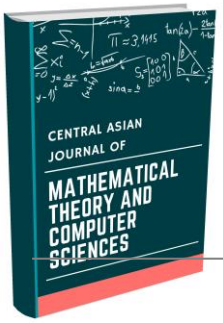

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The Role of Intelligent Transport Systems in Reducing Road Traffic Accidents in Uzbekistan

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Abstract

According to the information published by the government, a total of 10001 road traffic accidents occurred in Uzbekistan in 2021. More than 2425 people died in road traffic accidents and more than 9230 people were injured. Road accidents cause death or severe injury. This paper deals with reasons and solutions for the road traffic accidents in Uzbekistan.

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I. Introduction

Traffic is the major concern in developed and developing countries. Every country has their rules and regulations to control the traffic. In the past decade the density of vehicles has increased on the roads leading to road traffic, congestion and accidents. Traditional methods were used for controlling the traffic and reducing road traffic accidents i.e. deploying traffic lights, traffic signs, traffic policemen and round-about. But these methods are getting obsolete day by day. In the era of technology, intelligent and adaptive equipment should be used to control the traffic and reduce accidents. In recent years, in the Republic of Uzbekistan, a number of decisions have been made aimed at improving road safety and preventing road traffic accidents in order to reduce the number of people killed and injured in them. For example, the decision of the President of the Republic of Uzbekistan № PQ-190 adopted on 04.04.2022, "On measures to reliably ensure human safety on roads and dramatically reduce death cases" is one of these. According to the decision, in 2022-2025, one of the priority goals is to fully digitize traffic management, introduce advanced information and communication technologies, and implement new management and control systems.

II. Causes of road accidents in Uzbekistan

A road accident can lead to several unwanted consequences, including death, permanent injuries, loss of earnings, etc. In 2021, 1,150 accidents (11.5%) related to hitting pedestrians crossing pedestrian crossings, 1,380 accidents (13.8%) due to pedestrians crossing unmarked pedestrian crossings, 2,009 accidents due to traffic management problems (20.1%), 501 (5%) as a result of leaving children unattended, 610 (6.1%) following bicycle riders moving in areas where there is no bicycle lane, 402 (4%) following drivers not following traffic lights or traffic signs, 912 accidents (9.1 %) due to inexperience of drivers, 792 accidents (7.9 %) due to going in the opposite direction, 100 accidents (1 %) due to using a phone while driving, 2010

accidents (20.1 %) due to failure to observe the set speed limit, and 135 (1.4%) traffic accidents occurred due to drunken driving.

III. Analysis by age and gender of drivers who caused the traffic accident

The analysis of the drivers who committed road traffic accidents in 2021 by age shows (fig. 1) that drivers over 40 years old caused the most traffic accidents (27.6%), 25-30 years old (20.6%), drivers under the age of 25 (20%), drivers under the age of 30-35 (18.2%) and drivers under the age of 35-40 are in the fourth place. (13.6 %) caused a road traffic accident.

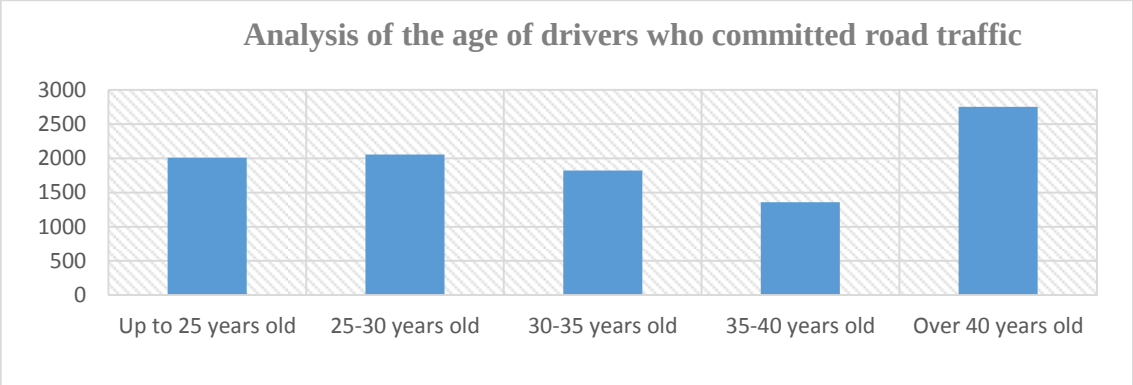

Figure 1. Analysis of the age of drivers who committed road traffic in 2021 in Uzbekistan.

The analysis of the drivers who committed traffic accidents by gender shows (fig. 2) that in 2021, women committed a total of 268 road traffic accidents and men committed a total of 9,733 road traffic accidents.

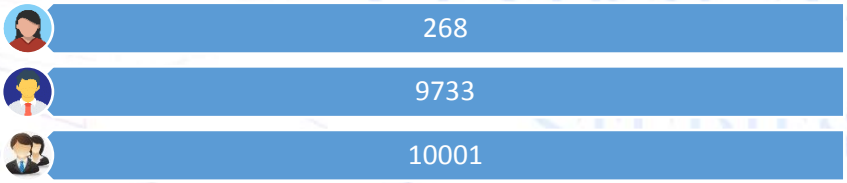

Figure 2. Analysis of the gender of drivers who committed road traffic in 2021 in Uzbekistan.

IV. Reasons for road accident in Uzbekistan

There are several reasons for road traffic accidents in Uzbekistan, as well as in other developed and developing countries, some of them are listed below. The main reasons for the origin of accidents are divided into 2 types.

