

USING RAILWAY STATIONS FOR LARGE-SCALE EVACUATIONS



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General information about the project KapaKrit

- Metropolitan railway stations are important junctions for rail traffic and can play an important role for large-scale evacuations in case of nature or human made hazards, where it may become necessary to evacuate a large number of people in a short time.
- To handle such a large volume of people in and around the station special measures are needed.

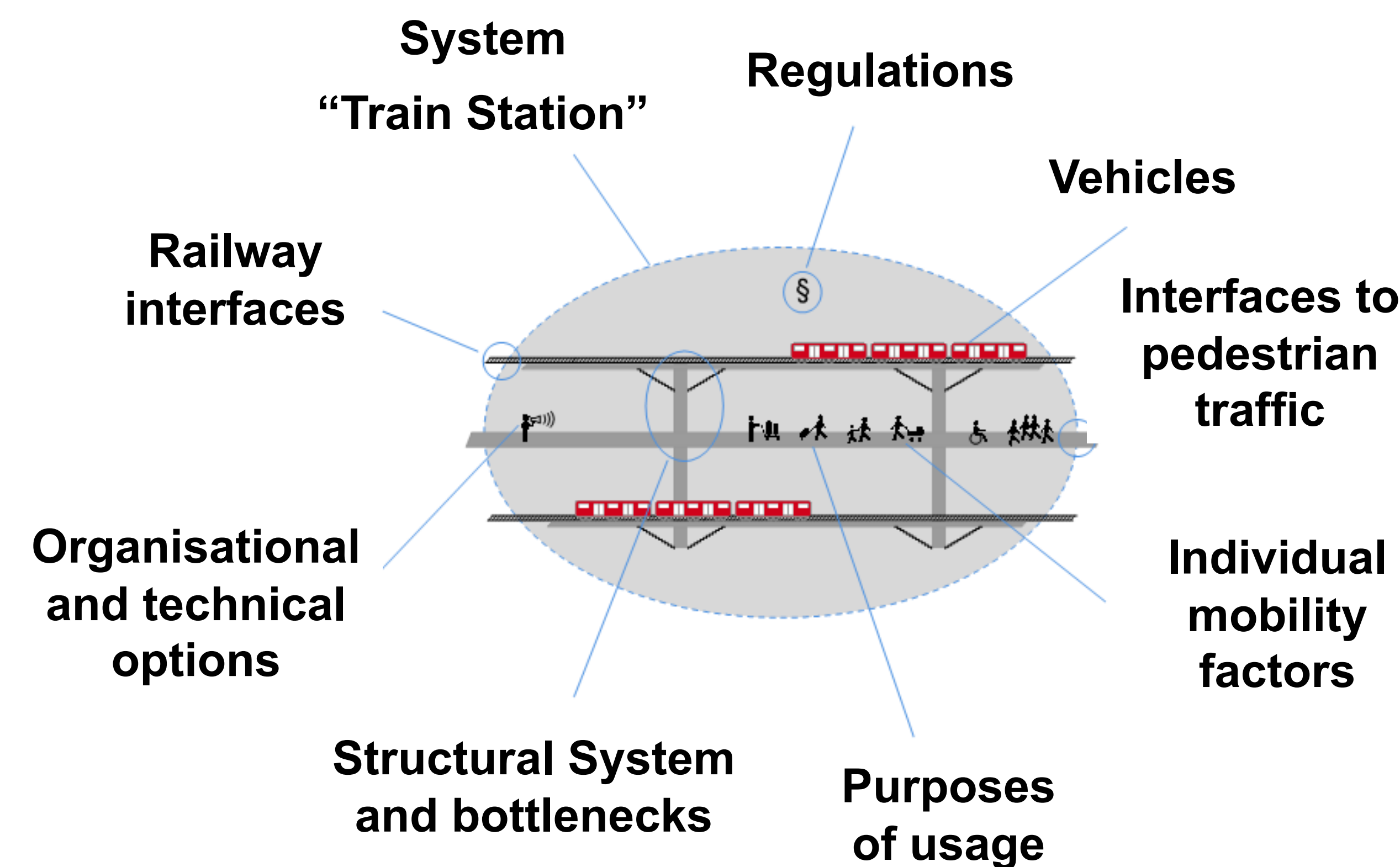


- In the project KapaKrit the impact of rail-based evacuation approaches is investigated, especially to estimate the capacity in case of large-scale emergency evacuations.
- The capacity is set as a value evacuees/hour and is influenced by constructional and technical bottlenecks inside the stations building and bottlenecks resulting from train operation service.
- To maximize the capacity for the evacuation context, special organisational and technical options are estimated.



