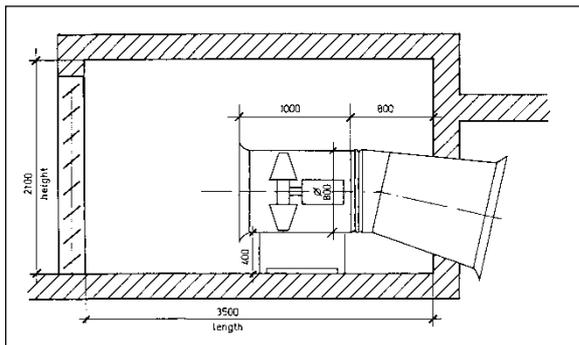


Cross-section of the 3800 mm diameter tunnel with the gas pipe line; units m



Sketch of fan house; units mm



Stollen Sörenberg during construction

Description

The 5'200 m long Sörenberg Tunnel houses a gas pipeline linking the Netherlands and Italy to cross the Swiss mountains. The inclination of the tunnel is nearly 5%.

At the lower end of the tunnel station a fan station is located which is equipped with two axial-flow fans. One of these fans is activated in order to exchange the air, before a person enters the tunnel or in case of a gas leakage. The second fan is installed as a backup. Both are equipped with shut-off valves. The air enters the tunnel at one end and leaves it at the other end. Normally, the flow direction is given by the direction of the natural forces, i.e. by the temperature difference between the inside and the outside of the tunnel. In some cases, this difference may be sufficient to reach the required air velocity in the tunnel. If not, the fans are switched on in order to support the flow in the direction given by the natural draft and wind at portals. Their design must be such that they can obtain the same flow rate in either direction.

The ventilation system is able to ensure one tunnel-air exchange within two hours resulting in a volume flow rate of $6 \text{ m}^3/\text{s}$. The fan diameter is about 800 mm. The electric power consumption stays below 15 kVA.

In case of gas leakage in the tunnel, the fans might be operating in an explosive atmosphere. Therefore, the electric motors must be explosion-proof and the fan construction spark resistant even in case of damage. In order to ensure fan operation in the correct direction, the measurement of the flow rate and its direction is required in the tunnel. The statutory noise limits in this recreational area posed additional restrictions for the design.

Services

HBI Haerter Consulting Engineers was responsible for the ventilation design and implementation during all phases of the project.