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Road Accident and Their Safety

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Abstract: Since roads are essential for social, economic, cultural, military and other communications of life, therefore the design of roads must be economical, safe and comfortable. Road networks are designed in our country but after its construction, they have many difficulties due to driver's licensing process, recklessness of drivers and other reasons that harm the safety of the road and causes more collisions.

Considering these points, this research article has been written to identify the causes of collisions in our country. The study will also look at how to reduce the number of traffic accidents across the country. Since many of our compatriots have been injured or even killed in the accidents, therefore we have studied many international journals and conducted a comparative study with the help of it. In addition to these journals, other authoritative books have also been used. In this research paper, we have identified that how to reduce the number of collisions.

As a result of this research study, it was found that currently there are many causes of collisions in Afghanistan, such as carelessness of drivers in different climatic conditions (snow and rain), physical distresses of the roads, Weaknesses in the licensing process, poor traffic control and other factors that contributes to the increase in collisions across the road.

It is therefore generally suggested that first of all, license control should be taken seriously, road surface distresses should be repaired in a timely manner, and public awareness programs about collisions should be considered for drivers and the public.

Index Terms - Safety, Traffic, Issues, Precaution, Collisions

I. INTRODUCTION

Safety on the roads is an essential factor that is consider during designing and operating. Traffic collisions depend on each country's applicable laws, licensing process and, to a greater extent, public awareness. Traffic congestion in Kabul has led to an increase in collisions, so this research is being conducted specifically for Kabul to determine the rate of traffic collisions in Kabul and to make appropriate recommendations. The purpose of this study is to find out how many deaths are caused by traffic accidents in Kabul.

Every year, 1.2 million people worldwide dies in traffic accidents and millions more are permanently injured in traffic accidents. (1) In some countries, in order to prevent more traffic accidents, special regulations have been adopted in reviewing and evaluating collisions, which had good results. For example, In France, due to special regulations, the rate of traffic collisions has dropped from 7242 to 5732 about 20 % from a period of 2002 to 2003 (1).

According to the World Health Organization, worldwide, 1.2 million people dies and 20 to 50 million suffers injury each year in traffic accidents. Given this figure, the mortality rate is similar to that of deaths from tuberculosis and higher than deaths from malaria. If these deaths are compared to deaths caused by other disasters, deaths by traffic will be ranked as No. 10 of all deaths. For those between the ages of 5 and 44, the death rate falls into the top three. According to a World Health Organization (WHO) survey conducted in the year 2009, the total cost of injuries caused by traffic accidents in a single year is estimated as 518 billion USD. According to the Asian Development Bank, 90% of all such incidents occurs in poor and developing countries (3).

Globally, the number of deaths due to traffic accidents among people between the ages of 15 and 29 reaches 3400 daily. If we consider gender in these figures, men are three times more likely to die in traffic accidents than women. There are places around the world where traffic accidents are less common than others, as shown in the figure below. (4)

