

Speed Limit and Safety: Importance for Traffic Flows

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Annotation:

Speed is one of the main factors influencing traffic accidents. The World Health Organization says that 1.3 million people die in road accidents every year and between 20 and 50 million are injured. At the same time, it is worth noting that road accidents also have significant economic costs. According to the study "Investing in Road Safety: A Global Imperative for the Private Sector," accidents cost the global economy \$518 billion per year.

Keywords: transport speeds, speed limit, initial speeds.

Experts from the Institute of Forecasting and Macroeconomic Research of the IPMI analyzed how much a decrease in maximum speed affects the traffic situation (average speed of transport) and road deaths. The following results were obtained as part of the study:

1. Reducing the maximum speed in cities by 10 km/h can help reduce mortality by 0.8 people per 100,000 people per year. For Uzbekistan, this is 614 lives saved.
2. The speed limit does not have a significant effect on the average speed of movement. The main influence on the speed of movement and travel time is the quality of the road infrastructure.
3. An improvement in the rule of law rating by 1 point can reduce road deaths by 3.3 people per 100,000 people per year. Speaking about the level of maximum permitted speed in cities, it can be noted that two theories are currently the most popular. Within the framework of the first theory, it is argued that reducing the maximum permissible speed will lead to a decrease in the number of accidents with serious consequences and reduce the number of deaths on the roads. Proponents of the second theory are of the opinion that lower transport speeds in cities will lead

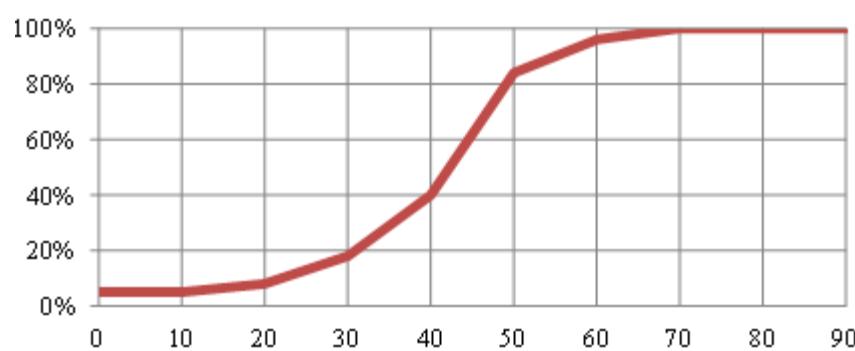
to a more difficult traffic situation, and logistics in general will become less accessible and more time-consuming.

For cross-country analysis, we have collected data on 140 countries. To assess the effect of the established speed limit on the average speed of movement, the average speed indicator is presented as a dependent variable. Variables such as mortality from road traffic injuries per 100,000 population, the quality of road infrastructure, speed limits in cities and rural areas, and the rule of law were also used. According to the results of the study, improving the quality of road infrastructure by 1 point can increase the average speed by 8.6 km/ h, and the speed limit does not significantly affect the average speed. This is due to the fact that the main factor ensuring optimal average speed of movement is a properly designed traffic management system and high-quality infrastructure.

This system, combined with high-quality roads, allows for optimal distribution of vehicle flows without creating traffic jams and artificially slowing down traffic, which will ensure the shortest possible time for a trip from point A to point B. The results of econometric modeling show that the maximum allowed speed in cities is positively correlated with the mortality rate. In other words, the higher the speed limit, the higher the death rate on the roads. This is due to the fact that the high speed of the car reduces the viewing angle of the motorist ("tunnel effect"), increases the braking distance of the car, the collision occurs at high speed, which more often leads to deaths. According to the results of an econometric analysis, reducing the maximum speed in cities by 10 km/h can help reduce mortality by 0.8 people per 100 thousand population.

Based on the results obtained, it can be concluded that reducing speed does reduce road deaths, while not significantly affecting the average speed of transport movement. However, the speed limit has a positive effect only if the situation improves with respect to traffic rules and the availability of appropriate infrastructure. This is an important factor in ensuring safety and maintaining average speed.

