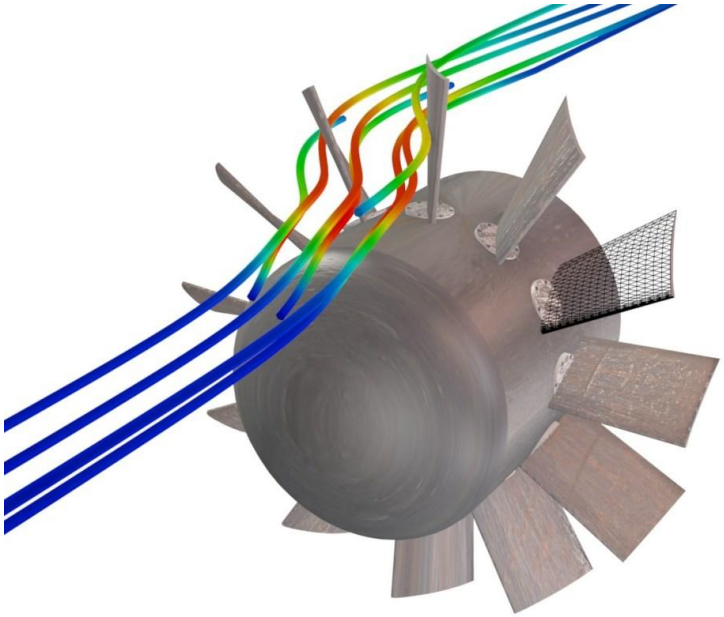
Thermo- and Fluid Dynamics
Consulting Engineer e.U.

Ventilation Design Criteria in Different Countries And Common Practise in Poland



Dipl.-HTL-Ing. Bernhard Hoepperger:

- More than 20 years of experience in tunnel ventilation design
- Finished about 300 tunnel projects worldwide (> 20 countries on 5 continents)
- Re-located 2012 and 2013 in Los Angeles for a big tunnel project
- Member of the Austrian Guideline **RVS 09.02.31** and **RVS 09.02.32**
- Official reviewer of **PIARC**

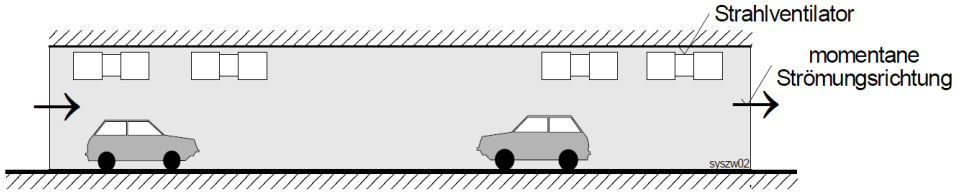
- Started his own company TFD Consulting Engineer e.U. in 2015
- TFD Consulting Engineer e.U.:
  - engineering company for mechanical engineering
  - specialized on ventilation design
    - for road tunnels
    - train tunnels
    - subway systems

Agenda:

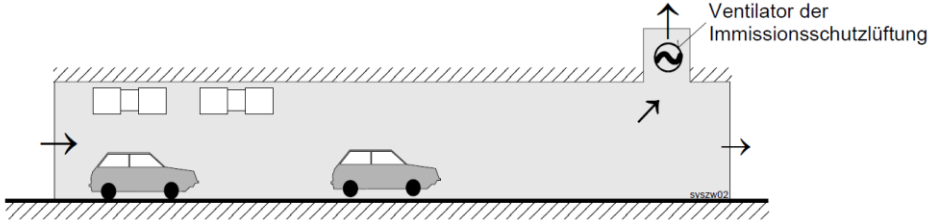
- Overview of most relevant ventilation systems
- Ventilation systems in Swiss (ASTRA)
- Ventilation systems in Germany (RABT and EABT)
- Ventilation systems in Austria (RVS)
- Comparison with common polish standard

Overview of Most Relevant Ventilation Systems

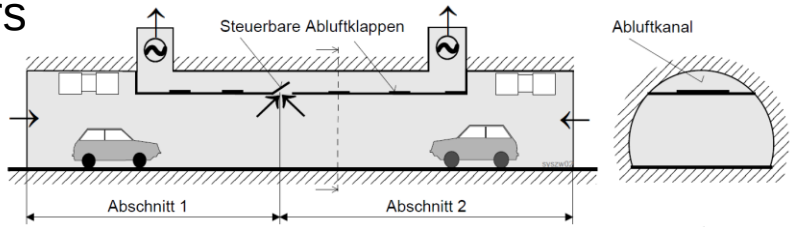
- Longitudinal ventilation system usually using jet fans



