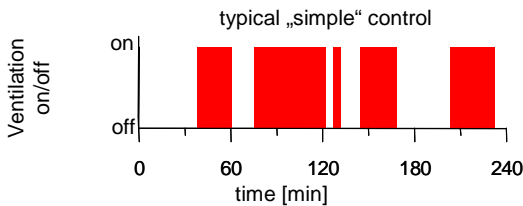
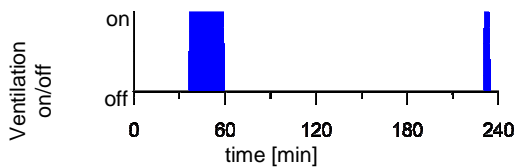
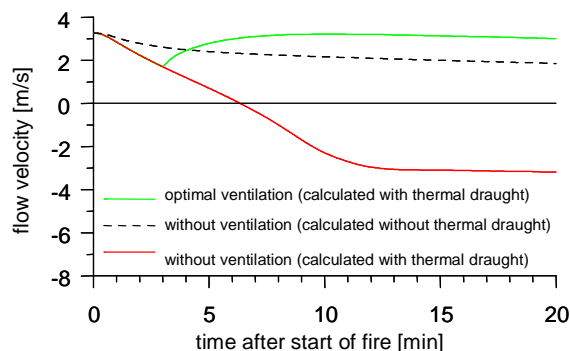


further developed control



Simulation of a further developed control logic (top) for minimization of duration of fan operation



Calculation of flow velocity in case of fire with thermal draught and resulting optimal ventilation strategies

HBI Haerter Consulting Engineers conduct detailed analysis of aerodynamic coefficients of a tunnel, the ventilation system and the sensing elements. This is the foundation of the control and monitoring concept. The control usually includes following operating conditions:

- normal operation, for example unidirectional traffic
- special case, for example oncoming traffic
- Event of fire and evacuation
- Event of fire and firefighting

Our services

HBI provides following services:

- Analysis of the timescale of detection, the ventilation system and tunnel system
- Analysis of the non-stationary processes
- Calculation of ventilation scenarios
- Create an optimal control logic
- Simulation of the control logic
- Guidelines for setting of parameters
- Test on the implemented control scheme
- Optimization of the setting of parameters during operation

Your benefits

The following advantages result for different operation modes

- A) Normal operation:
 - Proper quality of air during all operation conditions
 - Energy efficient operation
- B) Event of fire and evacuation:
 - Fire detection as quick as possible
 - Best possible support for the fire escape for the tunnel users by the ventilation system
 - Prevention of smoke propagation of a hot smoke layer against flow direction or support of a smoke stratification by low turbulence
- C) Event of fire and firefighting:
 - Best possible support for the fire fighters by an optimal system for all possible scenarios
 - Protection of civil structure by fast and safe handling of the fire