

Due to the ever increasing traffic demand, more and more countries around the world are confronted with traffic congestion. Traffic congestion has a negative impact on our quality of life due to wasted fuel, time losses, dangerous traffic situations resulting in accidents, ... By consequence, there is a need for short term solutions for this problem.

In this project we looked for a short term solution for the traffic congestion problem on highways in Belgium. Attention was paid to the level of sustainability of the proposed solution.

Our research started from three inventarisations: the inventarisation of the current traffic situation, the inventarisation of the available dynamic traffic management (DTM) systems and the inventarisation of the available traffic models.

Inventarisation of the current situation

In this inventarisation phase we looked at the current traffic circumstances on the Belgian highways and the available measurements. A study area was defined which consisted of the highway E17 Ghent-Antwerp. The choice of this highway resulted from the occurrence of recurrent congestion on this highway as well as the strategic importance of this highway for the port of Antwerp. A detailed study of the traffic situation in the study area was conducted.

Inventarisation of DTM systems

Based on the available literature, a survey of the existing systems to reduce congestion was compiled. We chose to study ramp metering as a means for DTM into more detail. A measure for optimality of a traffic situation (a cost function) needs to be defined in order to be able to optimize traffic. The sustainability policy defined by the government needs to be reflected in this cost function. In this project we proposed, and used, one possible cost function.

Inventarisation of traffic models

We can distinguish two large groups of traffic models: microscopic and macroscopic models. After a survey of the literature two microsimulation models were chosen (Paramics and Aimsun) for further investigation. Paramics was calibrated for a detailed simulation of the traffic situation in the study area. The less detailed macroscopic models were applied for optimization of the ramp metering strategy. This due to their more limited computational requirements.

The scientific results of this project were published in four journal papers, nine conference proceedings and four internal reports. Besides these publications, there were numerous talks and seminars where the results obtained in this project were presented.