

Toll charges reduce travel time

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A smart introduction of a variable toll charge, with different rates at different departure times, reduces traffic jams. Even small toll charges can exert a large effect on the total travel time, concludes Dutch researcher Dusica Joksimovic.

Joksimovic developed a simulation model that can help policy makers to estimate the consequences of various toll charges. The model predicts, where, when and how much toll must be charged for the desired policy outcomes, such as reducing the total travel time of all travellers or maximising the toll incomes (revenues). Based on a toll value entered, the model iteratively calculates the impacts on road congestion and the total toll incomes and searches for an optimal composition of the toll charge.

The model contains a number of variables. For example, it takes into account the different characteristics of travellers. People who want to be at a preferred destination by a given time are more inclined to pay more during rush hours than people who want to travel as cheaply as possible and are flexible with respect to their arrival time. A flexible toll charging system in which car drivers must pay more at peak times than off-peak times leads to less traffic jams, but also maximum toll incomes.

Various factors play a role in the problem of toll charges: the government wants to minimise both the total travel time of all travellers and harmful environmental effects whilst at the same time maximising toll incomes to pay, for example, for roadworks. Individual motorists mainly want to make their journeys as quick and cheap as possible.

These considerations lead to a complex decision model in which the various variables are dependent on each other. The instrument that Joksimovic developed during her doctoral research can provide policy makers with a quicker insight into the outcomes of policy measures.

Source: NWO

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