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Road Accidents Models for Sampla City

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Abstract: ***Road traffic accidents are considered the most important general health concern, as it results in numerous injuries and deaths worldwide. India is one among the developing nation which experiences the highest rate of such accidents. Thus the traffic agencies and public concentrates at the measures to reduce such accident severity in order to reduce the fatality rate. This paper reviews various factors and statistics related to road accidents occurred in various countries and also studies different safety measures suggested by researchers.***
Keywords: Road Accidents, Case Study, Haryana, Past Trends and Analysis

I. INTRODUCTION

The main problem in the study of traffic accident is to determine how the accident took place and how to prove such a course of the accident road safety is a multi- sectorial and multi dimensional subject. It includes orderly development and management of roads, provision of safer vehicles, and a comprehensive response to accidents. Road accident is a major problem for our future generation. In india with the expansion in road network, motorization and urbanization in the country the number of accident have surged. In different cities such as Delhi, Ahmadabad, Hyderabad, Chennai, Bangalore, and Kolkata for predicting road accidents using population and vehicular population. In this study an attempt has been made to develop Road Accidents Models for Sampla city (IN HARYANA) for a selected draw out of NH10.this is main highway but there are many issue what I see on the road. And I want to do work on this area.in this area there are a huge problem to cross the road when there are no red light system on the highway there are no sign board .i want to work that there is a systematic arrangement for crossing the road. Such as underpass or bridge.
The main point to study the road accident to protect our generation. Here the data was collected from police station, from road site, civil hospital, other department .for the purpose of study ,an RTA was defined as an accident which took place on the road between two or more objects. Road safty is an issue of national concern, public health and the gernal welfare of the people.

II. SCOPE OF THE STUDY

The topic of study 'Road Accidents modal for Sampla City' aims at studying the characteristics of road accidents on the main road of the city that is NH10 with a view to identify accident prone stretches and know the causes of accidents. The study for the NH10 such as sampla rohtak road, beri or sampla chock .there is no geometry shape and design .to develop the city there is on chock red light, sign design is also important .but there are no any type of sign or regulatory symbol. to develop suitable relationship between accidents and other parameters like traffic volume, population etc. for their use in prediction of accidents in future. This will help in taking remedial measures accordingly.. The models will help in better understanding of traffic accident data and fatalities to the policy makers in advising better traffic regulations and safety measures to enhance the safety. Black spots (dangerous accident prone stretches) will be identified in the city. On the basis of results some remedial measures and improvements will be suggested.

III. OBJECTIVES

A. To collect accident data of selected draw out of NH10 for last three years.
B. To study the data and agree on the trends of road accidents and identify the accident-horizontal stretches.
C. To carry out field study on the road for image study and to know the causes of accidents
D. To suggest corrective events and improvements for making accident-prone stretches safe
E. To grow accident models on the basis of available numbers.

IV. DATA COLLECTION

After discussion the traffic police the data to be ready from various steps:

A. Report has been ready after visit police station
B. Examine police accident report to identify the accidents which may have occurred within the road section during the defined time period
C. From the location site if possible

The data collected with the help of police and traffic police from Rohtak to Sampla. Spot because this the main highway and there is many accident take place. The data had collected from various steps:

1) Number of accidents year-wise
2) Type of accident
3) Vehicles involved in accidents
4) Location of accident
5) Time of accident
6) Age of persons involved in accident.

Other such applicable data required for growth of road accidents models like population of Rohtak city from 2017 to 2020 is obtained from municipal council office, Rohtak. Number of registered vehicles from 2017 to 2020 is obtained from SDM office, Sonipat Stand, Rohtak.

PWD (Public Works Department) proceedings are the main source of traffic volume of the draw out under study.

Field study is conduct at selected points for performing diagram survey of the traffic work of Rohtak city and some of the accident-prone stretches in the city. Reasons for the accidents are also find out at these locations. The situation of the traffic control signal system is also reviewed in the field study for their working conditions.

Table: 1.1.Accident Data of Rohtak City

Year	Population (P)	Vehicles (V)	dead (D)	Injuries (I)	Total Accidents (C)
2017	293428	19910	17	26	40
2018	304658	21943	20	36	60
2019	314962	25207	8	20	38

Data related to traffic composition is summarized in the following Table 1.2.

