VIAS institute

Research report no. 2018 -T - 06 - SEN

Car drivers and passengers

Thematic File Road Safety N°19

Federal Public Service
Mobility and Transport

Car drivers and passengers

Thematic File Road Safety N°19

Research report no. 2018 -T - 06 - SEN

Authors: Julien Leblud, Philip Temmerman and Annelies Schoeters
Responsible publisher: Karin Genoe
Publisher: Vias institute – Knowledge Centre Road Safety
Date of publication: 12/10/2018
Legal deposit: D/2018/0779/45

Please refer to this document as follows: : Leblud, J., Temmerman, T. & Schoeters, A. (2018). Thematic File Road Safety N°19 Car drivers and passengers. Brussels, Belgium: Vias institute - Knowledge Centre Road Safety

The complete report is available in Dutch and French:

Leblud, J., Temmerman, T. & Schoeters, A. (2018). Themadossier Verkeersveiligheid nr. 19 Autobestuurders en -passagiers. Brussel, België: Vias institute – Kenniscentrum Verkeersveiligheid.

Leblud, J. Temmerman, P. & Schoeters, A. (2018). Dossier thématique Sécurité routière n° 19 Conducteurs et passagers en voiture. Bruxelles, Belgique : Vias institute – Centre Connaissance de Sécurité Routière

This research was made possible by the financial support of the Federal Public Service Mobility and Transport.

Executive summary

The motor vehicle (the "car") is an extremely common mode of transportation around the world. In 2014, the world car fleet was estimated at nearly 1 billion, mostly in Europe, the United States and China. In Europe, there were about 579 cars per 1000 inhabitants in 2014.

Of course, with such a use of this transport mode, it is clear that many fatal accidents happen in a car. In 2014, 45% of fatal accidents on our roads occurred in a car. Nevertheless, there is a steady progressive decrease of about 7% per year in Europe in car deaths. As a result, the proportion of people killed in car accidents has decreased slightly compared to deaths in other modes of transport.

In general in Europe, injury and / or fatal accidents occur on rural roads, and mainly cause injuries to these occupants in the thorax (26% of injury accidents), in the head (21% of serious accidents) and in the legs (20% of injury accidents).

The car, compared to other means of transport, is a relatively safe mode of transport in terms of death and injury accidents (57 times safer than motorcycles, 23 times safer than bicycles and 8 times safer than pedestrians). The causes of car accidents can be divided into 3 categories: behaviour, infrastructure and vehicle malfunction. From a behavioural point of view, unsurprisingly, inadequate speed, driving under the influence of alcohol and / or drugs, non-wearing a seatbelt, distraction and fatigue are key factors in the risk of an accident. On the infrastructure side, the literature review showed that poor adhesion could lead to accidents. In addition, obstacles and particularly work areas can be accident factors. Finally, concerning the state of the vehicle, the review of the literature revealed that a lack of maintenance of the vehicle could be an accident factor, and that a car with a low Euro NCAP score significantly increased the risk of serious injuries.

The analysis of key figures in Belgium showed that car use almost doubled between 1985 and 2010, from 45 billion kms travelled on our roads to more than 80 billion kms. Since 2010, we have arrived at a plateau, probably corresponding to the saturation of our road infrastructure. During the same period, the number of victims and deaths in car accidents has steadily declined. In fact, there were more than 1,144 deaths a year in 1991, and we went to 288 deaths in 2017 (down 75%). The car is therefore a safer mode of transport than before.

Age and gender seem to play a very important role in the risk of car accidents. Indeed, the peak number of victims among motorists is between 20 and 29 years, before decreasing with age. Men and women follow a similar trend. We note, however, that there are more male victims than women aged 20 to 29 and over 70 years. The trend is reversed for passengers, more passengers are female victims. The breakdown among deceased victims seems different: in 2017, there were 288 road fatalities among the occupants of the car, including 226 drivers and 62 passengers.

The severity of the accidents (in terms of the number of deaths per 1000 car accidents) was compared between the regions and the types of roads. The overall severity is greater in Wallonia on ordinary roads outside urban areas, and on motorways. In the agglomerations as well, the severity of the accidents is greater in Wallonia than in Flanders or Brussels. In Flanders, gravity on motorways is higher than on ordinary roads outside urban areas.

The analysis of the accident time stamps shows that young motorists aged 18 to 25 are over-represented in fatal accidents during every period of the week. We find the same trend in drivers aged 26 to 39 for accidents occurring at night and during the weekend. On the other hand, during the week, there is a slight overrepresentation of over 55 years old fatalities.

Finally, the different types of car accidents were quantified: in 17% of the collisions, there is no opponent. Most accidents involve a side collision (36%) or a rear collision (20%). In 10% of cases, it is a frontal collision and in 10% of cases a collision with a pedestrian. Hazardousness can be calculated as the number of deaths or people severely injured (KSI) per 100 vehicles involved. In light of these different scenarios, we find that the most dangerous are the reversals and lurches, with 60 KSI per 100 vehicles. Then there are frontal impacts with 24 KSI per 100 vehicles and side impacts with 22 KSI per 100 vehicles. The different European countries were compared according to the number of deceased 30 days per million inhabitants. It can be seen that this indicator varies greatly between the different European partners. In fact, we go from 9 killed per year and per million inhabitants in Switzerland to 40 in Romania. Belgium is in the average with 29 killed per million inhabitants by car. On the other hand, the subjective feeling of road safety was also compared (on a score of 10, 0 being "very dangerous" and 10 being "very safe"). The results show that Belgian motorists (6.5) feel

safer than the European average (7.2). It is only in France and Poland that the subjective feeling of insecurity is the greatest. The subjective feeling of passenger safety in Europe averages (6.7). In Belgium, the subjective feeling of passenger safety is 6.5, it is closer to the European average. To improve the road safety of car occupants, we must therefore work on the 3 risk factors: infrastructure and the vehicle. For behaviour, the measures that have proved effective are training in driving and risk perception, legislation and strict control of risky behaviour (speed controls, driving alcohol, seat belt). Awareness campaigns on risk behaviours and good driving practices also play a positive role in the safety of car occupants, but should be coupled with enforcement. Regarding the infrastructure, the effort must be put on forgiving roads, that is to say the roads that will cause the minimum damage in case of accidents (presence of shoulder, guardrails), but also dynamic speed management that optimizes road safety. Finally, concerning the technology of the vehicle, innumerable technological advances have made it possible to improve the passive and active safety of current cars. In terms of active safety, we can mention the ABS braking system, the trajectory control, the automation of certain tasks (adaptive cruise control) and the visibility of vehicles (daytime running lights and rear view mirrors). In terms of passive safety, which aims to reduce the consequences of the accident, let us quote the Euro NCAP evaluations (allowed to improve the performance of the structure of the car in case of shock and to preserve the cockpit for moderate violence), seat belts, airbags and automated accident notification to emergency services.

Vias institute
Haachtsesteenweg 1405, 1130 Brussel · Chaussée de Haecht 1405, 1130 Bruxelles · +32 2 244 15 11 · info@vias.be · www.vias.be · VAT BE 0432.570.411