Why Traffic Management Works…
…And Why Coordinated Traffic Management Will Work Even Better

Prof. Dr. Serge Hoogendoorn, Delft University of Technology

Daily traffic congestion has become a major societal and economic problem over the past decades in and around most, if not all, major cities in the world. The estimated societal costs of congestion add up to billions of dollars. These costs not only include the costs due to spending time in a queue which could be spend more productively, but also costs due to the uncertainty in travels times, air pollution, etc. In particular travel time uncertainty turns out to be a major factor, since these require taking into account buffer times in order to deliver the goods on time or to just make it to that important appointment.

Amongst the different options (e.g. building new infrastructure) to relieve traffic congestion, managing traffic by means of traffic information, guidance, and control, turns out to be the most cost-effective one. Doing it wisely can strongly improve the utilization of available road infrastructure, and improve the reliability and robustness, while at the same time respect or even improve liveability issues in our densely populated metropolitan areas.

But why does it work? And what does 'doing it wisely' mean? In this presentation, we will address the five key characteristics of traffic network dynamics. These characteristics will be introduced by showing results of traffic data analyses, simulation, mathematical analyses, etc. Based on these characteristics, principles of traffic management will be proposed and illustrated by examples from the field of vehicular traffic management and crowd management.

We will show how the joint deployment of different traffic information, guidance and control measures can strongly improve the effectiveness of our traffic management activities, counteracting the potential negative impacts of their isolated deployment. In this, both traditional roadside based measures will be used jointly, alongside new in-car technology. This combined deployment of in-car and roadside systems will significantly improve the traffic manager's situational awareness (e.g. by innovative state estimation and data fusion, and intelligent problem diagnosis techniques), and it will increase traffic management effectiveness, while at the same time the overall system's architecture maintains relatively simple.