Table: 4.5 Traffic Composition of Rohtak City

Type of Vehicle	2012	2010	2011
CARS	2714	3012	3343
JEEPS	11	13	14
TRUCKS	86	95	106
TAXIS	8	9	13
TRACTORS	920	975	1033
BUSES	57	62	78
MOTOR CYCLES	13322	14920	16710
AUTOS	232	246	262
MISCELLANEOUS	560	611	648
Total	19910	21943	25207

It is observed that two wheeler is increased day by day and cars has been much higher than the other vehicles. Traffic volume survey was conduct at Rajive Chowk on NH10 by PWD B&R department. Table 4.6 presents the traffic volume data of Rohtak city for last three years. Traffic volume for the year of 2017was extract as 8963 PCU/day. This value reaches 1036 in 2019 showing a rise of 16%. Counts of types of vehicle are also shown in the Table.1.3.

Table 1.3: Traffic Volume Data of NH10

S.No	Year	Car/Jeep/Van /Taxis	Motorcycles	Buses	Trucks	Tractors	Total PCU/day
1	2017	2642	3363	1230	1143	585	**8963**
2	2018	2841	3613	1323	1229	629	**9635**
3	2019	3054	3870	1421	1337	676	**10358**
Total		8537	10846	3974	3709	1890	28956
Average/yr		2846	3615	1325	1236	630	9652
% Share		29	37	14	13	7	100

V. DATA ANALYSIS

A. Accident Crulety Key

The Accident cruelty key defined that there is number of people dead per accident. Table 1.5. presents Accident Severity Index for Rohtak city from 2017 to 2020. It is seen from the table that Accident cruelty key accident has regularly bigger from 32.33in 2017 to 46.04 in 2019.

Table 1.5: Accident Severity Index

Year (1)	Number of persons killed (2)	Total Number of Accidents (3)	ASI (4)=(2/3)*100
2017	15	45	33.3333
2018	23	58	39.6551
2019	29	63	46.0317

Above table is showing an increasing trend in accident cruelty key. The enlarge in the accident severity index seems to be the result of lack of medical facilities available in the Rohtak city.

B. Accident Casaualty Risk

The accident casualty risk, meaned that number of death per population.. The accident casualty risk of Rohtak city is shown in table – 1.6. The rate of accident casualty risk has shown growing trend form year 2017 to 2019. We can see from the table that accident fatality risk in 2017 was 5.11 and this value reaches 8.2 in year 2019.but it decrease in 2020.

Table 1.6: Accident casualty Risk

Year (1)	Number of Persons killed (2)	Estimated mid-year Population (3)	Accident Fatality Risk (4)=(2/3)*100000
2017	15	293428	5.11
2018	23	304658	7.5
2019	29	314962	8.2

This characteristic of accident is dependent on the population factor. As from the above table it is clear that population of the city is increasing every year due to which vehicle population is also increasing. As a result more accidents are going on every year and accident fatality risk is increasing due to lack of safety improvements taken in the city.

C. Variation in Deaths with Population

As the population is increasing the strength of vehicle is also increased and due to these accidents occurs more.this table show the present death in Rohtak. City from 2012-2014. Above table shows that with 17.3% increase in the population of the city, number of deaths has increased by 93.33% that is considered to be a great worry for the people of Rohtak city. The percentage increase in deaths is found to be almost five times the corresponding increase in population. Fig 1.1 presents variation in deaths due to road accidents with population.

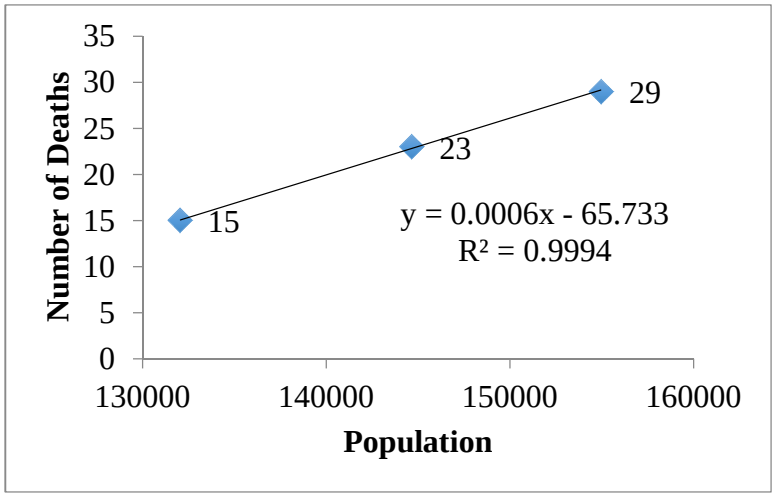

Fig. 1.1: Variation in Deaths due to road accidents with Population

The rise in the deaths due to road accidents is seen because increasing population of Rohtak city has resulted in more accidents that made people more vulnerable to fatal accidents.

