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Study on the effects of speed limits changes on Belgian motorways on mobility, road safety and environment.

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Summary
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Leblud J., Lequeux Q. , Slootmans F., Broeckaert M., Maes J. et Trotta M. (2017) *Les limitations de vitesse sur autoroute sont-elles encore pertinentes ? Effets de l'adaptation des limites de vitesse sur les autoroutes belges sur la mobilité, la sécurité routière et l'environnement.* Bruxelles, Belgique: Institut Belge pour la Sécurité Routière – Centre de Connaissance Sécurité Routière

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Summary

Goal and methodology

The goal of this study was to investigate the opportunity to change the speed limits on motorways, and to investigate the impacts on mobility, road safety and environment.

The study was organised as follows. The first part described the current situation on the Belgian motorways. More specifically, it described the today's Belgian rules regarding speed at federal and regional levels, but also the road infrastructure technologies that allow the speed monitoring and regulation. It then focused on the traffic and accident areas on the Belgian motorways. Finally the behaviour of the Belgian drivers was confronted to the regulation.

The second part investigated the effects of speed and speed adaptation on mobility, safety and environment thanks to an exhaustive review of the scientific literature.

The Belgian motorway network is part of the most important European network. The regulations are different from one country to another. The analyse of speed limits and adaptations in other European countries allowed us not only to identify the good practices but also to enrich the present study by the expertise of interviewed foreign experts. Belgian behaviour was also compared to our European neighbours.

A synthesis of all this information was done in order to check the transferability of these methods to the Belgian motorway infrastructure. Different hypotheses of speed adaptation have been prepared. Stratec was appointed to prepare a Belgian motorway model thanks to which hypotheses have been tested and effects on mobility, road safety and environment were addressed.

Key results

This study emphasised that dynamic speed was enhancing the traffic flow in many studies, which had a positive impact on mobility, road safety and environment. In this literature review, advantages of increasing the speed limits were not found. Indeed, increasing the speed limits leads to an increase of the accident rate and severity. Moreover it has a consumption increase effect (thus increasing pollutant emissions). Finally it has only a small impact on mobility and trip duration (especially considering the small size of Belgium).

Simulations highlighted that applying dynamic speed decrease could improve trip duration on Belgian roads globally (- 25%), road safety (-6% death) and environment (decrease of CO, CO2, small particles, etc.). The study also confirmed that an increase to 130km/h would not have a huge impact on mobility, but has a negative impact on environment. Moreover, some drivers could be tempted to drive even faster than the new speed limit, increasing even more the accident risk and severity.

Finally, this research project highlighted the current development of the infrastructure technologies in Belgium and supports it fully in the context of Dynamic speed limits.

Key recommendations

This study about the possibility and the benefit of modifying speed limitations in Belgium allowed to highlight significant effects on mobility, road safety and environment.

The progressive decrease of speed limits where congestion occurs seems to improve the traffic flow and the flow homogeneity. A higher mean speed, lower trip durations, higher security and a decrease of the pollution are observed. This measure should be promoted and is already used in other countries. It would be now useful to study in detail the effects of such measures on specific sections of the Belgian network (for instance to study the traffic flow during SMOG alerts). Moreover, there would be a need to inform road users about the collective advantages of such dynamic speed decrease, which are not directly perceived at the individual level.

Moreover, on specific roads where traffic flow is low and where the monitored mean speed is above 120 km/h, it would be possible to increase the speed limit to 130 km/h. But the only advantage would be a

small mobility benefit. It would be necessary to advice road users (behavioural changes) thanks to campaigns. Belgian drivers tend to exceed the speed limit (ESRA study). Section controls would also be necessary to be sure that new limits are strictly respected. But increasing the speed limit has also deep disadvantages: crash risk increase (faster speed means more severe accidents) and pollution increase.

Finally, it should be noticed that the measures for adaptive speed decrease and speed increase zones are not excluding each other. Both could be simultaneously taken because they would be applied in totally different places.

The speed modifications (decreasing or increasing) should be coupled with road user information so they can understand why they have to adapt their speed and respect rigorously the speed limits in force. It would be necessary to explain the advantages of such measures for each of the users, but also the collective advantages of respecting the speed limits.

In conclusion the present study, even if it is (partially) based on modelling and should be interpreted with caution, enabled us to take part in the debate on the expansion of dynamic speed limits in Belgium. It fully support the efforts made by the Regions in terms of infrastructure. It would be now important to conduct other studies focusing on specific zones (with high traffic and/ or high accident rates) in order to compute and maximise the advantages of dynamic speed limits.

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