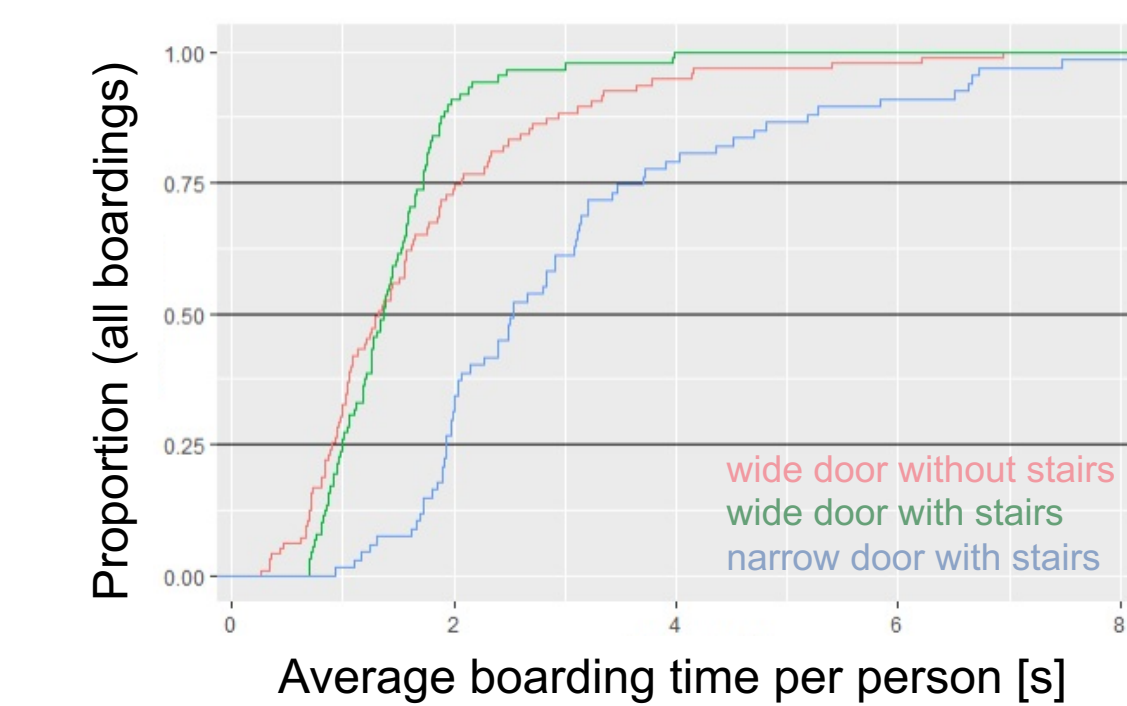
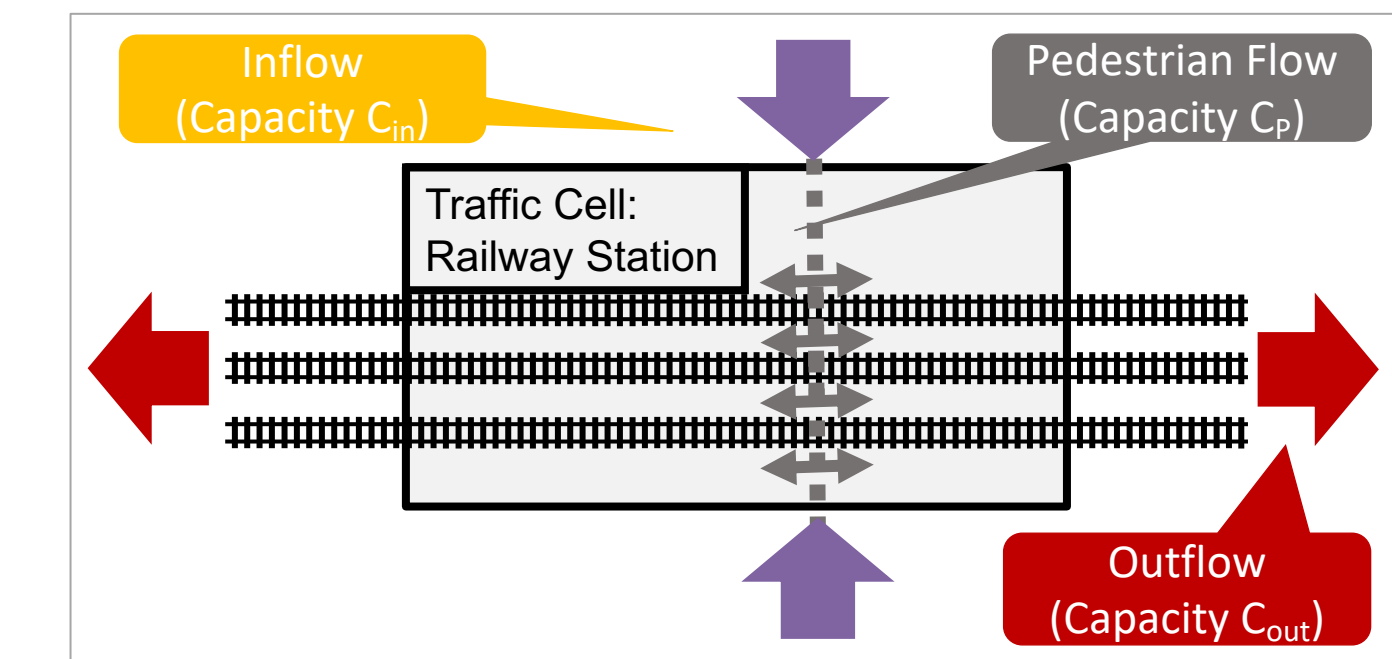
- The aim of the project is to draft a guideline for the usage of railway stations in case of a large-scale evacuation.
- Therefore, an **open-access tool** to evaluate the capacity of a station will be created, which includes the simulation software (JuPedSim) and methods to estimate the needed model parameters.
- As object of investigation from the practice the main train station of Dortmund (DO Hbf.) is investigated.
- The methods to achieve the projects goals are field studies at DO Hbf., parameter studies by simulations, literature reviews and corporations with the city administration of Dortmund, the federal police and railway organisations like the Deutsche Bahn, National Express and Abellio.

