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Impact of Technical Means on Road Traffic Accidents

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Annotation: In this article, measures to reduce traffic accidents and improve road safety have been developed.

Key words: Road traffic accidents, road, pedestrian, driver, vehicle.

As the population of our country is growing at a high rate, reducing the intersection of pedestrians and vehicles is becoming one of the most urgent issues. In 2021 alone, 10,001 traffic accidents occurred in the territory of our Republic, of which 2,426 people died, 9 230 people received various injuries. Traffic accidents in the country decreased by almost 7% compared to last year. The main causes of traffic accidents are related to non-observance of the established speed limit (20.1 percent), road defects (20.1 percent), pedestrians crossing the roads from unmarked places - (13.8 percent), overtaking or driving in the opposite direction (7%), bicycles on the road (5.3%), drivers falling asleep at the wheel (5.1%), and driving while intoxicated (4 There were cases like .2%).

The time of occurrence of road traffic accidents is mostly daytime (61%), the remaining 39% is at night.

It is reported that (the road traffic accidents that occurred in the territory of the Republic in 2021 are shown in Figure 1) throughout the Republic, the largest number of accidents occurred in Fergana region, Tashkent region, Samarkand, Namangan and Tashkent city. It was recorded in Syrdarya, Jizzakh and Navoi regions.

Figure 1. Road transport accidents that occurred in 2021 across the territory of the republic

It is not possible to ensure the safety of traffic on the road only by construction measures, we will take measures to organize it, in addition, the intensity of vehicles, weather changes and the perception of the driver should be taken into account.

The road organization should not only provide the ability to move traffic flows on the road, but also manage them using the available means.

The introduction of technical means plays a special role in the implementation of traffic management measures: road signs, traffic lights, road barriers and guiding devices, etc.

Measures to increase the level of road safety at the places of traffic accidents should be implemented in the following sequence:

1. Determining the places of traffic accidents;
2. Assessment of the stability of the observed level of traffic accidents and their danger;
3. Diagnosis of traffic accident zones with identification of the causes and factors of traffic accidents, including assessment of the role of road conditions;
4. Planning measures aimed at eliminating unfavorable factors in order to increase the level of road safety in the places where traffic accidents occurred;
5. Estimating the costs of the events taking into account the efficiency of the planned events and the estimated reduction in the number of road traffic accidents as a result of their implementation;
6. Implementation of measures to increase road safety, and then evaluate their real effectiveness.

The assessment of the impact of measures to improve road safety on the reduction of road traffic accidents is carried out on the basis of comparing the accident rate observed before the completion of the relevant road works with the level of accidents after their completion.

After the implementation of the planned measures, the predicted decrease in the level of traffic accidents is aimed at improving the traffic conditions.

As a preliminary indicator describing the expected change in the state of accidents as a result of the measures taken, the average unit of the reduction in the number of road traffic accidents on the considered road section is shown in fractions of the unit. (Table 1) shows the values of this indicator for various measures to improve road safety.

In terms of final results, measures to reduce accidents in traffic accident zones can be divided into two categories:

- those who contribute to the prevention of certain types of traffic accidents (one measure)
- those aimed at preventing all accidents (set of measures) .

Table 1

№	Measures to improve road safety by elements and regular road sections	Probability of reducing the number of traffic accidents in fractions of a unit	
		Total number of traffic accidents	Traffic accidents with victims
1.1.1.1	Installation of road warning signs	0.26	0.41
1.1.1.2	Set a "speed limit" sign	0.50	0.20
1.1.1.3	Change speed limits:		
	from 70 to 50 km per hour	0.21	0.16
	from 70 to 60 km per hour	0.10	0.08

	from 80 to 50 km per hour	0.29	0.22
	from 80 to 60 km per hour	0.20	0.15
	from 80 to 70 km per hour	0.09	0.07
	from 100 to 70 km per hour	0.46	0.35
	from 100 to 80 km per hour	0.39	0.30
1.1.1.4	Set up a "Give way" road sign	0.07	0.05
1.1.1.5	Installation of "STOP" road sign	0.32	0.25
1.1.1.6	Installation of "Emergency Zone" information panels	0.20	0.15
1.1.2.5	Setting up symbols	0.44	0.34
1.1.3.1	Installation of barriers (regardless of type)	0.19	0.25
1.1.3.2	Installation of fences on lighting poles and communication poles	0.17	0.22
1.1.4	Electric lighting		
1.1.4.1	Electric lighting device	0.26	0.25

The average probability of reducing the number of road traffic accidents in T year as a result of the implementation of measures is determined by the following formula.

$$P_M = \frac{\sum_{m=1}^{M}(\frac{1}{1-P_m} - 1)}{1 + \sum_{m=1}^{M}(\frac{1}{1-P_m} - 1)}$$

where M is the number of measures to improve traffic safety that affect the reduction of the accident rate of t every year ($t_m^{sl} \leq t$)

The reduction in the number of road traffic accidents as a result of the implementation of several activities is determined according to the following formula

$$\Delta n_t = P_M * n_t$$

where n_t is the projected number of traffic accidents in year T in the absence of measures to improve road safety.

As a result of the implementation of complex measures to increase road safety, the total expected decrease in the number of road traffic accidents in the i-part of the concentration of road traffic accidents is determined, taking into account its service life:

$$\Delta n_t = \sum_{t=0}^{t_{max}^{sk}} \Delta n_t$$

t_{max}^{sk}- the longest service life of the event that is part of this complex, years.

The service life of the M-event is determined in accordance with the current regulatory and procedural documents, taking into account the regional characteristics of road use.

Expected decrease in the number of road traffic accidents as a result of measures to improve road traffic safety on the road network with i-number of accident concentration sections

$$A = \sum_{i-1}^{I} \Delta n_i$$

here, taking into account Δ ni-impact zones, the reduction in the number of road traffic incidents in the i-part of the concentration of road traffic incidents, pcs.

As a result of the implementation of measures to increase road safety, the number of road traffic accidents will decrease, the number of people killed and injured will decrease, and the volume of road traffic accidents will decrease proportionally.

Measures to improve traffic safety on highways:

1) Measures to increase road safety are selected depending on the level of traffic loading (Table 2).

Table 2

The traffic load level is less than 0.2	Measures to improve traffic safety on two-lane roads	
	Construction Strengthening of road sides.	Organizational Insertion of edge and noise marks and device
0.2-0.45	Strengthening of road sides. Selective increase of visibility to ensure movement in places not less than 1.5-2 km	Determining the path
0.45-0.7	Rehabilitating the most congested intersections at the same level, replacing them with a roundabout or regulated intersection. Increasing pedestrian crossings and additional lanes, widening narrow bridges.	Regulation of traffic speed in some places
0.7-1.0	With a narrow road - widening of the road up to 3.50 m.	Install remote control characters. Speed regulation
1.0 dan ko‘p	Upgrade to a higher category. Create a third line.	Upgrade to a higher category. Create a third line.

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