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TRAFFIC ACCIDENT INVESTIGATION ON THE KAMCHIK PASS

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Abstract
This research focuses on the investigation of traffic accidents occurring on the Kamchik Pass, a critical transportation route. The study examines key parameters, including the intensity of transport flow and the width of the road, to establish their correlation with the annual number of road traffic incidents per kilometer. Using statistical and analytical methods, the research highlights how these factors influence the frequency and severity of accidents. The analysis provides valuable insights into the underlying causes of traffic incidents and suggests strategies for enhancing road safety. These findings are intended to inform infrastructure development, optimize traffic management, and minimize accident rates on the Kamchik Pass.
Keywords: Road traffic incidents, road width, slope angle, visibility distance, amount of traffic.

Introduction

The Kamchik Pass serves as a vital transportation route, connecting the Fergana Valley with other regions of Uzbekistan. As one of the busiest mountain passes in the country, it experiences a high volume of traffic throughout the year, contributing significantly to the nation's economic and social activities. However, the challenging geographical conditions, coupled with the increasing intensity of transport flow, have led to a notable number of road traffic accidents on this route.

Road safety has become a growing concern for authorities and researchers, particularly in high-risk areas like the Kamchik Pass. Understanding the factors that contribute to traffic incidents is crucial for devising effective solutions to minimize risks and enhance the safety of travelers. Among the many variables influencing accident rates, the width of the road and the volume of traffic flow are considered critical determinants.

This study aims to analyze the relationship between these factors and the annual number of traffic accidents per kilometer on the Kamchik Pass. By employing statistical methods and data analysis, the research seeks to uncover patterns and correlations that can inform decision-making for infrastructure development and traffic management. Ultimately, the findings will provide valuable insights for reducing accident rates and improving road safety on this critical transport route.

The main part

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It is known that on mountain highways, factors such as the relief structure of the area, the height of the road above sea level, the curvatures of the road in the plan and longitudinal section, the visibility distance on the road and the slope along the road. creates specific traffic conditions and has a great impact on vehicle assemblies, control systems and traffic safety [1].

Traffic flow of traffic accidents on the road in mountain conditions, analysis based on the study of road parameters was carried out on the example of the Kamchik Pass highway.

According to research, the number of accidents per km of road per year increases with the increase in traffic intensity. It is typical for all countries and is represented by the following correlation [2].

$$n_N = 0,256 + 0,000408 * N + 1,36 * (10^{-7}) N^2 \quad (1)$$

where: nN is the number of accidents per one km of road per year; N- traffic flow, vehicle/hour 40 <N< 1600 vehicle/hour;

Figure 1 shows the graph of the number of annual accidents per 1 km of road nv and the transport flow N for the Kamchik Pass road.

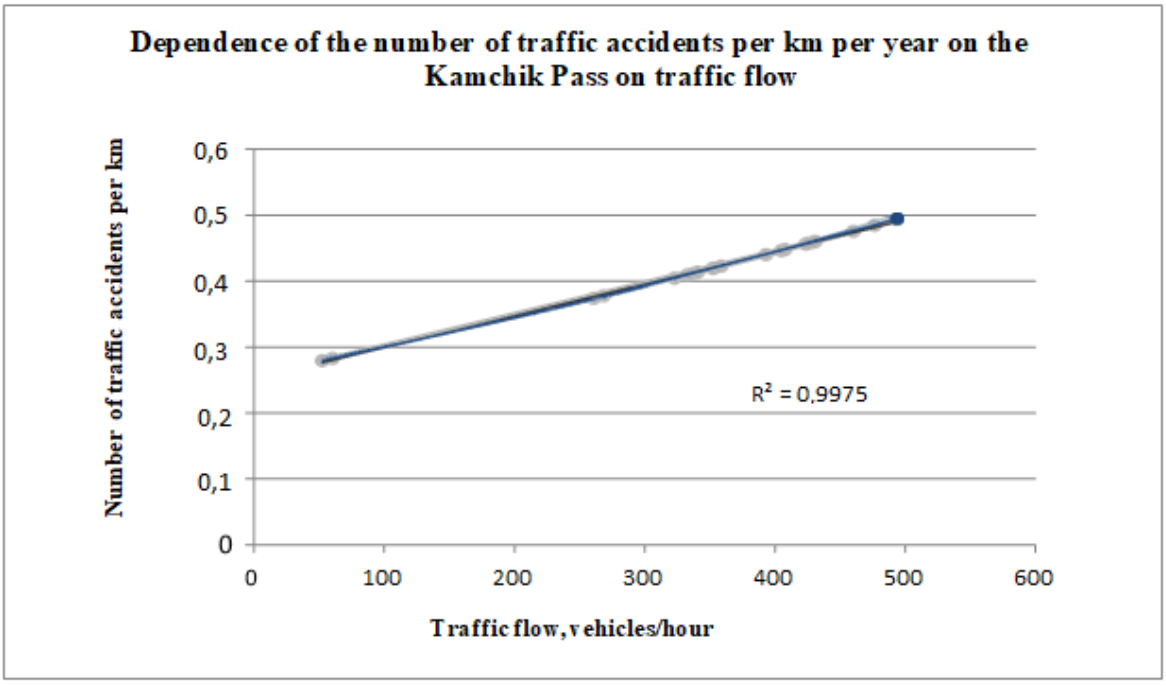

Figure 1. The number of traffic accidents nN per 1 km of road per year on the Kamchik Pass versus the traffic flow N.

