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Identification and Improvement of Accident Prone Locations on selected Stretch of NH-44

Ajay[1], Akash Batra[2]
[1]*Student M.tech,* [2]*Assistant Professor, Civil Engineering, Kurukshetra University, IIET Kinana, Jind, Haryana, India*

Abstract: ***This experimental work attempts to identify the accident prone locations on selected stretches on NH-44 in the Haryana State. Growing number of road accidents needs to be controlled by identifying the accident prone locations on NH-44. In this paper a study has been carried out on road accident data of a selected stretch of NH-44 (Panipat-Karnal Road). A 50 km road stretch between RD 66 km to 116 km was selected and road accident data of four years (2012-2015) was collected. To identify the accident prone locations the total stretch was divided into smaller sections of 5 km each. Total accidents and accident severity value has been used to rank the accident prone locations. The stretch of the road 66-79 km is found to be the most accident prone followed by the stretch 79-88 km and the stretch 89-98 km. A field study has been conducted to compare the analysis with field results.***

This thesis contains the data collected from NH-44 highway on the section from Panipat to Karnal in Haryana, their analysis and results are derived. The study is divided in four sections, at each section study is conducted by accidental statistics reports and usage studies which further contains accumulation studies and duration studies.

Keywords: Accident prone locations, NH-44, Growing number of road accidents, field study, accidental statistics reports.

I. INTRODUCTION

The rapid population growth and increasing economic activities have resulted in the tremendous growth of motor vehicles. This is one of the primary factors responsible for road accidents on National highways in India. The increasing number of road accidents is imposing considerable social and economic burdens on the victims, and various direct and indirect costs. Road accidents are essentially caused by improper interactions between vehicles, between vehicles and other road users and/or roadway features. The situation that leads to improper interactions could be the result of the complex interplay of a number of factors such as pavement characteristics, geometric features, traffic characteristics, road user's behavior, vehicle design, driver's characteristics and environmental aspects. Thus, the whole system of accident occurrence is a complex phenomenon. Many researchers have devoted their work in the area of road accidents and traffic safety aspects. Works have been undertaken on accidents characteristics, accident forecasting and better roadway and vehicular design for the improvement of road safety in different traffic and roadway conditions. A number of studies on road safety have also been carried out in India, in different cities such as Delhi, Mumbai, Chennai and Ernakulum as well as on some highway (Sandip Chakraborty and Sudip K. Roy). In this dissertation work, an attempt has been made to Identify and Improve Accident Prone Location on a Given Stretch of NH-44.

II. METHODOLOGY

A. Data Collection

The accident data are collected from National Highway Authority of India (NHAl) and SOMA Isolux. NHAI is associated with maintenance and construction of NHs in the country. The SOMA Isolux Construction Company is presently engaged ill widening project of NH-44 from Panipat to Jalandhar. The data collected is for four years from 2014 to 2017. The accident data contain the information like date, time and location of accidents. The data also include type of accident (fatal/mirror or serious injury),number of persons dead/ injured, vehicles involved in accident, probable cause of accident and the jurisdiction of the police station. As the data collected is of four years duration, it consists of voluminous pages. Some sample tables of the data are given in Table I-IV. The data regarding physical features of the site, wherever required, is collected by conducting field visit to the sites of accidents.

National Highway Authority Of India
Accident Data- Month of Jan 2014
Name of PIU/CMU: Karnal
Name of Stretch: K.M. 66.000 to K.M. 387.100
National Highway No. 44

TABLE-I
SAMPLE TABLE SHOWING ACCIDENT DATA FOR MONTH OF JAN 2014

S. N.	Date / Month / Year	Day / Night	Locations (Chainage)	Details of Accident Victims			Causes	Type of Accident	Name of Area Police Station	Remarks
				Fatal	Serious Injury	Minor Injury				
A	B	C	D	E	F	G	H	J	K	L
8	12-01-14	Day	123 LHS		2		2	Collision of car & Truck	Karnal	Car hit truck
10	13-01-14	Night	121 LHS		10		2	Collision of Bus & Truck	Karnal	Bus hit truck
15	15-01-14	Night	127/3 LHS		2		2	Collision of Car & Truck	Karnal	Car hit truck
16	18-01-14	Night	107 LHS		2	3	3	Collision of Car & Truck	Panipat	Car hit car
21	20-01-14	Night	111 LHS		2		5	Collision of Canter & Truck	Panipat	Canter hit car

