SAFETY EFFECTS OF DYNAMIC SPEED LIMITS ON MOTORWAYS

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ABSTRACT

Dynamic speed limits (DSL) are limits that change according to real-time traffic, road or weather conditions. In DSL-schemes road users are typically informed of speed limit changes by electronic signs that are housed within gantries situated above lanes. Dynamic speed limit systems are increasingly applied worldwide, usually on motorways. One of the objectives of dynamic speed limits is to improve traffic safety through reductions in speed variations within and across lanes and between upstream and downstream flows. This paper shows the results of an empirical evaluation of the effects on traffic safety of a dynamic speed limit system on motorways in Flanders, Belgium. The evaluation was done by means of a before-after analysis of crashes, completed with a cost-benefit analysis. The results show that the number of injury crashes decreased significantly (-18%) after the introduction of the system. A separate analysis for serious and fatal injury crashes revealed a non-significant decrease of 6%. A distinction according to crash type showed an almost significant decrease of 20% in the number of rear-end crashes whereas the number of single-vehicle crashes decreased by 15% (ns). However, no effect was found for side crashes. In addition to the analysis of the effects, a cost-benefit analysis was applied. The costs of the implementation of these systems were compared with the benefits of crash prevention. The cost-benefit analyses of the crash effects showed a benefits-to-costs ratio of approximately 0.7, which means that the costs tend to exceed the benefits. Taking into account the important margins of uncertainty with respect to both costs and benefits, we have also explored how the net benefits are affected by some key assumptions. The general conclusion is that there is no convincing evidence that the costs of the system currently outweigh the expected benefits in terms of crash prevention.