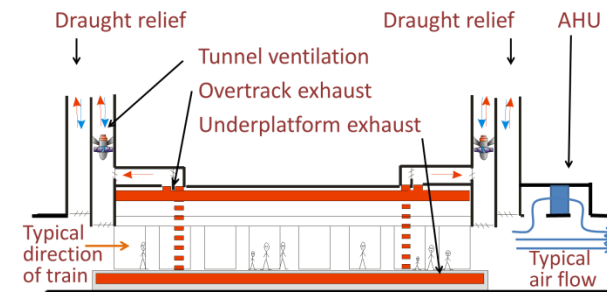




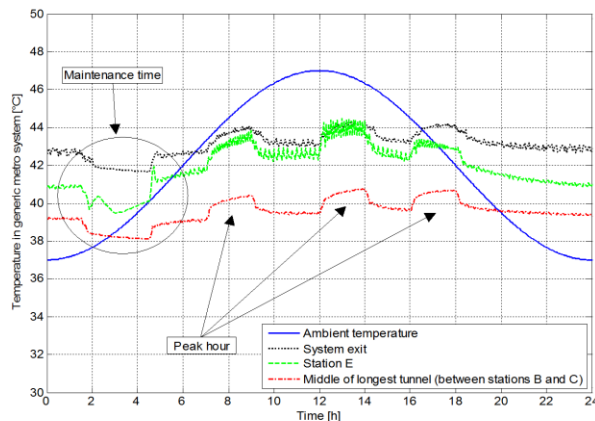
Architectural view of interchange station



Construction works at the Msheireb station complex



Key elements for tunnel ventilation and cooling



Simulated temperature fluctuations during 24 h at selected locations of a metro line

## Description

As part of the Qatar Integrated Railway Project (QIRP), several long-distance rail and urban metro lines shall be constructed. In the city of Doha, the Phase 1 of Doha Metro with about 50 km of twin-tube, single-track tunnels and 35 underground stations shall be built. The project owner, Qatar Railways Company (Qatar Rail), has proposed the Phase 1 of Doha Metro to be operational by 2021.

For an acceptable tunnel environment and for fire safety, the stations and tunnels shall be equipped with ventilation and cooling systems.

Due to the hot, subtropical climate and the substantial heat release from trains running with short headway, the heat control of the tunnels and stations is a key challenge of the project. Full-height platform screen doors lead to an aerodynamic decoupling of the platform and the trackway at stations. While the platform zones are air-conditioned, the trackway area at stations and the tunnels are ventilated and possibly cooled.

## Services

HBI Haerter Consulting Engineers provided the following services for Qatar Rail and Deutsche Bahn International (DBI):

- collection of fundamentals and requirements related to the tunnel ventilation system (TVS)
- elaboration of TVS concepts for all operation modes
- elaboration of concepts for cooling of tunnels particularly for maintenance and emergency modes of operation (stationary and mobile dry cooling system, instantaneous wet-cooling, etc.)
- numerical analysis of ventilation and cooling performance (simulation tool: THERMOTUN, THERMO, SES, FDS, BuildingExodus)
- sensitivity studies and cost estimates
- aerodynamic analysis (mechanical forces, pressure comfort, traction power demand)
- sizing and inventory of ventilation and cooling equipment
- elaboration of control schemes
- definition of interface schedules, in particular, specification of civil requirements and those of other systems
- elaboration of tender documents