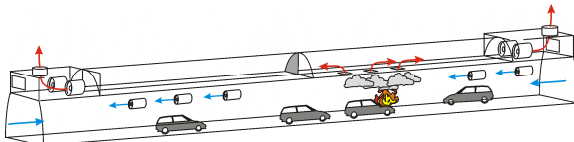




Tunnel Portal with exhaust stack



Tunnel jet fan



Emergency ventilation principle



Smoke extraction through smoke damper

Description

The Gotschna tunnel is part of the Klosters bypass. It is 4.2 km long bi-directional tunnel. A gradient of slightly less than 5% and the alpine conditions may cause high buoyancy of the tunnel air. The tunnel ventilation is designed to match these conditions.

The tunnel ventilation system is a transverse system. The two vent stations at the portals are equipped with two axial fans each, one for supply and one for exhaust. Fresh air is supplied through 400 pipes. Exhaust air is extracted by means of 59 remote controlled dampers. 24 jet fans are installed along the carriageway.

The control system is designed for maximum flexibility. In normal operation, various ventilation modes are possible, incl. transverse ventilation, local extraction or longitudinal ventilation.

In case of emergency, the ventilation is operated as local smoke extraction. The capacity exceeds 240 m³/s. In this mode, both exhaust fans are operated. To support the extraction, the air-flow along the tunnel is controlled by means of jet fans.

The parallel safety gallery is equipped with a pressurisation system. Two axial supply fans are installed at the portals. By this means, smoke ingress into the safety gallery is avoided in all emergency scenarios.

The development of the Gotschna Tunnel ventilation system formed a basis for the safety requirements defined in the latest version of the Swiss design codes for tunnel ventilation and safety gallery ventilation.

Services

HBI Haerter was responsible for the ventilation of tunnel and safety gallery from the first concept ideas through to commissioning, including preliminary and detailed design, control system functional description, tender documentation, bid award recommendation, site supervision, aerodynamic measurements and factory, site acceptance and smoke tests.