

Insights into one or two MATSim applications at Swiss Federal Railways: Intermodal freight transport and future scenarios 2050

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Abstract

In this talk, one or two different MATSim applications within Swiss Federal Railways (SBB) is addressed – depending on the project progress and maybe depending on the available time and audience.

The first application addresses an innovative agent-based simulation approach to investigate the shift of Switzerland's inland freight transport from road to rail:

Most of today's inland freight transport in Switzerland is operated on the road system. In addition to negative environmental impacts, the large prevalence of road transport also burdens passenger road traffic. In this study, an innovative agent-based simulation approach is developed to investigate the potential shift from road to rail. In a first step, future freight demand for inland road transport is calculated based on official governmental forecasting tools provided by ARE (Bundesamt für Raumentwicklung, Switzerland). In a second step, the agent-based simulation framework MATSim (Multi-Agent Transport Simulation) is used to investigate different supply concepts and estimate the mode shift effect from "road-only" to "combined road and rail transport". The simulated transport supply consists of the road network, the rail network, the cargo rail schedule and the rail-road terminals where containers are loaded from Heavy Goods Vehicles (HGV) to cargo trains and vice versa. For both, the road and rail system, dynamic queuing effects are explicitly taken into consideration: road segments are modeled as a first-in-first-out queues and each terminal is modeled using capacity constrained cranes. The method provides insightful results to understand the impact of supply concepts, prices and assumptions regarding temporal restrictions on the mode shift effects.

The second application addresses the use of SBB's multimodal simulation environment "SIMBA.MOBI" for the purpose of longterm planning and the development of future scenarios for the year 2050.