



# INDICATOR OF ACCIDENT AND ANALYSIS OF EXISTING PROBLEMS OF ENSURING TRAFFIC SAFETY IN MAJOR CITIES OF UZBEKISTAN

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**Abstract.** This article is devoted to the analysis of accidents and road safety in large cities of the Republic of Uzbekistan such as Bukhara, Fergana and Samarkand. And also, statistical data of road traffic accidents are processed throughout the republic. Such factors as transport risk, social risk and severity of the consequences of a road traffic accident have been identified. In conclusion, the author's opinion on the factors affecting road safety in the republic is presented.

**Keywords.** Accident rate, road traffic accident, statistics, road safety, large cities, transport risk, social risk.

The growing saturation of cities with cars, especially cars, causes extreme congestion of the city's street network, a drop in traffic speeds and a deterioration in road safety conditions. The transport difficulties of large, historically developed cities are exacerbated by their inability to handle huge traffic flows. Large cities of the Republic of Uzbekistan begin to experience such difficulties, which should be prepared for a meeting in the near future with a very large number of domestically produced cars. When studying the traffic flow at the road network of large cities of the republic, such as Bukhara, Samarkand, Fergana, etc., they proved the fact that a

high percentage in the traffic flow is a car and reaches this figure up to 94% [1,2].

Studies in this direction are mainly of a specific nature: they consider individual patterns, simple or complicated flow models using special sections of mathematics. They allow one to get an idea of the individual patterns of movement, but do not fully solve the task of developing the theory of traffic flows as a system of interrelated patterns of car movement. The increase in the city's transport fleet and the intensity of the use of private cars will lead to an increase in the interaction of transport with the environment. Therefore, when developing prospective city development schemes today, it is necessary to justify the

permissible traffic intensity, taking into account road safety and its interaction with the urban environment. [3].

The low intensity of traffic in the past did not create inconvenience for residents and drivers of large cities. However, a sharp increase in the number of cars in the last 10 years has made it a priority not only to reorganize the UDS of large cities of the republic to provide the necessary traffic modes, but also to ensure traffic safety and organization. [4].

Professor K. Kh. development of a number of cities of the republic - Bukhara, Samarkand, Fergana, Andijan - in the near future will face a complex of transport problems typical for the city of Tashkent.

## METHODOLOGY

To assess the level of road safety in the Republic of Uzbekistan, the author used statistical models to assess the level of road safety, which are based on a comparison of statistical data on road accidents, the level of motorization (transport and social risks).

In order to more objectively compare the level of road safety, relative indicators are the ratio of two absolute indicators multiplied by a scale factor (1):

$$O = \frac{A_1}{A_2} \cdot K$$

where, O- relative indicator; A<sub>1</sub>- the first absolute indicator; A<sub>2</sub>- the second absolute indicator; K- scale factor.

Transport risk characterizes the accident rate in relation to the number of vehicles in the fleet. This indicator is calculated as the ratio of the number of deaths or the number of accidents to the number of the fleet, multiplied by 10 thousand vehicles.

The number of deaths per 10 thousand vehicles characterizes the risk of a car getting into an accident during its

operation, in which people died; the number of accidents per 10,000 funds characterizes the risk of a car getting into a traffic accident.

The transport risk is calculated according to formulas (2) and (3):

$$T_{risk} = \frac{A_d}{Q_{park}} \cdot 10000 \quad (2)$$

$$T_{risk} = \frac{A_{r.t}}{Q_{park}} \cdot 10000 \quad (3)$$

Where,  $T_{risk}$ - transport risk;  $A_{pog.}$  - the average number of people in the region who died in traffic accidents;  $A_{r.t}$  - the number of accidents;  $Q_{v.h.}$  - the number of vehicles in the fleet.

Social risk characterizes the accident rate in relation to the population.

This indicator characterizes the risk of each individual person to die in an accident or get injured in terms of 100 thousand populations and is determined by formula (4):

$$C_{risk} = \frac{A_d}{P} \cdot 100000 \quad (4)$$

where,  $C_{risk}$  - social risk; P- the population.