National Highway Authority Of India
Accident Data- Month of Jan 2015
Name of PIU/CMU: Karnal
Name of Stretch: K.M. 66.000 to K.M. 387.100
National Highway No. 44

TABLE-II
SAMPLE TABLE SHOWING ACCIDENT DATA FOR MONTH OF JAN 2015

S. N.	Date / Month / Year	Day / Night	Locations (Chainage)	Details of Accident Victims			Causes	Type of Accident	Name of Area Police Station	Remarks
				Fatal	Serious Injury	Minor Injury				
A	B	C	D	E	F	G	H	J	K	L
12	13-01-15	Day	135 LHS		10	4	2	Collision of Bus & Truck	Karnal	Bus hit truck
13	15-01-15	Day	116 LHS		1		2	Hit & Run Accident	Panipat	Pedestrian hit by unknown vehicle
14	16-01-15	Day	134 RHS		2		3	Hit & Run Accident	Karnal	car hit by unknown vehicle
25	26-01-15	Night	148 LHS		3		2	Collision of Car & Trolley	Nilokhier	Car hit Trolley
26	26-01-15	Day	129 RHS		4		6	Car fell beyond shoulder line	Nilokheri	Car fell beyond shoulder line

National Highway Authority Of India
Accident Data- Month of Jan 2016
Name of PIU/CMU: Karnal
Name of Stretch: K.M. 66.000 to K.M. 387.100
National Highway No. 44

TABLE-III
SAMPLE TABLE SHOWING ACCIDENT DATA FOR MONTH OF JAN 2016

S. N.	Date / Month / Year	Day / Night	Locations (Chainage)	Details of Accident Victims			Caus-es	Type of Accident	Name of Area Police Station	Remarks
				Fatal	Serious Injury	Minor Injury				
A	B	C	D	E	F	G	H	J	K	L
8	13-01-16	Day	143 RHS		3		2	Collision of Car & Motor cycle	Nilokheri	Car hit motor cycle
13	15-01-16	Day	147 RHS		2		3	Collision of Car & Motor cycle	Nilokheri	Car hit motor cycle
25	16-01-16	Day	141/2RHS		3		6	Collision of Car & Median	Nilokheri	Car collided with median
39	26-01-16	Day	130 LHS		3	1	3	Hit & run accident	Karnal	Car hit by unknown vehicle
40	26-01-16	Day	110 RHS		4		6	Collision of Car & Median	Panipat	Car collided with Median

National Highway Authority Of India
Accident Data- Month of Jan 2017
Name of PIU/CMU: Karnal
Name of Stretch: K.M. 66.000 to K.M. 387.100
National Highway No. 44

TABLE-IV
SAMPLE TABLE SHOWING ACCIDENT DATA FOR MONTH OF JAN 2017

S. N.	Date / Month / Year	Day / Night	Locations (Chainage)	Details of Accident Victims			Cau se s	Type of Accident	Name of Area Police Station	Remarks
				Fatal	Serious Injury	Minor Injury				
A	B	C	D	E	F	G	H	J	K	L
8	01-01-17	Day	102+500 LHS	0	0	0	2	Unknown vehicle hit of car	Gharaunda	hit & run case
12	02-01-17	Night	112+720 LHS		0	0	2	Truck over turned on the road	Gharaunda	Due to over speed & foggy weather
13	02-01-17	Night	140+520 LHS	0	0	0	2	Canter over turned on the road	Gharaunda	Due to over taking
48	05-01-17	Night	105+780 LHS	0	0	0	2	Colison of two cars	Gharaunda	Car hit another car
49	05-01-17	Day	123+160 RHS	0	0	0	2	Multiple accident	Karnal	Car to over speed

B. Tabulation Of The Collected Accident Data

The data collected is shown from table V-IX. Table V-IX presents accidents classification due to particular causes. Table VI shows the accidents depending upon their nature of occurrence. Table VII classifies the accidents on the basis of type injuries. Table VIII shows the time during which accident occurred whether in day time or night time. Table IX presents vehicles classification of accidents.