- Point extration usually combined with a longitudinal ventilation system



- Semi transverse ventilation system having an exhaust duct and dampers



Source figures: ASTRA 13001

Swiss ASTRA 13001

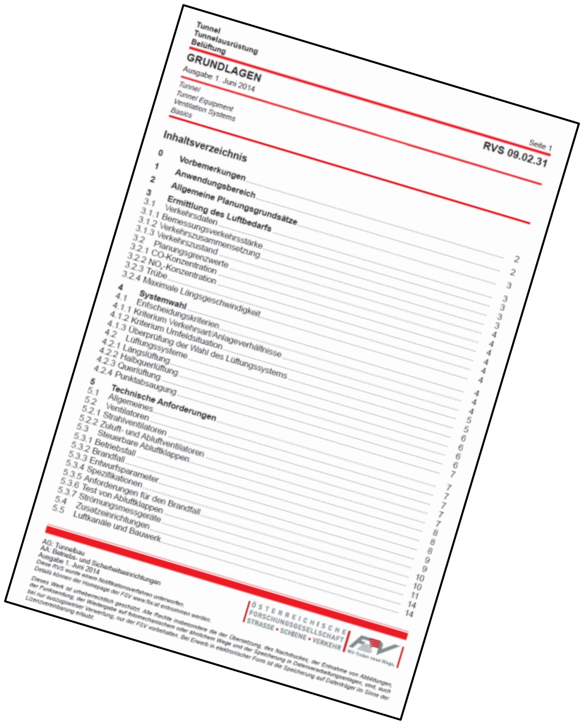
- Usually no mechanical ventilation system for less than 800 m
- Based on traffic data and gradient a longitudinal ventilation system for
  - One way traffic up to 3,000 m
  - Two way traffic up to 1,500 m
- Based on traffic data, gradient and tunnel lenght
  - Point extraction
  - Semi transverse ventilation system
- Design heat release rate of 30 MW
- 55 road tunnels are >2,000 m

German RABT2006 and EABT-80/100

- Usually no mechanical ventilation system for less than 600 m
- Based on traffic data a longitudinal ventilation system for
  - One way traffic up to 3,000 m
  - Two way traffic up to 1,200 m
- Based on traffic data and tunnel lenght
  - Point extraction
  - Semi transverse ventilation system
- Design heat release rate of 30 MW
  - >4,000 trucks.km/day/tube 50 MW
  - >6,000 trucks.km/day/tube 100 MW
- 74 road tunnels are >1,000 m

Austrian RVS 09.02.31

- Usually no mechanical ventilation system for less than 700 m
- Based on traffic data a longitudinal ventilation system for
  - One way traffic up to 5,000 m
  - Two way traffic up to 3,000 m
- Based on traffic data and tunnel lenght
  - Point extraction
  - Semi transverse ventilation system
- Design heat release rate of 30 MW
  - >15% trucks based on risk analyses increase to 50 MW
- More than 40 road tunnel are >1,500 m



Tunnel
Tunnelausrüstung
Belüftung

GRUNDLAGEN
Ausgabe 1. Juni 2014

Tunnel
Tunnel Equipment
Ventilation Systems
Basics

Seite 1
RVS 09.02.31

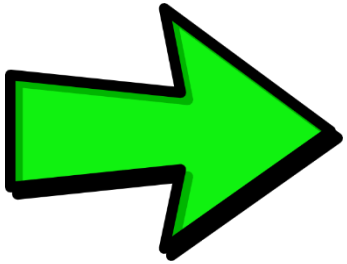
Inhaltsverzeichnis

AG: Tunnelbau
AA: Betriebs- und Sicherheitseinrichtungen
Ausgabe 1. Juni 2014
Diese RVS wurde einem Notifikationsverfahren unterworfen.
Details können der Homepage der FSV www.fsv.at entnommen werden.

ÖSTERREICHISCHE FORSCHUNGSGESELLSCHAFT STRASSE • SCHIENE • VERKEHR

Comparison with common polish standard

	ASTRA	RABT / EABT	RVS	Poland
no mechanical ventilation system	<800 m	<600 m	<700 m	each project has their own definitions, PFU's and requirements. Mostly a sum of different guidelines
longitudinal ventilation system one-way traffic	<3.000 m	<3.000 m	<5.000 m	
longitudinal ventilation system two-way traffic	<1.500 m	<1.200 m	<3.000 m	
design heat release	30 MW	standard is 30 MW	standard is 30 MW	mostly 100 MW



Prepare a Polish Tunnel Ventilation Guideline

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