The severity of the consequences characterizes the passive safety of the car, the condition of the roads and the quality of medical care provided to the injured. As a rule, the calculation of this indicator is based on the ratio of the number of dead and the number of victims (the sum of the wounded and the dead) multiplied by 100 victims:

$$S = \frac{A_d}{A_d + A_{ran.}} \cdot 100 \quad (5)$$

Taking into account the above formula, the state of road safety in the republic and in large cities of Uzbekistan was analyzed.

**RESULTS AND DISCUSSION**

Table 1 presents the initial data for calculating the relative accident rates in the

Republic of Uzbekistan. The data were obtained from official sources [6] and [7].

Table 1. Initial statistical data for calculating relative accident rates in the Republic of Uzbekistan for the period 2009-2022

years	Number of accidents	Number of deaths from traffic accidents	Number of injured from road accidents	Population	Number of cars*
2009	10 760	2178	11 590	27 533 400	1 535 840
2010	10 705	2163	11 549	28 001 400	1 580 112
2011	10 611	2161	11 228	29 123 400	1 690 918
2012	10 309	2158	10 835	29 555 400	1 728 867
2013	10 245	2274	10 377	29993500	1 840 012
2014	10 200	2304	10 298	30 492 800	1 946 130
2015	10 164	2444	10 035	31 022 500	2 109 185
2016	10 212	2496	9 845	31 575 300	2 191 231
2017	10 044	2473	9 637	32 120 500	2 273 419
2018	8 990	2262	8 458	32 656 700	2 440 276
2019	8 588	2096	7 943	33 255 500	3 156 149
2020	8 164	1979	7 647	34 558 900	3 220 174
2021	8 212	1803	6 158	34 752 000	3 556 132
2022	8 044	2065	6 983	35 423 000	4 056 892

\*- Statistics on the number of vehicles owned by individuals in the Republic of Uzbekistan

In table. Table 2 shows the results for three indicators of accidents, such as transport risk, social risk and the severity of

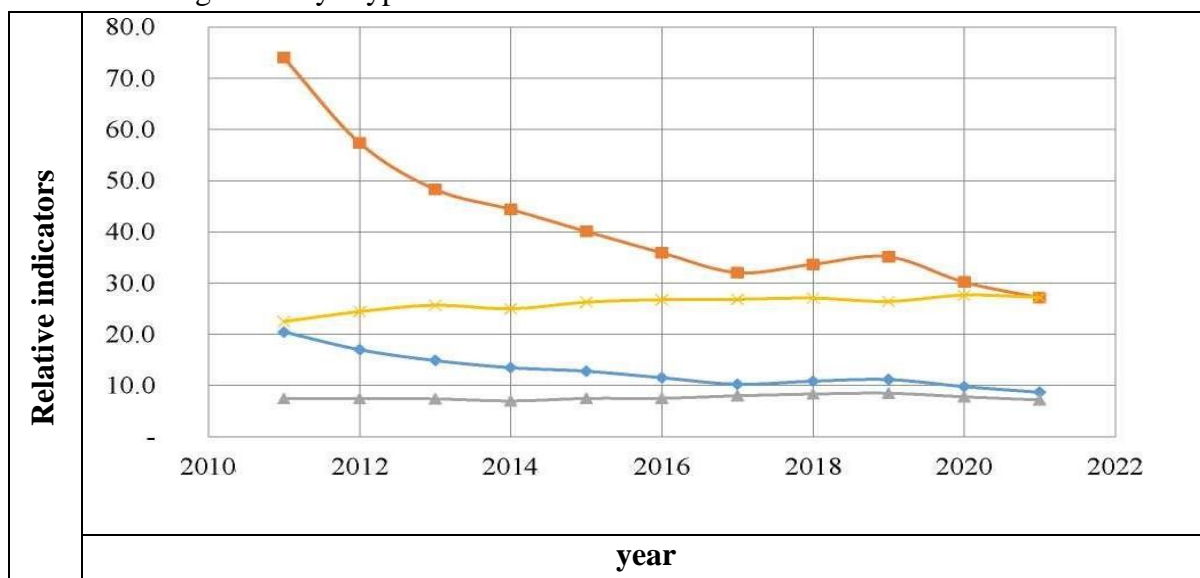
the consequences of an accident, calculated according to the above (2)-(5) formulas and presented by years (from 2009 to 2022)