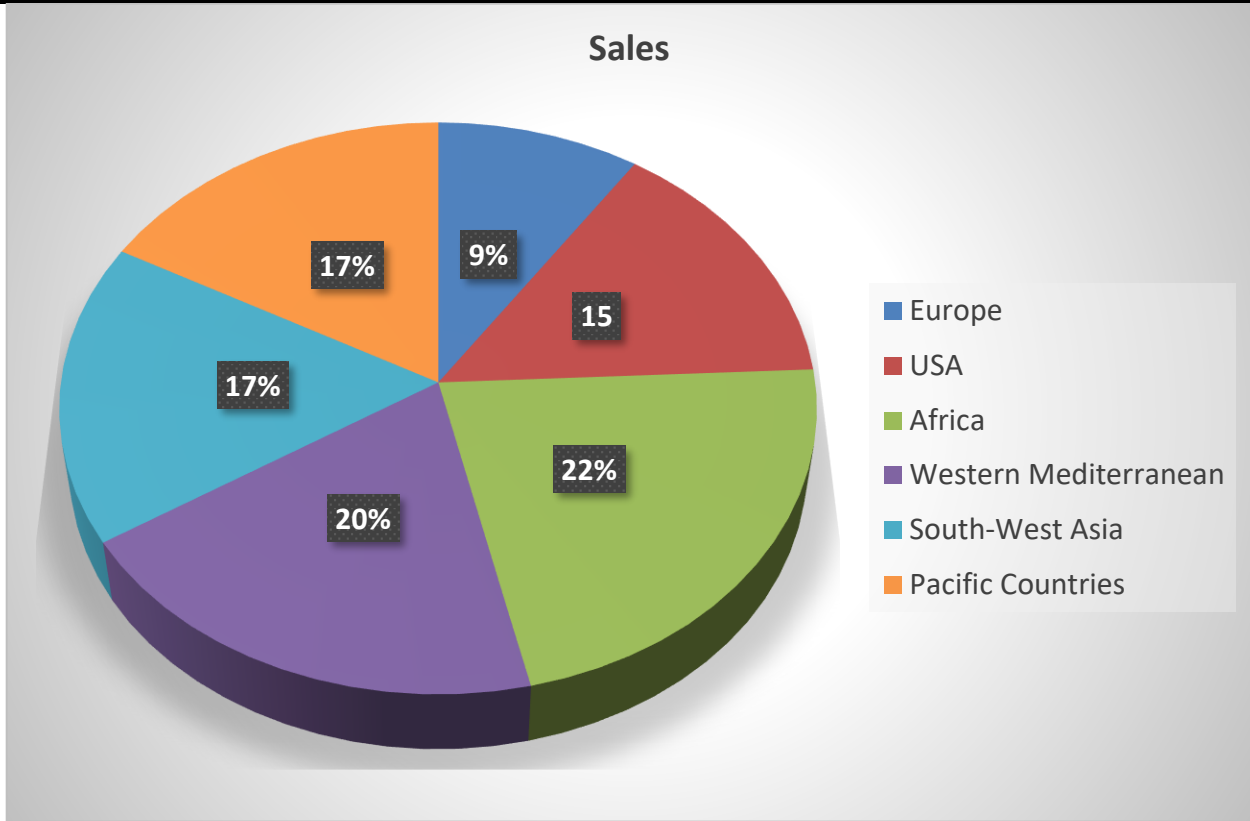


Fig 1.1 Traffic accidents around the world

In Afghanistan, between June and December of year 2013, 1514 traffic accidents were recorded only from provincial hospitals, the distribution of which is shown in each zone of the country as below (2).

