

CHAPTER 94

Trondheim

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The Institute of Transport Economics (TØI), in cooperation with Julia Kern from TU-Berlin and Frederik Bockemühl from Hasselts University, built a first prototype model for the region of Trondheim (Norway) (Flügel and Kern, 2014).

The road network data was imported from a publicly accessible data base (Elveg). Figure 94.1 illustrates the network. Most required link information could be directly inferred from the data base. The lane capacity (vehicles per hour) was assumed to be a flat 1 800 per lane. Existing toll stations, with their current toll structures, were coded manually in the network file. The public transport, walk and cycle networks had not been implemented at this time. Agents using one of these modes were teleported; travel times were calculated with predefined speeds per transport mode. Initial demand was derived from the National Travel Survey (NTS 2009) travel diaries. 4 453 respondents were simply scaled up to 191 676 agents; activity locations and departure times were slightly randomized to avoid clusters. This model differentiated only between work and “other” activities. Desirable working hours were specified as eight hours; demand consisted only of private cars (no trucks).

Standard utility functions were applied, but in the calibration process, default values for travel time disutility in different transport modes were adjusted so that the model would reproduce observed market shares. The simulated traffic fit (in the reference scenario) against real-world counts was deemed satisfactory for a first implementation (Bockemühl, 2014).

Standard behavioral modules in MATSim were included in the Trondheim model. Agent could react to policy measures through three choice dimensions: changing route, changing transport mode and changing departure time. To test whether MATSim predicted reasonable behavioral changes, a small case study was performed. Additional tolls on streets (bridges and tunnels) to Trondheim city center were coded in the network and three congestion price structure were tested. Figure 94.2 illustrates the effects on the simulated cars entering and leaving Trondheim city center. Compared to the reference scenario without tolls, total number of cars was reduced in

How to cite this book chapter:

Flügel, S, Kern, J and Bockemühl, F. 2016. Trondheim. In: Horni, A, Nagel, K and Axhausen, K W. (eds.) *The Multi-Agent Transport Simulation MATSim*, Pp. 525–526. London: Ubiquity Press. DOI: <http://dx.doi.org/10.5334/baw.94>. License: CC-BY 4.0

all toll scenarios. Some agents changed transport modes; others, who would have driven through Trondheim center, changed their route. Comparing the three different congestion-pricing structures, it was also evident that agents changed departure time. The difference between the 15 NOKs flat scenario and the 10/20 NOKs scenario was small; the effect in the 50 NOKs rush scenario was substantial. Actually, in this scenario, traffic was heavier before 3 pm and after 5 pm implying that many agents changed departure time to avoid high congestion pricing.

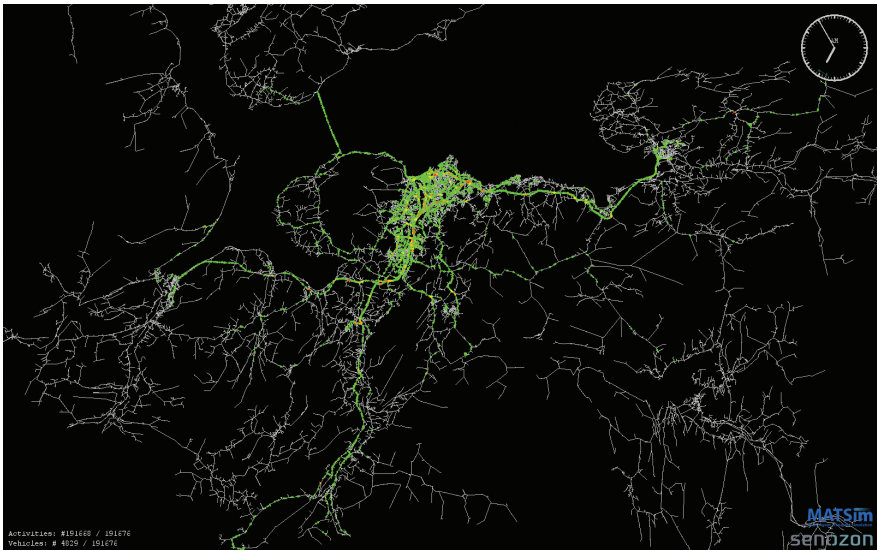


Figure 94.1: Network and simulated traffic in Trondheim and surroundings for 6:55 am (source Flügel et al., 2014) (visualized with Via).

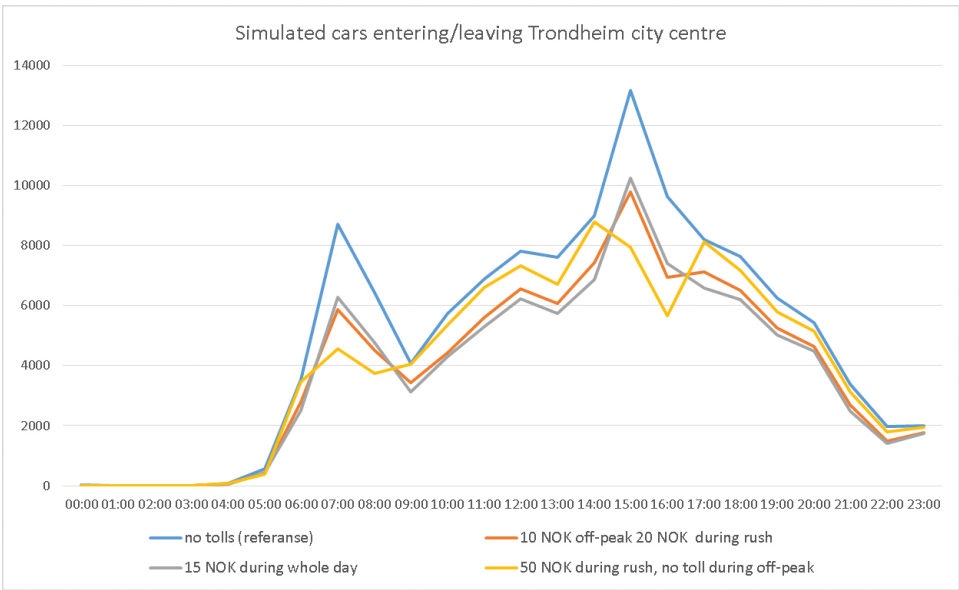


Figure 94.2: Cars entering/leaving Trondheim city center in reference scenario and three congestion pricing scenarios (source Bockemühl, 2014).