D. Accident Risk

Analysis and risk assessment method have usually been developed in response to problems. To non-fatal type of accidents. However the situations had improved a bit in 2017, as there is only minor difference in accident risk value. Table 5.4 is the representation of accident risk for the period of 2017-2019.

Table 1.7: Accident Risk

Year (1)	Total Number of Accidents (2)	Estimated Mid year Population (3)	Accident Risk (4)=(2/3)*100000
2017	45	293428	34.07
2018	58	21943	40.09
2019	63	25207	40.65

E. Distinction in Accidents with Population

Table 1.8 shows the number of road accidents in Rohtak city. It is clearly seen from the table that number of accidents is increasing with increase in population every year. From the year 2017 to 2020 population has enlarged 293428 to 25207. There were 45 road accidents registered in 2018 and this figure reached 63 showing a rise of 45.The percentage raise in accidents is found to be almost two and half times the parallel raise in population.

Table 1.8 Road Accidents in Rohtak City

S.No	Year	Accidents (% Increase)	Population (% Increase)
1	2018	45 (00.0)	293428 (00.0)
2	2019	58 (28.9)	21943 (9.54)
3	2020	63 (40.0)	25207(17.34)

F. Accident Fatality Rate

The Accident Fatality Rate is defined as the number of deaths per 10,000 vehicles. Table 1.9. presents the fatality rate during period 2012-2014. There was an increase in fatality rate from 8.37 in 2012 to 13.05 in 2014.

Table 1.9.Accident Fatality Rate

Year (1)	Number of Persons killed (2)	Number of Registered Vehicles (3)	Accident Fatality Rate (4)=(2/3)*10000
2017	15	17910	8.37
2018	23	19943	11.53
2019	29	22207	13.05

The representation of accident fatality rate is shown in table 1.9for period 2017 to 2020.

Accident fatality rate has shown increasing trend over the last three years because of the significant growth of number of registered vehicles in Rohtak city.

VI. CONCLUSION

A. The Accident Severity Index (ASI) for Rohtak city has increased from 33.3% in 2012 to 46.0% in 2014. It indicates more deaths taking place in road accidents.

B. The increase in accident fatality risk from 11.4 to 18.7 in the last three years indicates that accidents are causing more deaths for a given population.

C. Population, number of registered vehicles and traffic volume on the road have increased in the last three years leading to increase in the number of accidents and fatalities.

D. The percentage increase in accidents is found to be almost two and half times and the percentage increase in deaths is found to be almost five times the corresponding increase in population.

E. The percentage increase in accidents is found to be almost two times and the percentage increase in deaths is found to be almost four times the corresponding increase in registered vehicles.

F. The percentage increase in accidents is found to be almost three times and the percentage increase in deaths is found to be almost six times the corresponding increase in traffic volume. All these points show that the measures taken for reducing accidents in the past are not adequate.

G. It is observed that the percentage of day time accidents (69.5%) is much higher than the night time (30.5%) accidents. This may be attributed to high traffic volume and high traffic congestion on the road during day time.

H. Accident prone segments have been identified on 10 km stretch of the road under study using various methods. The most accident prone segment is identified Kharawar to Rajive Chowk Intersection.

I. The reasons for more accidents on this segment include a) NH10 meeting with 71A without proper merging and diverging lanes, b) encroachment of carriageway on NH10 and on corners of the curves with other road by vehicles mostly auto-rickshaws, c) meeting of cross-roads from Hooda Complax side d) absence of working signal lights on intersection, e) very poor condition of road pavement in this segment of the road, f) absence of foot-paths for pedestrians and g) absence of road markings. Many of these reasons are found to be valid for other accident prone segments of the road as well.

J. According to the type of vehicles involved in accidents, it is observed that two-wheelers are involved in maximum number of accidents (39%), followed by bus/trucks (30%), cars (17%)and others (14%).

K. It is observed that economically active age group of the society that is 30-45 years occupied the maximum share in accidents (50.66%) followed by age group of 16-29 years (29.33%) and 46-60 years (15.11%).

L. Maximum accidents fall in the category minor injury type (49.77%) followed by fatal type (30%) and major injury type (20%).

M. Simple Linear Regression and Multiple Linear Regression are used to develop accident models for Rohtak City. In total six models are developed using simple linear regression relating accidents and deaths with population, registered vehicles and traffic volume. It is observed that traffic volume has more effect on number of accidents and deaths as compared to population and number of registered vehicles.

