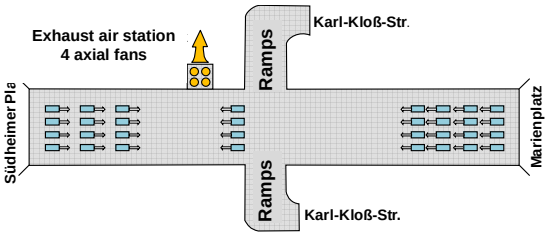
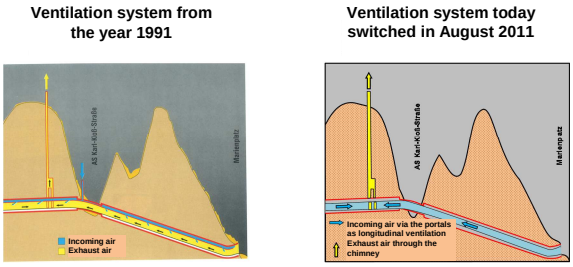
Heslach Tunnel (DE)
Energy savings by dynamic fan control

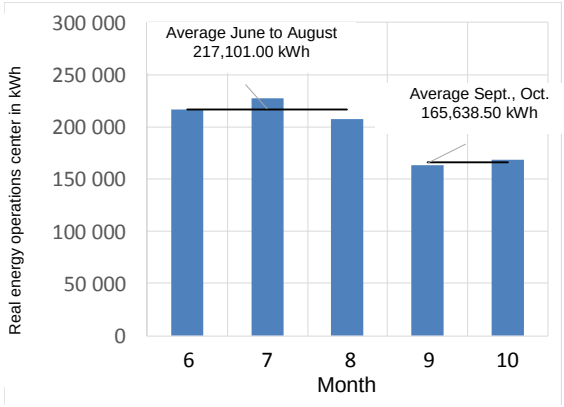


Arrangement of the jet fan and the exhaust air station



Ventilation system in 1991 and today, after the switch in August 2011

Exhaust air ventilator A1 in the exhaust air station



Real energy of the operations center in the year of the conversion (conversion in August 2011)

The energy costs for the normal operation of the tunnel ventilation represent a significant part of the total operating costs in the Heslach Tunnel. This is due to the high length of the tunnel, the very high traffic burden and the two-way traffic operation. For reasons of immission protection, the contaminants accumulating in the tunnel are extracted through the exhaust air station located west of the access ramps of Karl-Kloß-Str. by means of four axial fans.

In the control specifications of the ventilation system of 1991, the jet fans have been employed statically to achieve a balancing of the tunnel arms with different lengths and an air supply to the extraction point of the exhaust air station as even as possible. On the higher ventilation levels, incoming air distributed over the length of the tunnel has been additionally introduced.

After the conversion in the Heslach Tunnel, the control in normal operation was switched to a dynamic ventilation strategy. Due to the decrease of the vehicle emission values, the distributed incoming air is not required any longer. The air volume to be extracted at the fans of the exhaust shaft is gradually imposed depending on the measured values of visual opacity and carbon monoxide. Depending on this exhaust air volume, the jet fans are brought into a basic setting in both tunnel sections and then regulated dynamically so that an ideal target speed related to the exhaust air volume is pursued in both tunnel arms.

As a result, this conversion of the ventilation control which has been realized in August 2011 showed significant energy savings. The real energy of the operations center in the months from June until October in the year of the conversion 2011 is shown on the left. The difference of the averages from June to August before the conversion and from September until October after the conversion results in savings of 51 463 kWh. This corresponds to energy and cost savings of 24 % with respect to the average value from June until August.

Thanks to the conversion of the tunnel ventilation to dynamic control, significant energy and operative costs savings were achieved in the Heslach Tunnel.