

STUDY OF THE IMPACT OF THE AMOUNT, COMPOSITION, AND SPEED OF MOVEMENT ON TRAFFIC SAFETY ON THE “TASHKENT SHAH” STREET OF INTERNATIONAL IMPORTANCE M34 IN YANGIYOL CITY, TASHKENT REGION

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Abstract: This article examines the impact of the amount, composition, and speed of vehicle movement on traffic safety on the "Tashkent Shah" street of international importance M34 in Yangiyol city, Tashkent region.

Key words: road conditions, traffic safety, amount and composition of traffic, speed of movement, traffic accidents.

In the world, special attention is paid to improving road infrastructure, ensuring safe and comfortable traffic conditions for road users, widely using intelligent systems in traffic organization and management, and significantly reducing the mortality rate on roads to increase road traffic safety.

More than 10,000 road traffic accidents occur annually in the Republic of Uzbekistan, with nearly 2,500 people dying and about 10,000 suffering various degrees of injuries. The number of vehicles entering and leaving Tashkent city is increasing daily. For example, between 250,000 and 300,000 vehicles from the regions travel to and from the city daily. Such a situation primarily manifests itself on the roads leading into the city, creating challenges in ensuring traffic safety.

To ensure traffic safety, it is necessary to assess the amount and composition of traffic flow on the roads. For this purpose, research was conducted on the Tashkent-Dushanbe highway (M34), an internationally significant road, to analyze the amount, composition, and speed of vehicle movement on "Tashkent Shah" street. The total length of the M34 highway is 457 km, of which 170 km passes through Uzbekistan and 287 km through Tajikistan. The section within Uzbekistan mainly consists of Category I-II roads with asphalt concrete surfaces. The Zafarobod — Shahrison, Varzob — Dushanbe segments have strong asphalt concrete surfaces and belong to Category II-II.

More than 200 km of the road passes through mountainous areas, with the Shahrison — Varzob segment consisting of black gravel pavement and categorized as IV-V. In addition, in the direction of improving road conditions and infrastructure, traffic signs, traffic lights, lighting, road markings, and pedestrian crossings are being installed in regional and district centers, and road organization is being enhanced. Moreover, it has been determined that only the Traffic Safety System will be responsible for regulating roads and that republican and regional funds under the "Safe Road and Safe Pedestrian" system will be established to finance these efforts.

Based on international experience, it can be said that improving regulations for freight transport movement will increase the service life of roads and reduce the costs allocated for their maintenance. Considering the changes in traffic volume and composition, improving road conditions and increasing traffic safety are pressing issues. Taking these into account, research was conducted to enhance traffic flow and safety on two-lane roads. To achieve this, research was carried out on the general-use highway of state significance M34 "Tashkent Shah" street. The amount and composition of traffic on the highway are presented in Table 1 below.

Calculation	Passenger	Trucks by load capacity	Bus	Motorcycle	Total
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time (hour)	car	2 t	2-5 t	5-8 t	More than 8t		transport	
16 ⁰⁰ -16 ⁰⁵	122	12	5	3	2	0	0	144
16 ⁰⁵ -16 ¹⁰	125	10	4	1	1	0	0	141
16 ¹⁰ -16 ¹⁵	131	8	2	2	3	0	1	147
16 ¹⁵ -16 ²⁰	128	15	6	4	1	1	0	155
16 ²⁰ -16 ²⁵	119	12	3	2	2	0	0	138
16 ²⁵ -16 ³⁰	136	6	1	2	3	1	0	149
16 ³⁰ -16 ³⁵	120	7	3	3	3	0	0	136
16 ³⁵ -16 ⁴⁰	124	9	7	2	1	0	1	144
16 ⁴⁰ -16 ⁴⁵	129	10	5	3	1	1	0	149
16 ⁴⁵ -16 ⁵⁰	136	7	4	2	0	0	0	149
16 ⁵⁰ -16 ⁵⁵	130	8	7	4	2	0	0	151
16 ⁵⁵ -17 ⁰⁰	127	6	7	3	3	1	0	147
Total66	1527	110	54	31	22	4	2	1750