N. Two models have been developed using multiple linear regression relating accidents and deaths with population, registered vehicles and traffic volume. These models, however, are not found to be that suitable as simple linear regression models.

O. On the basis of the data analysis, characteristics of accidents and field visits conducted for the study the remedial measures have been suggested to reduce accidents on the accident-prone segments of the studied stretch of the road. These measures include a) speed limit for various vehicles, b) provision of foot paths, traffic lights and road markings, c) removal of encroachment especially on curves of intersections for ensuring adequate sight distance, d) provision of parking spaces especially for auto rickshaws and e) strict enforcement of regulations.

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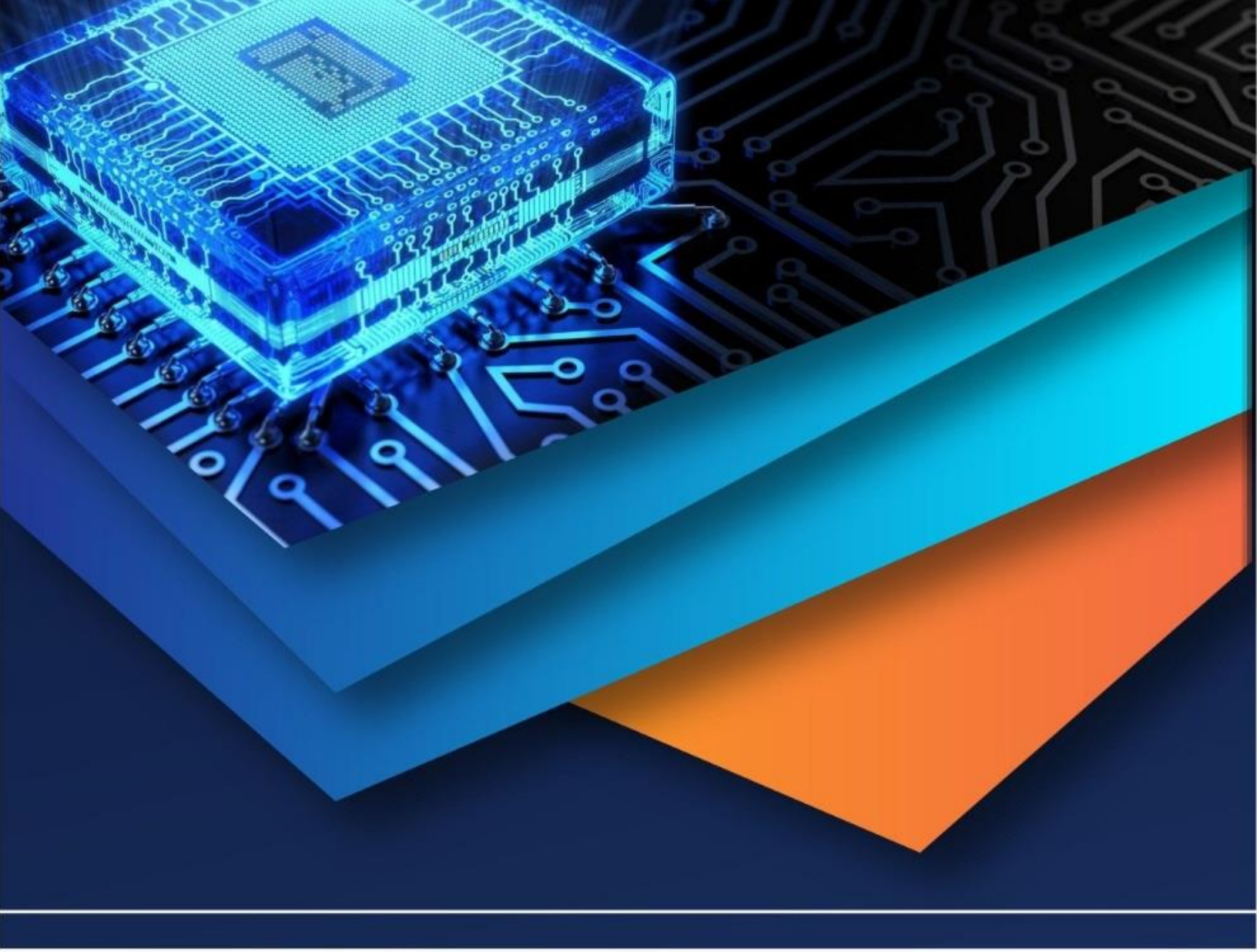

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