System "Train Station" and its interfaces



Performance of passenger railway stations

- Investigation of the methodological foundations for determining the maximum performance of passenger railway stations with a focus on the public transportation systems
- Systematic recording and valuation of input variables, e.g. rail and urban infrastructure, railway-specific regulations, volume of passenger traffic, train-specific parameters



- Parameter studies in various evacuation scenarios
- Derivation of technical and operational concepts and measures

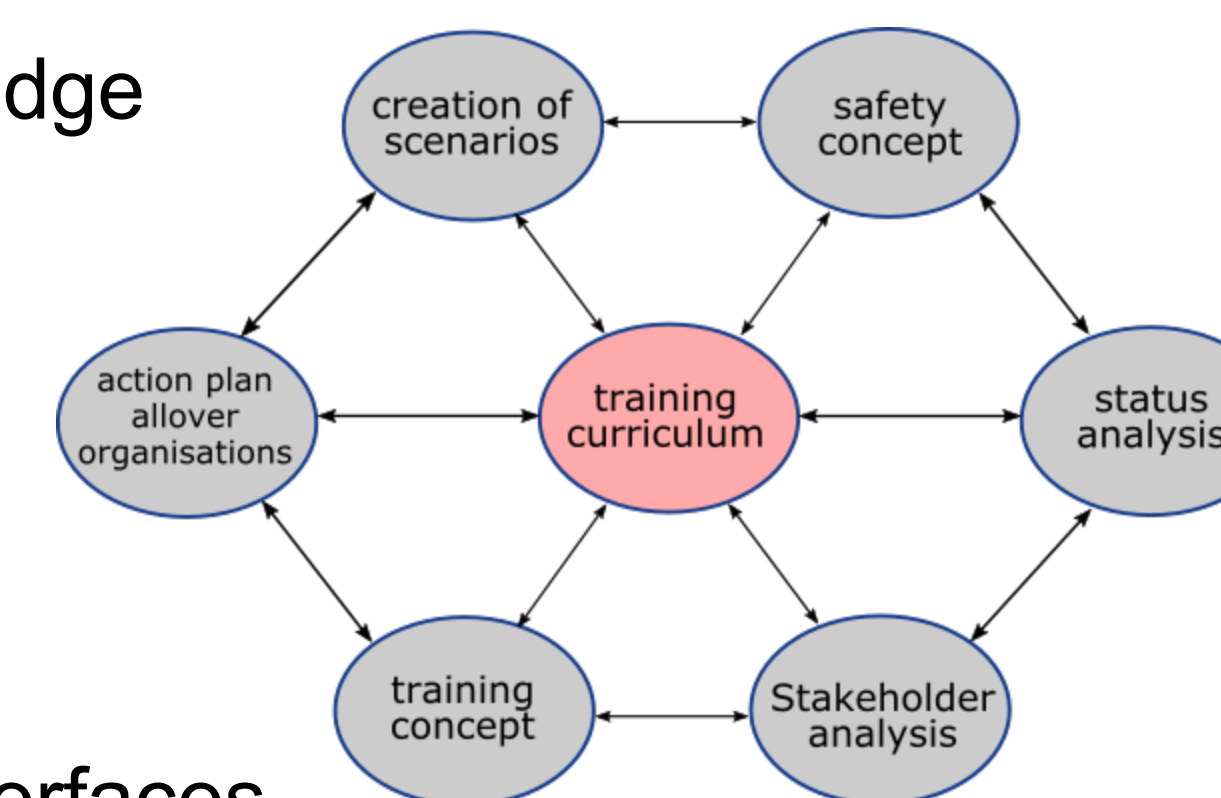
Action plan and training curriculum

Goals:

- Pointing out connections, options for action and limits
- Strengthen the cooperation between the stakeholder in the scenario "Using train stations for large-scale evacuation"
- Increase performance and capacity of the system "train station" in the scenario
- Transferability through knowledge transfer and advice