TABLE-V
NUMBER OF ACCIDENTS DUE TO PARTICULAR CAUSE

Causes	2014	2015	2016	2017
Druken	0	0	1	4
Over Speeding	38	42	318	709
Vehicle out of Control	28	30	15	141
Fault of driver of motor vehicle/driver of other vehicle/cyclist/passenger	0	0	55	61
Defect in condition of mototr vehicle/road condition	1	0	5	19
Others	6	10	29	3

TABLE-VI
NUMBER OF ACCIDENTS BASED ON THEIR NATURE

Causes	2014	2015	2016	2017
Overturning	5	5	59	134
Head/Rear on collision	54	46	261	252
Collision brush/side swipe	0	0	0	0
Right angled collision	0	0	0	0
Skidding	0	0	0	0
Right turn collision	0	0	0	0
Hit and run	11	28	39	190
Others	3	5	61	234

TABLE- VII
NUMBER OF ACCIDENTS ON THEIR NATURE BASED ON TYPE OF INJURY

Year	2014	2015	2016	2017
Overturning	5	5	59	134
Head/Rear on collision	54	46	261	252
Collision brush/side swipe	0	0	0	0
Right angled collision	0	0	0	0
Skidding	0	0	0	0
Right turn collision	0	0	0	0
Hit and run	11	28	45	190
Others	3	5	64	234

TABLE -VIII
CLASSIFICATION OF ACCIDENT BASES ON TYPE OF INJURY

Year	Fatal Injury	Serious Injury	Minor Injury	Non Injury
2014	15	53	15	-
2015	16	72	27	-
2016	18	88	58	260
2017	24	202	155	465
Increase with respect to 2008	1.5 times	2.8 times	5.7 times	-

TABLE IX
DAY-NIGHT TIME WISE CLASSIFICATION OF ACCIDENTS

Year	Day	Night
2014	40	33
2015	54	28
2016	249	174
2017	501	309

TABLE- X
VEHICLE CLASSIFICATION OF ACCIDENTS

Vehicle Type	2014	2015	2016	2017
Two Wheelers	21	44	52	145
Auto	5	14	14	10
Car/Jeep	59	61	271	335
Bus	8	12	44	63
Canter	19	6	55	159
Heavy Truck	38	21	209	258
Tractor	2	8	13	42
Pedestrians	5	9	14	23
Bycycle	3	2	11	22
Other	0	0	4	21

C. Analysis Of Road Accident Characteristics

After the tabulation of data is completed the further analysis of tabulated data according to different characteristics of accidents is done. The characteristics are also studied on different stretches of road length. The different characteristics analyzed are-

Nature of Accident
Cause of Accident
Type of Vehicles Involved
Type of Injury
Time of Accident

After analyzing these characteristics, different tables and charts are made showing the relationship between characteristics and road stretch are presented in the next chapters.

D. Identification Of Accident Prone Locations

For identifying accident prone locations, first Accident Severity Value (ASV) was calculated. ASV is calculated by assigning some values to different types of accidents based on injuries which occur during the road accidents. Generally four types of accidents are classified based on injury type and the values assigned to them in this study are given below-

Fatal Accident - 10
Serious Injury Accident - 05
Minor Injury Accident - 03
Non Injury Accident - 02

After that ASV is calculated and a field visit is made to the site and photographs are taken of the locations or points which contribute or due to which accident can take place on the road stretches. The different stretches considered in the study are assigned ranking on the basis of above analysis made,

E. Improvement Measures

The study presented in the dissertation has been conducted to identify the accident prone locations on the selected stretch (66-116km) of NH-44. On the basis of the characteristics of the accidents and the field visits conducted for the study the improvements are suggested to reduce the accidents on the road.

III. CONCLUSION

Highways form the main lifeline of a country's economy, trade and commerce. Without highways a nation cannot develop .As the country grows, the traffic and the number of accidents on highways also increase. The road accidents scenario in India is alarming. The study presented in the dissertation has been conducted to identify the accident prone locations on the selected stretch (66-112 km) of NH-44 and suggest the improvements. The following are the main conclusions drawn from the study:-

A. The road accident data for the year 2014-17 for the stretch 66-112 km of NH-44 was collected from NHAI and Soma Isolux, the agency involved in widening project of NH-44. The data was analyzed to determine various characteristics of accidents.

B. Over speeding/drivers fault (87-88%) is found to be the main cause of road accidents. About 2% of accidents are caused due to defective vehicles/ bad roads, about 6% of accidents are caused due to vehicles going out of control and 3% of accidents are caused due to other reasons which may include bad weather etc. There is no significant difference in the cause of accidents during day and night time.

