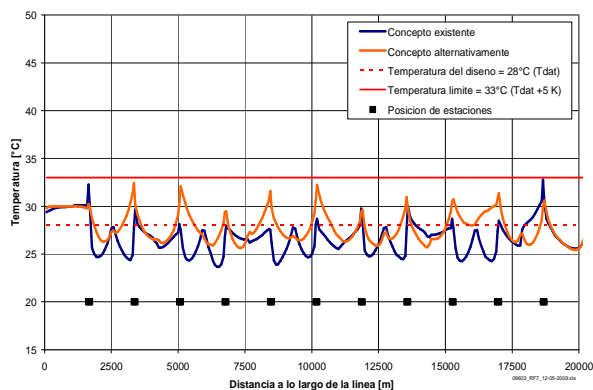
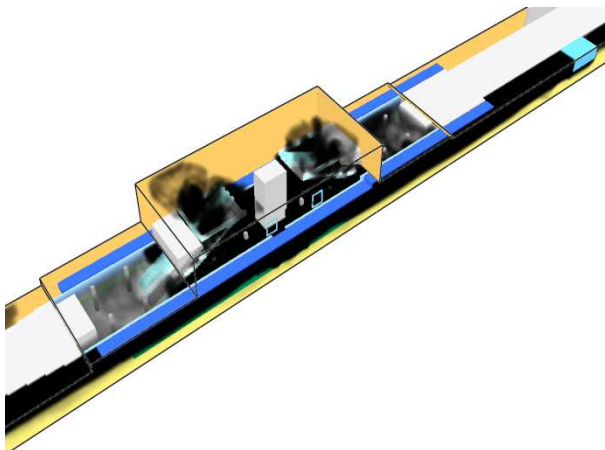




Virtual image of a new station of Metro Barcelona line 9



1-dimensional simulation of temperature in tunnel and station with SES



3-dimensional CFD simulation of smoke propagation in case of train fire in station Nova Terminal

Description

The network of Metro Barcelona is being extended. A major element of the various projects is the construction of line 9 (Linea 9). Line 9 is a new underground link crossing the city of Barcelona. At its final state, it will comprise a length of about 42 km and 46 stations. It will be the longest European underground line. The line will be built in 4 different sections. Section 1 (Tramo 1) starts at the airport of Barcelona and consists of 14 stations.

Stations and tunnels of Metro Barcelona line 9 are equipped with ventilation systems in order to provide tenable conditions in the public spaces and tunnels of the metro system.

Services

HBI Haerter Consulting Engineers provided the following services:

- Review of the initial proposal of the tunnel ventilation design
- Proposal of optimizations and modifications concerning ventilation design and related civil and electrical measures
- Proposal of alternative concepts for the tunnel ventilation system
- Verification of the alternative ventilation concept for normal and emergency mode of operation regarding:
 - air velocities
 - air temperatures
 - smoke propagation in stations
- 1-dimensional unsteady simulations for the verification of the temperature in the tunnels and stations with the software SES
- 3-dimensional unsteady simulations (CFD) for the verification of the smoke propagation in case of a train fire in the station
- Specification of the modified tunnel ventilation system in terms of key design parameters (flow rate, pressure loss, power requirements)
- Specification of further fire safety related measures (civil design, SCADA, organisation)