A. Caused by the incompetence of the bodies organizing the traffic.

B. Caused by the fault of road users.

A. Caused by the incompetence of the bodies organizing the traffic.

(i) ***Poor lighting on roads and highways.*** The lack of lighting devices on the internal and main express highways of Uzbekistan is one of the reasons for the increase in traffic accidents at night on these roads.

(ii) ***Lack of necessary road signs.*** There is a significant lack of road signs on the roads. The road signs are necessary to alert the drivers and pedestrians about the turns, speed limits, crossings, etc which will help them with the proper driving and road usage.

(iii) ***Cross-roads.*** There are umpteen number of cross roads in the Uzbekistan Road design. As we see in Uzbekistan road design, the cross-roads join the main road at a 90° angle and that is very dangerous while joining the main road.

B. Caused by the fault of road users.

(i). Speeding. Another main reason for road accidents is over-speeding. Many drivers drive around 30 to 40 km/ph over the speed limit and this is very common on the highways. Around one-third road accidents are caused due to over-speeding.

(ii). Distracted Driving. A distracted driver is not someone who ran a red light or someone who drove drunk. A distracted driver is a motorist that diverts his or her attention from the road, usually to talk on a cell phone, talk to the passengers, send a text message or eat food or even applying makeup. To safely drive a car, the driver must give full attention to the road. Drivers who divert their awareness, whether it's to talk on their cell phone or send text messages to their friends, end up putting the lives of the other drivers or pedestrians to risk. Distracted driving is especially dangerous because, whereas drunk driving usually occurs at night, automobile accidents caused by distracted drivers can all day. Teens are most likely to engage in distracted driving. Research has shown that teens tend to engage in cell phone tasks much more frequently, namely text messaging, in riskier situations than adults. There is also a factor of teenage inexperience with driving that has to be taken into account.

(iii). Drunk Driving. Drinking makes people lose the ability to focus and function properly. This makes it dangerous for the driver to operate the vehicle.

(iv). Poor maintenance of vehicles. While driver error is the number one cause of car accidents, poorly maintained vehicles also make a large contribution to the road accidents every year. Vehicles that receive little or no servicing are accidents waiting to happen and there are several components that are regularly neglected.

(v). Other Reasons. Many other reasons like driving in the opposite lane, improper turns, unsafe lane changes, defects in the vehicle, not required tailgating and overtaking, running red lights and stop signs cause fatal road accidents.

VI. The role of intelligent transport systems in preventing accidents

Most of the developed country's transportation had been assisted and directed using ITS. The main motive of the ITS is to provide the public safety, environmental feeds and many more. Some of the other key benefits of using ITS are as follows:

A number of systems exist with high safety potential in reducing crash risk. Some of them are of a very general character:

- Intelligent speed adaptation
- Electronic driving license

On motorways, the most safety beneficial systems have the potential to reduce injuries and fatalities by about 10–15 per cent. These systems are:

- Motorway control systems
- Driver and vehicle monitoring systems
- Collision avoidance systems
- Incident management
- Automated speed enforcement

On other rural roads, current systems with the potential to reduce injuries and deaths by more than 10 per cent are fewer than on motorways, but they are more effective - intelligent speed adaptation has a 30 per cent and automated speed enforcement a 20 percent injury reduction potential. Collision avoidance systems which, work perfectly would, of course, have a very high potential. However, there are considerable problems in designing collision avoidance systems to work perfectly. The ITS systems with the highest safety potential are:

- Collision avoidance
- Automated speed enforcement
- Speed control systems with variable speed limits
- Driver and vehicle monitoring systems

In urban areas, systems with most safety potential (injury reduction of 30 per cent when fully implemented) are:

- Collision avoidance
- Intelligent speed adaptation
- Urban traffic control

Much ITS development has so far concentrated on motorways, including the development of safety relevant ITS. The safety problems, however, concentrate in urban areas and on rural roads other than motorways. Hence, the implementation of ITS for the purpose of reducing crash risk should concentrate in urban areas and on rural roads other than motorways. Intelligent speed adaptation is the ITS application with the highest safety potential to reduce injury crashes in the whole road transport system.

There are some applications associated with the use of ITS which are as follows:

1. Advanced Traveler Information System (ATIS)

- Real-time Traffic Information
- Route Guidance / Navigation Systems
- Roadside Weather Information Systems

2. Advanced Transportation Management Systems (ATMS)

- Traffic Operations Centers
- Dynamic Traffic Signs

3. ITS-Enabled Transportation Pricing Systems (ITSETPS)

- Electronic Toll Collection
- Variable Parking Fees

4. Advanced Public Transportation System (APTS)

- Real-time Status Information for Public Transit System
- Automatic Vehicle Location

5. Fully Integrated Intelligent Transportation (FIIT)

- Collision Avoidance
- Intelligent Speed Adaptation

6. Advanced Traffic Management System (ATMS)

- Real-time Traffic Status
- Dynamic Traffic Control
- Incidence Response

7. Commercial Vehicle Operations (CVO)

- Traceability and safety of commercial vehicles such as trucks, vans, and taxis.

8. Advanced Vehicle Control Systems (AVCS)

- Collision Warning of the vehicles

9. Advanced Rural Transportation System (ARTS)

- Provide Information about Remote roads via Radio.

VII. Conclusion.

Common driving errors and casual pedestrian behaviour leads, unfortunately, to death and serious injury in road traffic accidents. Road safety education is therefore the need of the hour. Furthermore, good roads designed keeping also in view the rights of the pedestrians to walk, well maintained vehicles and a good traffic system can in a major way prevent this human made problem

Conclusion

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