C. The collected data is found to be lacking in respect of making of making clear distinctions between various causes of accidents specially the drivers fault/over speeding/vehicle going out of control/drunken driving .

D. Type of accidents include 46% as head on/rear end collision, 19% as hit and run type and about 14% as overturning type accidents. There is no significant difference in the type of accidents during day and night time.

E. Maximum accidents fall in the category of non injury type (49%) followed by serious injury type (29%), minor injury type (17%) and fatal accidents (5%). Serious injury type accidents are found to be more than minor injury accidents. There is no significant difference in the type of injury during day and night time accidents.

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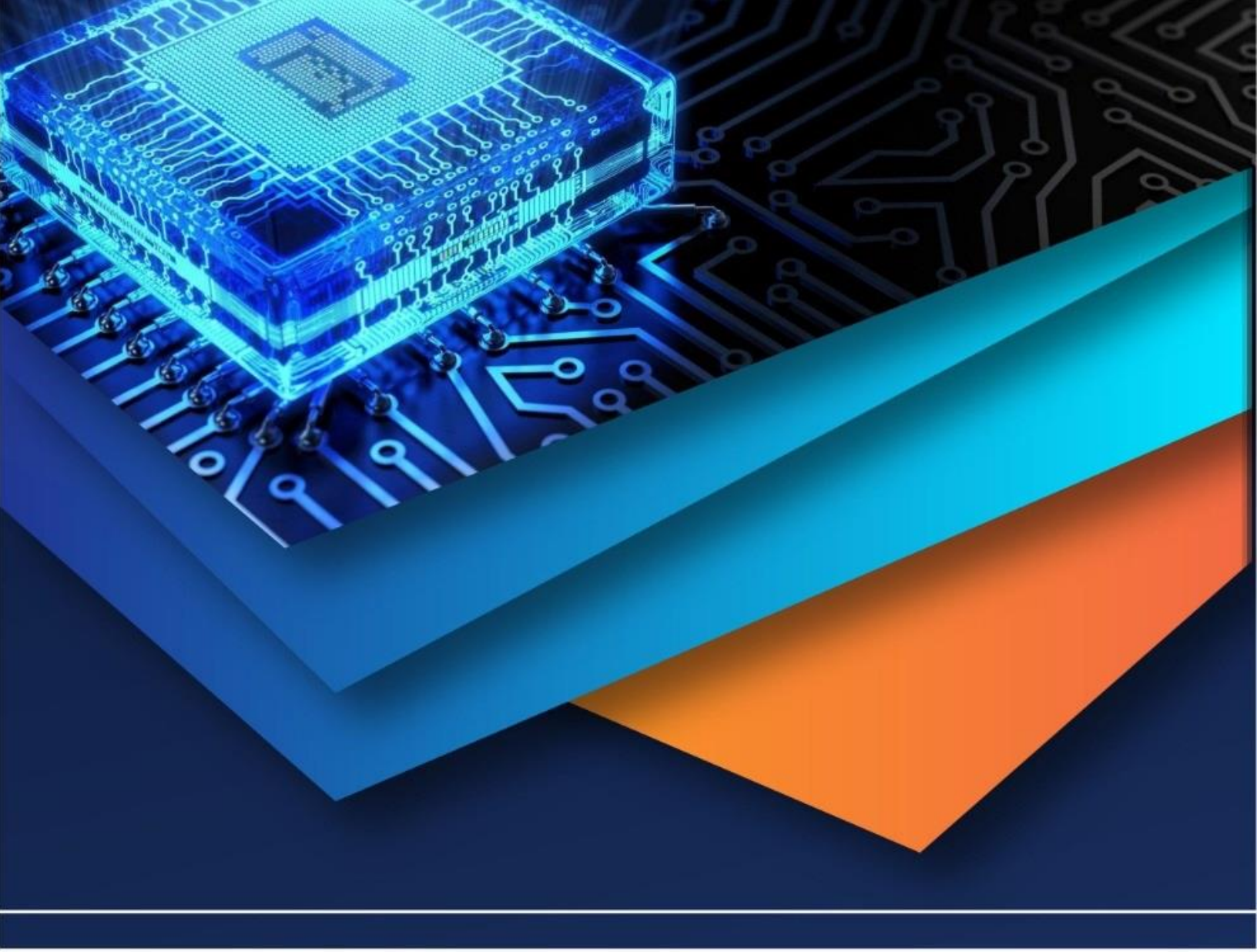

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