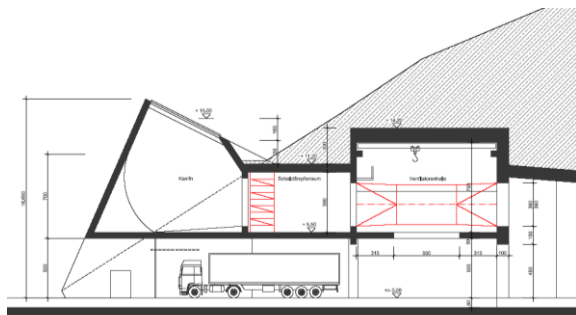
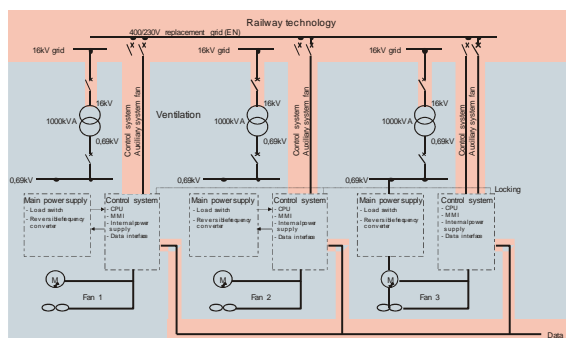


Ceneri Base Tunnels Schematic Layout; two single track tunnels (East and West); the intermediate access tunnel Sigirino (FIS) serves as fresh-air and exhaust ventilation duct



Longitudinal section: ventilation station at the portal of the access tunnel Sigirino (Finestra di Sigirino, FIS)



M&E schematic for the tunnel ventilation system in the ventilation station

## Description

The Ceneri base tunnel (CBT) is an important part of the Gottard axis and allows a low-gradient rail passage in the Swiss alpine region. It consists of two single-track tunnels, which are connected by cross-passages at 300 m intervals. The tunnels were designed to allow speeds up to 250 km/h.

The ventilation system for the CBT is designed for the operation during maintenance works and for emergencies. The ventilation must provide satisfactory air quality for the maintenance personnel as well as facilitate the tunnel evacuation during emergencies.

## Services

HBI Haerter Consulting Engineers provides the following services as part of the task as ventilation designers:

- Tunnel Ventilation Concept Design for Normal Operation of the CBT
- Development and implementation of a complex numerical model for the simulation of CBT rail tunnel aerodynamics
- Recommendations for threshold values and standard values for the ventilation, for ventilation design and fan selection
- Calculations of pre-determined scenarios for the evaluation of air flow rates as well as steady state and time-varying pressure duties for the main fans
- Determination of the relevant axial fan's duty points
- Coordination with other design disciplines (civil and electrical)
- Specification and design of electro-mechanical components, such as fans, dampers, attenuators, control system elements, cooling equipment, power supply and equipment monitors
- Layout of mechanical components in the ventilation station
- Definition of space requirements of the ventilation equipment for the civil design of the ventilation stations located at the tunnel portals.
- Definition of the structural requirements of the ventilation shafts (location, dimensions)