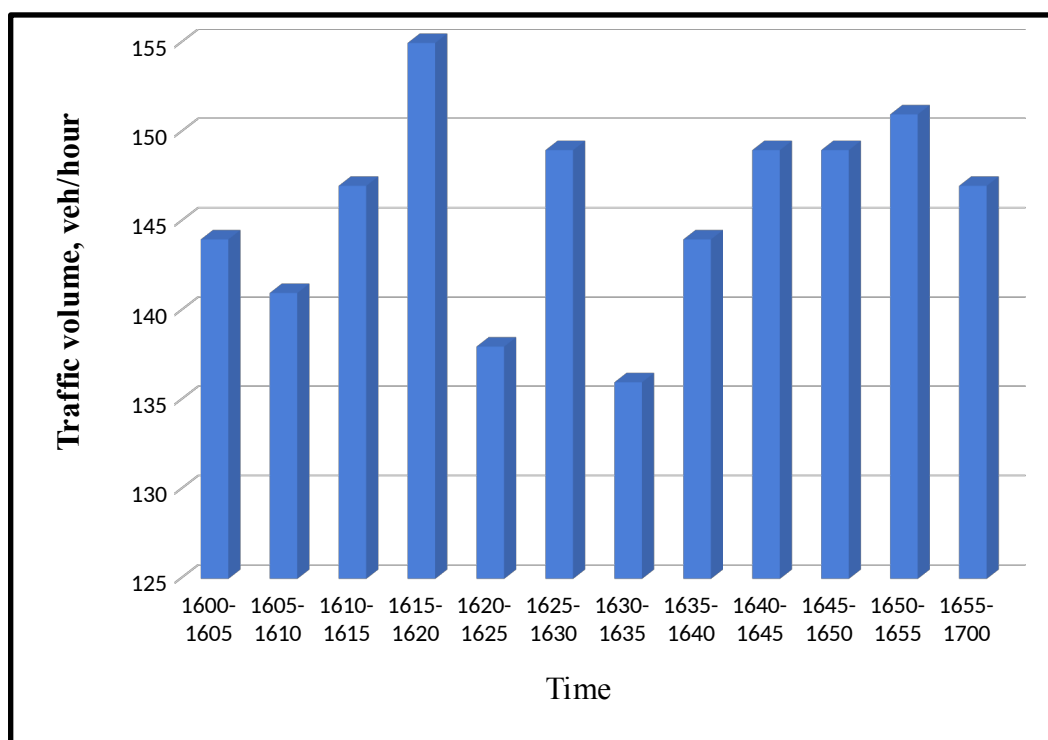


Figure 1. Diagram of traffic volume variation on "Toshkent Shoh" street. The above graph indicates that the traffic volume on "Toshkent Shoh" street varies by hour.