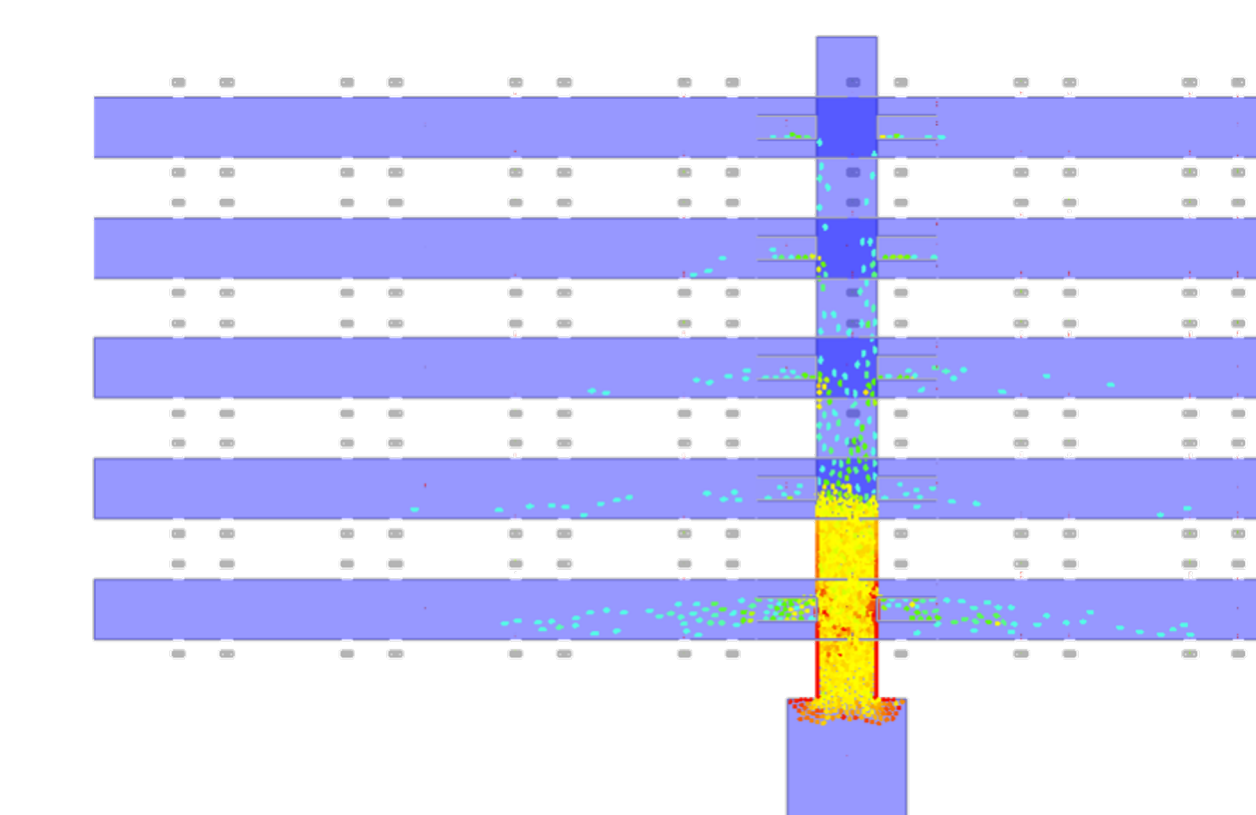
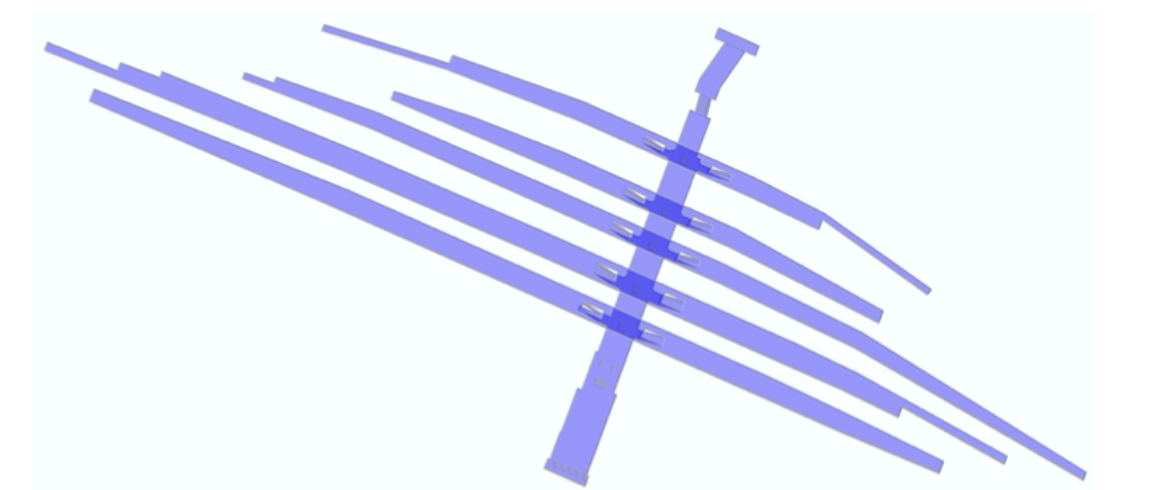
Tasks:

- Stakeholder analysis
- Video analysis
- Analysis of complexity and interfaces
- Development of measures
- Identification of training requirements and development of a training concept



Simulation studies

- Doing parameter studies using the Jülich Pedestrian Simulator (JuPedSim) a software tool for pedestrian dynamics
- Investigating the system "train station" to find critical bottlenecks
- Development and investigation of technical, organisational and structural measures to avoid critical bottlenecks and increase the capacity of train stations for the scenario "Using train stations for large-scale evacuation"



Simulation Model:

- 3D train station model
- Trains = doors at platform edges with flow regulation for different entry times
- Agents with different parameters to model a realistic population distribution