Year	Transport risk (relative to death toll)	Transport risk (relative to the number of accidents)	social risk	The severity of the consequences
2009	14.2	70.1	7.9	15.8
2010	13.7	67.7	7.7	15.8
2011	12.8	62.8	7.4	16.1
2012	12.5	59.6	7.3	16.6
2013	12.4	55.7	7.6	18.0
2014	11.8	52.4	7.6	18.3
2015	11.6	48.2	7.9	19.6
2016	11.4	46.6	7.9	20.2
2017	10.9	44.2	7.7	20.4
2018	9.3	36.8	6.9	21.1
2019	6.6	27.2	6.3	20.9

2020	7.5	25.2	6.3	20.6
2021	8.7	21.8	6.1	20.1
2022	8.6	19.2	6.1	21.3

In Fig.1. A graph of accident rates for the Republic of Uzbekistan from 2009 to 2022 is given. by types of risks

(transport, social) and by severity of consequences.



- ◆ Transport risk (relative to death toll)
- Transport risk (relative to the number of accidents)
- ▲ Social risk
- ✕ The severity of the consequences

Fig. 1. Accident rates in the Republic of Uzbekistan

From Figure 1, we can conclude that over the course of 11 years, the transport risk in Uzbekistan has been decreasing relative to the number of accidents. Compared to 2011, in 2022 the relative indicator of transport risk decreased by 38%. This indicator came as a result of a decrease in the number of accidents and an increase in the number of cars throughout the region of the country. And also, the

relative indicator of transport risk in relation to the number of deaths also tends to decrease and amounts to 6.6 for 2022. The social risk indicator is 6.3 (2022), while in 2011 it was 7.9 and this indicator has improved by 21%. The severity of the consequences of road accidents has remained at a high level for 11 years and continues to increase. On average, 21-22 people out of 100 victims die in road

accidents. That is, 1 out of 5 people die as a result of an accident. [5]

## CONCLUSION

Thus, we can conclude that although according to statistics, the number of road accidents decreases every year, the severity of the consequences of road accidents, where an average of 2 thousand people die throughout the Republic, is relevant, although the author is very skeptical about these data.

As part of the former Soviet Union, Uzbekistan has inherited a complex hierarchical planning system and urban planning is highly centralized. Design and planning documentation has a mostly pyramidal hierarchical structure, starting with the General Scheme settlements and to territorial planning schemes and master plans for individual settlements [6, 7].

The road network of the Republic of Uzbekistan has been created for decades and it takes time and significant investments to change it. The structure and length of the road network of large cities such as Samarkand, Bukhara and Fergana and all others were created on the basis of master plans of cities approved by the government of the republic, focused on a certain level of motorization. For a long time in our country, priority in the development of transport services was given to public passenger transport, and the level of motorization of up to 120-180 cars per 1 thousand inhabitants was taken as the calculated level for cities. The entire transport infrastructure was created for this level of motorization, while at present the level of motorization of the city is already 74 cars per 1 thousand inhabitants,

There is an urgent need to take additional measures to ensure the safety of the most vulnerable category of road users

- pedestrians, since in the republic this indicator is in first place in terms of the number of accidents, and in terms of traffic violations in third place.

Thus, the deterioration of road safety on the roads of the Republic of Uzbekistan is determined by the following factors:

- Increase in population in large cities of the republic;
- Increased mobility of the population and vehicles;
- The existing level of UDS of cities does not meet modern needs;
- Public transport is not developed in large cities except Tashkent.
- The transport planning of large cities, the traffic capacity of the road network, and especially the condition of car parks requires a scientific solution;
- Lack of information content on highways and city streets;
- Lack of “road ethics” among drivers.
- Since the car market of the republic is not “full”, it is planned to continue increasing the number of cars in the country;

The consequence of the above actions (factors) is an increase in traffic intensity, deterioration of traffic conditions, traffic jams, traffic conflicts and, as a result, an increase in the number of accidents. The pace of development of motorization in Uzbekistan and the severity of transport problems in large cities of the republic are such that there is an objective need to form a scientifically based transport policy aimed at improving traffic conditions.

And also, I would like to note the fact that the lack of information on detailed statistics of road accidents in the republic in open sources does not allow us to explore the problems of ensuring traffic safety in a comprehensive format and does not allow

science to develop in this area.

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