



Northern Portal of the Elbe Tunnel with 4 tubes



Impeller of old exhaust fan



Exhaust duct after refurbishment



Smoke test during ventilation system commissioning

Description

The road tunnel crossing the Elbe tunnel in Hamburg is one of the most frequented road tunnels in the world.

The first three tubes of the Elbe tunnel have been in service since 1975. Each tube with a length of 2.8 km contains two lanes. The tunnel ventilation system is a transversal ventilation using 18 fresh-air and exhaust-air fans. The fans are placed in three ventilation buildings: near the portals and in the middle of the tunnel. The air ducts are situated between the traffic tubes in the submerged section and below or above the traffic space in the TBM sections. Their cross sectional areas have been optimised to minimise operating costs.

Services

The original ventilation system from 1975 was designed and commissioned by HBI.

In 2002, the fourth tube with a length of 3.1 km was inaugurated. It contains two lanes for uni-directional traffic and one emergency lane. The longitudinal ventilation consists of 64 jet fans. Furthermore, 192 dampers in the tunnel ceiling and four two-stage, high-temperature exhaust fans in the portal buildings serve as emergency ventilation providing an extraction rate of 220 m³/s.

HBI was responsible for the ventilation concept of the 4th tube, as well as for the emergency ventilation control.

Afterwards, HBI planned a refurbishment of the old three tubes in order to reach the latest safety standards according German guideline (RABT). Using the existing buildings and air ducts, 15 new fans and 250 dampers for point extraction of smoke have been installed. The minimum extraction capacity has been increased to 300 m³/s.

In 2013, the refurbishment of all tunnel tubes has been completed. Since February, all four tunnel tubes are open to traffic.