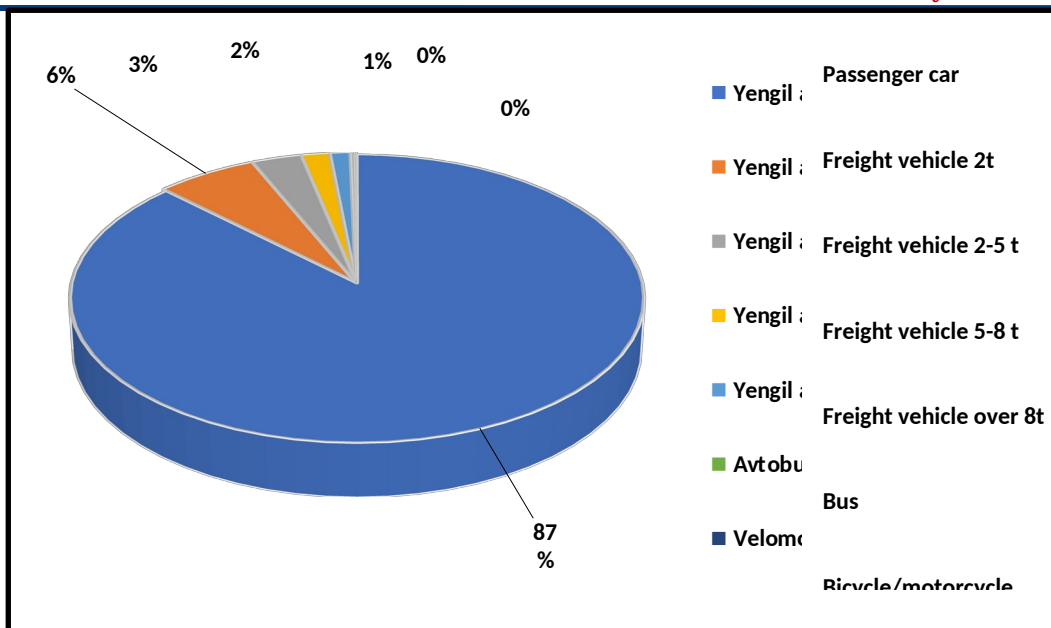
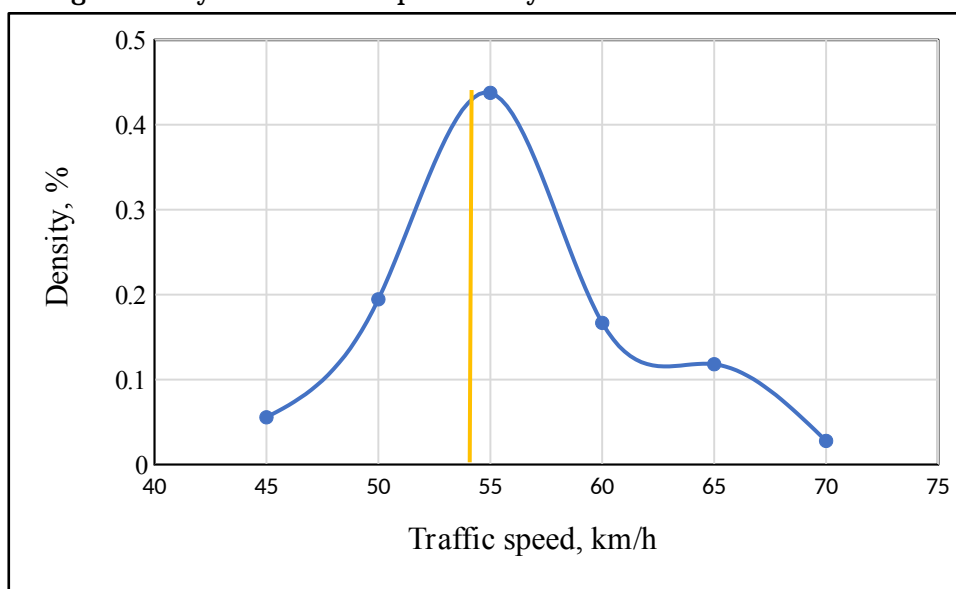


Figure 2. Seklogram of traffic composition changes on "Toshkent Shoh" street.

The analysis of the traffic composition revealed that 87% of the traffic consists of passenger cars, 7% of freight vehicles up to 2 tons, 3% of freight vehicles between 2-5 tons, 2% of freight vehicles between 5-8 tons, and 1% of freight vehicles over 8 tons, while buses account for 0.05% from this, it can be concluded that the traffic composition is mainly made up of passenger cars. This, in turn, indicates that the characteristics of the traffic flow are primarily determined by passenger cars. An increase in the number of passenger cars in the flow leads to an increase in traffic speed, while an increase in the number of freight vehicles complicates the transport flow and significantly affects drivers' psychological conditions. As a result, drivers are more likely to make mistakes while driving, which significantly increases the probability of road traffic accidents.