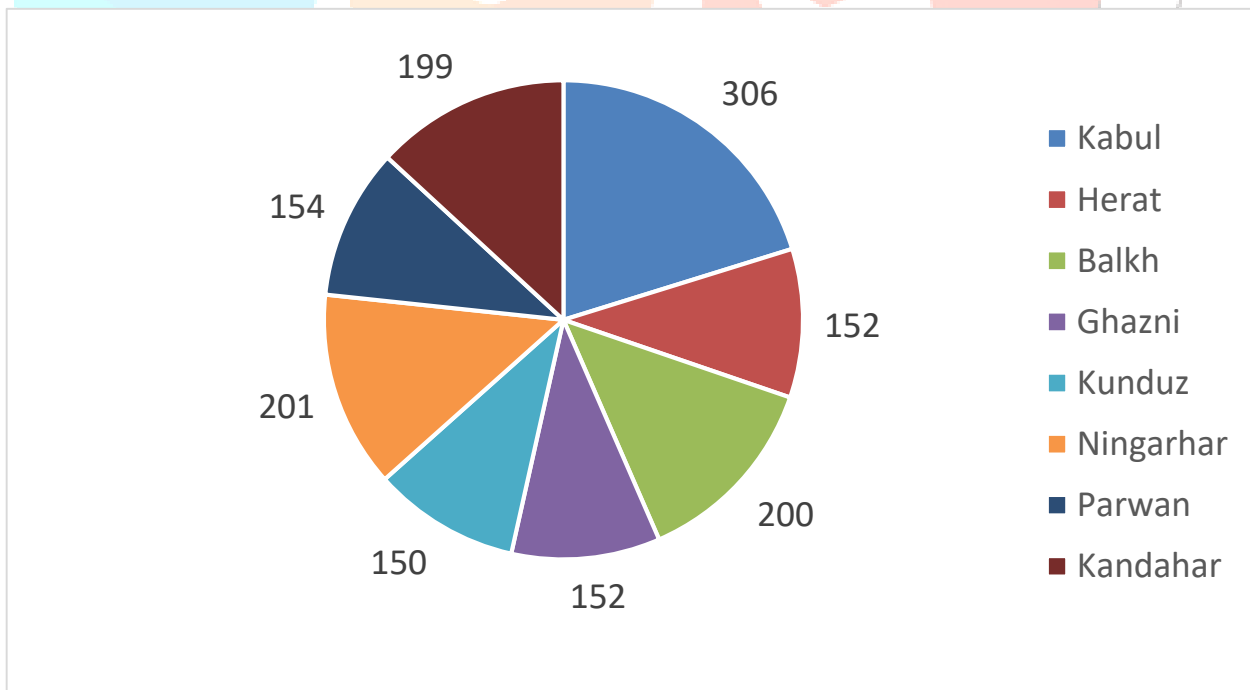


Fig 1.2 Traffic injury chart for some provinces

60% of people involved in these traffic accident injuries were such that they were between 10 and 30 years old. The injuries included various types of drivers such as opium addicts, alcoholics etc. These types of drivers are shown in the figure below (2).

Types of Drivers included in the Accidents/Collisions

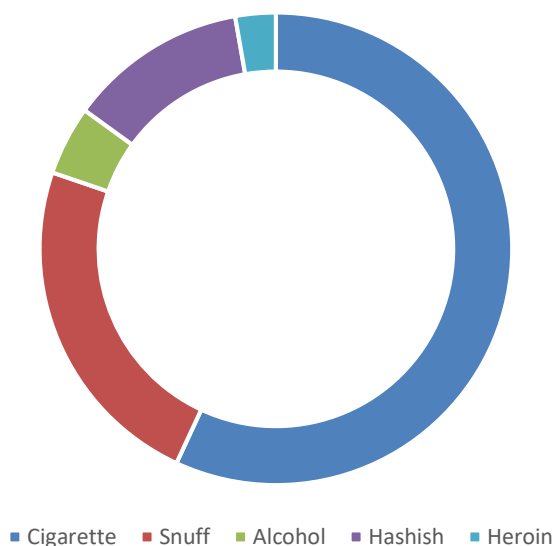


Fig 1.3 Type of drivers included in the accidents/collision

II. IMPORTANCE OF THE RESEARCH TOPIC:

Globally, the safety of roads and the rate of traffic collisions are among the factors that pose the greatest threat to people's lives. Therefore, it is important to identify traffic accidents, their causes and solutions in order to better control traffic, regulate the licensing process and raise public awareness.

III. OBJECTIVES OF THE RESEARCH TOPIC:

The main objectives of this study are as follows:

- I. To be able to identify the root causes of collisions
- II. To be able to reduce the level of collisions with the help of this research.
- III. As collisions takes the lives of many people, new information about collisions can be shared nationally and internationally so that better traffic management can become a part of people's lives.
- IV. So that we can have appropriate implementable recommendations as a result

IV. LITERATURE REVIEW:

In conducting this scientific research, national and international sources have been used to provide a good result and ultimately good suggestions for the society as a result of a descriptive study. Since roads are the most important means of access in urban and rural areas, so it is important to follow the necessary guidelines in both areas.

According to a United Nations report, 1.6 million people in Asia live in urban areas, making up 40% of the world's population. By 2030, that number will reach 2.7 million. In urban areas, the traffic speed reduces from 23km/h to 16km/h, the number of car parking reduces from 59 to 33 it is the number just, and the vehicles capacity reduces from 427 Veh/h to 289 veh/h due to footpaths.

Safety helmets for motorcyclists in urban areas can reduce collisions and injuries by up to 40 percent. If the speed of the vehicle is reduced by 5%, the amount of collisions will be reduced by 30% (REF-5).

Reports show that in 2017, 9500 people across Europe died on urban/city roads alone. The death toll from collisions on urban roads has dropped by 14% between years 2010 and 2017.

Access management on roads and intersections is what significantly reduces the number of traffic accidents. Such control and management includes the appropriate engineering design of the intersection's entry and exit sections, as well as the appropriate design and layout of other roads connecting to highways and roads.