Analysis of the graph shows that the number of accidents increases with the increase in traffic flow on each road section. The traffic flow on the Kamchik pass road has been increasing for years, which leads to an increase in the number of accidents.

The dependence of the number of accidents per 1 km of road per year on the width of the road can be expressed by the following equation [2].

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$$n_v = 1/(0{,}173B - 0{,}21), \quad (2)$$

where: nB is the number of accidents per 1 km of road per year; V - the width of the road, in meters;

$$4m < V < 20\ m;$$

Figure 2 shows the graph of the number of annual accidents nv per 1 km of the road as a function of the road width V for the Kamchik pass road.

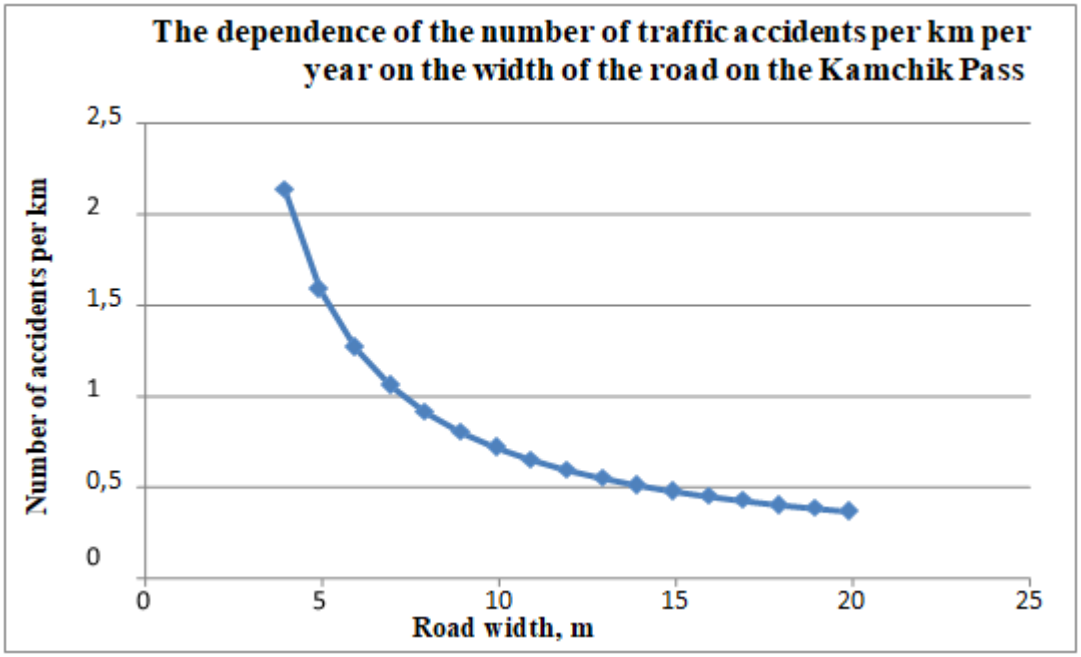

Figure 2. The annual number of traffic accidents per 1 km of road for the Kamchik Pass road versus the road width V.

Analysis of the graph shows that the number of accidents increases as the width of the road decreases. The 222-230 km sections of the Kamchik Pass road are the most dangerous sections in terms of accidents. As the width of the road decreases, the number of accidents increases. The increase in the number of annual accidents per 1 km of road increases significantly when the road width is less than 7 m. Turns with a small radius of curvature are dangerous places for accidents. Accidents occurring in them are 10-12% of the total amount. The most dangerous road sections are those with a turning radius of less than 500 m. Visibility is one of the important factors of road safety. Most accidents occur at a visibility distance of less than 300 m due to improper driving speed. The number of annual accidents per km of road depending on the visibility distance can be expressed by the following formula:

$$n_d = 1/(0{,}200 + 0{,}00111d + 0{,}0000009d^2), \quad (3)$$

$$25 < d < 800m$$

where: nd is the number of annual accidents corresponding to 1 km of road per year; d - visibility distance;

Conclusions

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In short, in order to reduce the occurrence of accidents on mountain roads: the laws of the dependence of factors such as the flow of vehicles in mountain conditions, the width of the road, the visibility distance on the road on the number of accidents were determined in the example of the Kamchik Pass road Knowledge of these laws and dangerous sections of mountain roads ensures road safety in mountain conditions by adapting the technical parameters of highways to modern requirements. plays an important role in successfully solving and, as a result, preventing accidents on mountain roads.

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