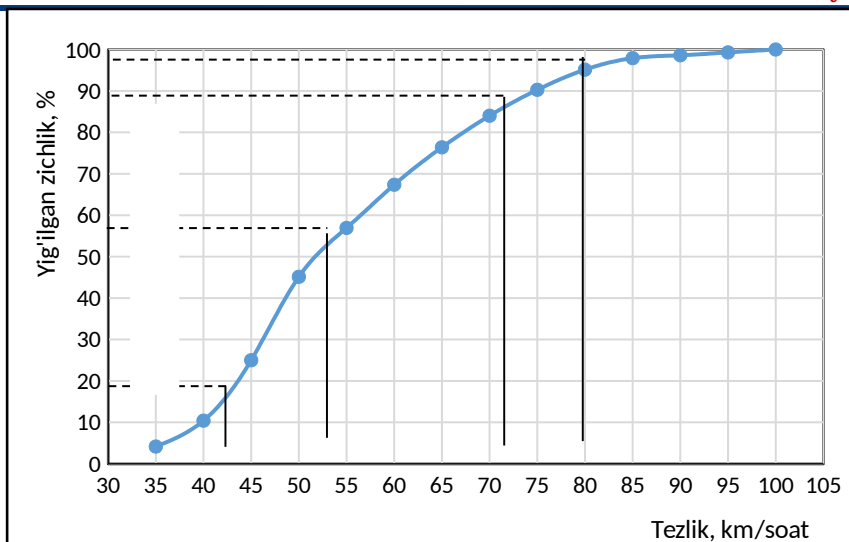


Figure 3. Statistical processing of observation results

a) Distribution curve; b) Cumulative curve.

With the help of the distribution curve, the most frequently repeated speed - the modal speed is determined. Using the cumulative curve, the speed values at 15, 50, 85, and 95% probability levels are found. The speeds determined from the cumulative curve can be analyzed as follows. Here, the 15% speed should be considered the lowest speed in traffic organization, and with its help, the minimum speed is limited, and a 4.7 mandatory sign is set.

The 50% probability speed shows the average speed of all vehicles in the flow.

The 85% probability speed is mainly used for setting road signs and markings.

The 95% probability speed is considered the calculated speed and is used in road element calculations.

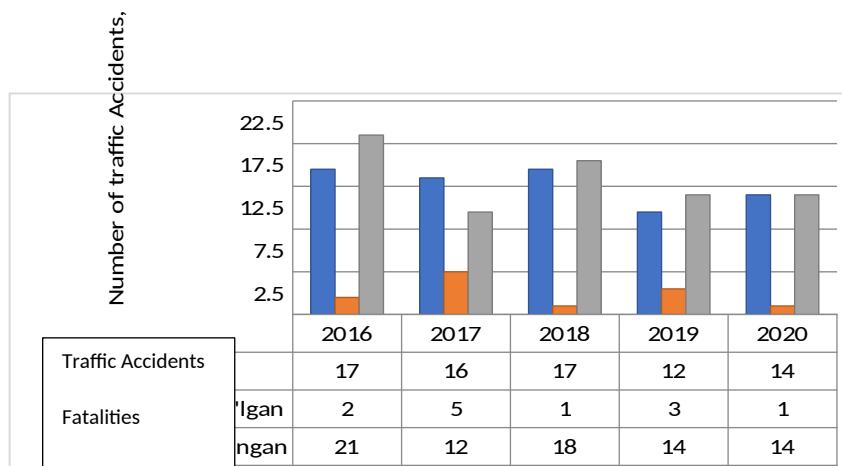


Figure 4. Histogram of road traffic accidents on "Toshkent Shoh" street from 2016 to 2020

An analysis of road traffic accidents on "Toshkent Shoh" Street over the past five years was conducted. As a result, it can be observed that the highest number of accidents occurred in 2016, while this figure decreased by 2020. A decline in the number of traffic accidents, as well as a reduction in the number of fatalities and injuries, was observed in 2020.

Currently, increasing road safety, significantly reducing the number of traffic accidents and fatalities, improving road infrastructure, and creating favorable conditions for road users are among the pressing issues being addressed at the state level.

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