So with this management on the surrounding two-way roads (Auxiliary lanes) we can reduce the amount of traffic collisions by 5-23%. As a result of regular control and management of these points on urban and rural roads, the rate of collisions can be reduced by 25-31% (7).

Consideration of auxiliary lanes also has a significant impact on the reduction of traffic accidents. Auxiliary lanes can be right-handed lane and left-handed lane. These auxiliary lanes should be considered when considering major roads with high traffic and minor roads when a Two Way Stop Control Intersection is considered. In the design of auxiliary lanes, when the left-leaning lines are taken into account, the amount of traffic collisions is reduced by 28-48%. However, in the design of auxiliary lanes, when right-leaning lines are taken into account, the rate of traffic collisions is reduced by 14-26% (8).

Also in roundabouts, the traffic rotates around a green area, which in itself leads to traffic safety. These roundabouts, which can be considered on rural or urban roads, have a significant impact on reducing traffic accidents.

If we turn the Two Way Stop Control Intersection on Major Roads into Roundabouts, the amount of traffic collisions will be reduced by 82%. Also, if the SIGNALIZED INTERSECTION is converted to roundabouts, the collision rate will be reduced by 78% (9). The yellow light on the signalized intersections of the urban/city roads is also of great importance in the roads. This color instructs the driver to clear the entire area of the intersection from vehicles on this side, after which the green light turns on in which the traffic starts to move.

By installing these yellow lights we can reduce traffic injuries by 12%. Also by installing these lights the amount of total collisions can be reduced by 8-14% (10).

Dangerous areas on the roads are horizontal and vertical curves and special attention is paid to them during design. In addition to the economy on the roads, road safety is an important factor to consider. In order to design this dangerous section of road safely, it is important to consider appropriately all safety factors in this section, such as super elevation, radius of the curve, road surface roughness at the curves, etc. In short/mini curves, it is possible to reduce the amount of collisions by 52%, by strengthening the roughness of the road surface (11).

V. RESULTS:

One of the most important subject/topic to be considered in road design is its safety and economic viability. Both of the above points are taken into consideration precisely while designing a road, taking into account its local conditions, climatic conditions, traffic laws and all the features of road area/site. Considering all these factors, the necessary design factors for it are also taken into consideration during the design and finally a design equipped with technical and engineering laws can be achieved. The literature studied in this article show that the following problems exist in our country.

- During the design of the road the design engineer does not visit the road site and the result is that he cannot perform a proper design.
- All road safety factors such as super elevation, radius of the curve and roughness level of the road surface should be taken into consideration after road site survey.
- Once the road is designed, adequate plans must be developed and implemented for its safety.
- After the construction of the road, its repair and reconstruction should start as soon as the road construction work is completed.

VI. RECOMMENDATIONS:

As there are many problems in the design of roads in Afghanistan, but at least we can consider the points that greatly reduce the amount of collisions on the road.

1. At the time of road design, the area in which the road is to be constructed should be thoroughly considered according to the condition of the land. Because on the one hand, our country does not have any special standard in terms of hill roads and on the other hand, the road area is not studied accurately, so the road is witness to more traffic accidents.
2. All the technical principles of safety in the field of curves should be taken into consideration while designing. These safety principles are as follows:
 - a. Road pavement marking.
 - b. Installation of traffic signs in appropriate locations along roadsides
 - c. Considering some of the structures (Guideposts, Graill etc.) and their paintings to ensure the safety of the roads.
3. Strengthening the roughness of the road in short/mini curves.
4. Motorcyclists in urban areas should use safety helmets and reduce speed as much as possible.
5. Generally, the parts/sections of roads connecting other roads or the access to major roads should be designed technically and applied in the field as it significantly reduces the amount of collisions for the road.
6. The design of auxiliary lanes in urban and rural roads has a significant impact on road safety therefore they should be considered.
7. As there are no traffic lights in all major cities of Afghanistan or they are not considered according to the traffic survey and design, therefore the rate of collisions on the roads is also significantly higher. To solve this problem, a traffic survey should be conducted and as a result of the calculations, the traffic lights should be designed and used on a daily basis.

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