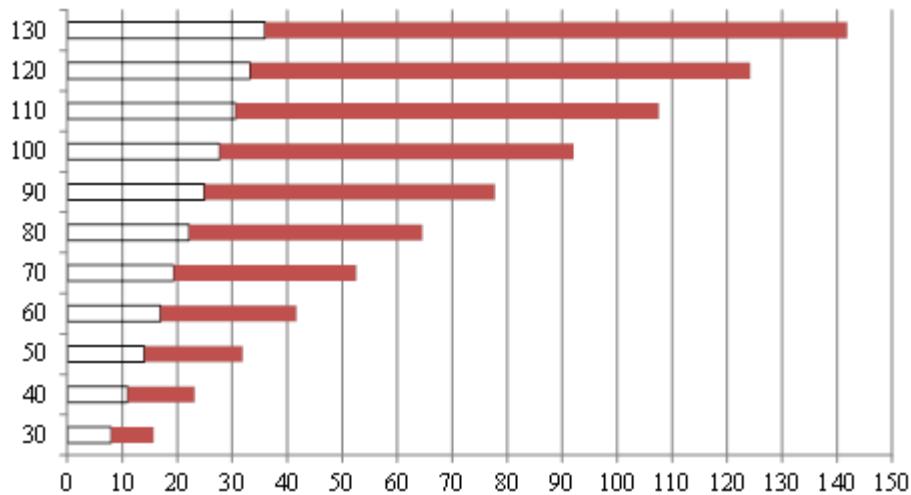
Reducing the speed by 10 km/h on average in the world can reduce the number of deaths on the roads by 0.8 people per 100,000 population. Within Uzbekistan, this means 614 lives saved. Moreover, accidents at lower speeds reduce the degree of injury, which also means less health care costs and faster recovery of people after an accident. From an economic point of view, the cost of injuries in road accidents is estimated at about 1% of gross national product in low-income countries, 1.5% in middle-income countries and 2% in high-income countries.



The effect of speed on the likelihood of fatal injuries in a collision between a pedestrian and a vehicle.

When regulating speed on country roads, it is necessary to take into account that speed limits of 90 km / h practically leave no chance for survival for participants in an accident in a collision without braking (for example, a side impact into a car that suddenly appeared from an adjacent road). In addition, reducing the speed at the time of impact in an accident takes some time and a significant

part of the kinetic energy of the vehicle may not be extinguished by the braking mechanisms at the time of the collision. The probability of such a situation occurring at increased speeds increases due to an increase in the driver's reaction time while increasing the length of the braking distance. Figure 2 shows the paths traversed by the vehicle during emergency braking with different initial speeds, assuming a driver reaction time of 1 second.



The above calculation results indicate that the complete repayment of the kinetic energy of a car moving in a moderate density car stream at a speed of more than 80 km/h, even with a minimum reaction time of the driver, is problematic, not to mention situations where this time may increase, due to the psychological state and age of the driver, up to 3 seconds. An important psychological indicator is the driver's ability to correctly assess the speed of movement and time intervals. Studies have shown that in the general traffic flow, at least 15% of drivers drive cars at a speed exceeding the speed of the traffic flow, and up to 40% make mistakes in the direction of underestimating the speed of their car. It is known that the safest speed is equal to the speed of the traffic flow. If the vehicle's speed in the stream deviates from the flow speed by 30 km / h in a greater or lesser direction, the probability of an accident increases 10 times. Real differences in traffic speeds, for example on motorways, in view of the various technical capabilities of the vehicle can reach 60 km / h, and these further increases the likelihood of an accident many times over.

At the same time, according to the European Council for Transport Safety, a hypothetical one-time upgrade in such a situation of the entire currently operated vehicle fleet to the level of the safest car in its class can reduce deaths on European roads by 40-50%. These figures suggest that a significant increase in the potential danger of a modern fleet of cars due to saturation of its high-speed samples is aggravated by the presence of a significant proportion of cars in it (up to 40-50%) that do not fully meet modern requirements for their structural safety.

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	Localities, km/h	Highways, km/h	Motorways, km/h
Belgium	50	90	120
Denmark	50	80	110
Germany	50	100	6/0
Spain	50	90	120
France	50	90	130
Irish	48	96	112
Italy	50	90	130
Netherlands	50	80	120

Austria	50	100	130
Portugal	50	100	120
Sweden	50	90	110
Great Britain	48	96	112

The real state of the road transport situation in Uzbekistan shows that the decision taken to increase speed limits is fraught with negative consequences. It is obvious that today in society there is a priority of the socio-economic criterion under the criterion of "Zero mortality", but at the same time it is necessary to understand that road safety in areas with increased speed can be ensured only with the unconditional implementation of regulatory requirements for the arrangement of roads, creating a safe road environment on them by equipping automated traffic control systems, in conditions of strict control of the behavior of traffic participants and the inevitability of punishment for violation of established norms and rules.

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