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Crash Clusters on NH-52 by using Google Maps

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Abstract – *Road crashes in India directly affects the economy to a large extent and various lives every year. Road Safety in India is also a major concern among the people daily as the number of crashes are increasing every second, every minute and every hour of the day. This paper generally deals with the study and to analyze crash clusters in Hisar city on NH-52 in the state of Haryana, India and also to see the real image of clusters as by using Google Maps by analyzing the adequate frequency of the crash clusters according to the type of crashes and other considerations. The fatal and non-fatal crashes both have been considered for creating crash clusters on NH-52. The crash rate has also been calculated considering the fatal and non-fatal crashes.*

Key Words: **Road crashes, Crash cluster, Crash rate, NH-52**

1. INTRODUCTION

Road crashes are increasing in India, as India is the largest country in the phase of larger number of crashes in the worldwide. As per data given by World Health Organization, nearly 4, 67,044 crashes reports on Indian roads in 2018, which is further an increase of 0.5% as compared to 4, 64,910 in 2017. As per the report issued by Ministry of Road Transport and Highways (MORTH) in 2018, more than 1.5 million people lost their lives in road crashes. Also, the road crash severity calculated by the number of people killed per 100 crashes, have shown a rise of 0.6 % points as in the year 2018.

India is considered as the first in the number of road crash deaths among the 199 countries as per World Road Statistics, 2018 followed by China and U.S. Also, WHO Global Report on Road Safety 2018 shows that India constitutes for almost 11% of the crash related deaths in the World.

National Highways which comprises of 1.94 % of total road network, accounted for 30.2% of total road crashes and 35.7% of deaths in 2018. State Highways which account for 2.97% of the road length accounted for 25.2% and 26.8% of crashes and deaths respectively.

2. STUDY AREA

The study stretch taken into consideration is of Hisar city in the state of Haryana which is approximately 8 kms in length. It is one of the major national highways starting from Ambala, Haryana to Pali, Rajsthan as shown in Fig. -1:

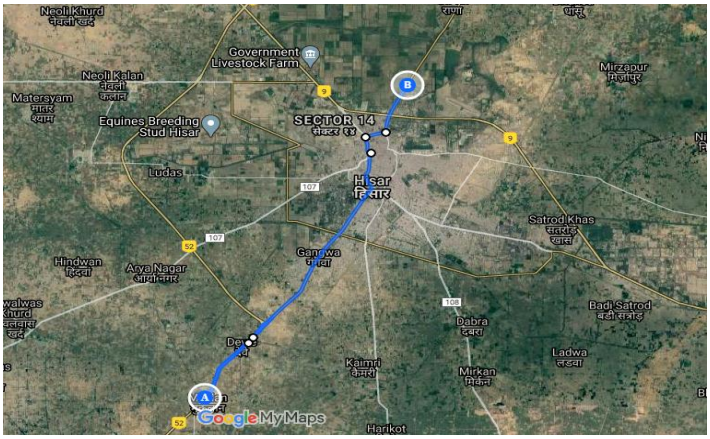

Fig -1: Stretch under Study

3. OBJECTIVE & SCOPE OF THE WORK

The selected stretch is a part of NH-52 which is renamed after NH-65 and widening of the stretch in the year 2016. The crash data collected for the past five years from 2011 to 2015 and to create a crash cluster by using Google Maps. The objectives of the study include:

a) Creation of crash clusters by using Google Maps.
b) Crash rate analysis.

4. DATA COLLECTION

The crash data has been collected from police department for the period of 2011-2015 and from various Police Stations i.e City Hisar, Sadar and Thana Hisar. Some of the FIR has also been downloaded online from website www.haryanapoliceonline.gov.in. The collected crash data has the following observations:

1. Date of Crash.
2. Time of Crash
3. Day of Crash
4. Victim Vehicle
5. Accused Vehicle.
6. Injuries (Minor/Grievous).
7. Number of deaths/Fatalities
8. Collision Type

9. Location of Crash
10. Ref. No. or Entry No.
11. Beat duty
12. Driver's Age (years)
13. Victim's Age (years)
14. Village/landmark nearby location.
15. Property damage

GPS location has also been identified by using crash reports and information mentioned according to the location or nearby area.

5. DATA ANALYSIS

5.1 Yearly Variation of Crashes

Table -1: Yearly variation of crash data from 2011-2015

Year	Number of Crashes
2011	9
2012	18
2013	9
2014	12
2015	6
Total	**54**

Table 1 shows that there are total of 54 crashes took place during the year 2011-2015. The maximum number of road crashes took place in the year 2012 and 2014.

5.2 Monthly Variation of Crashes

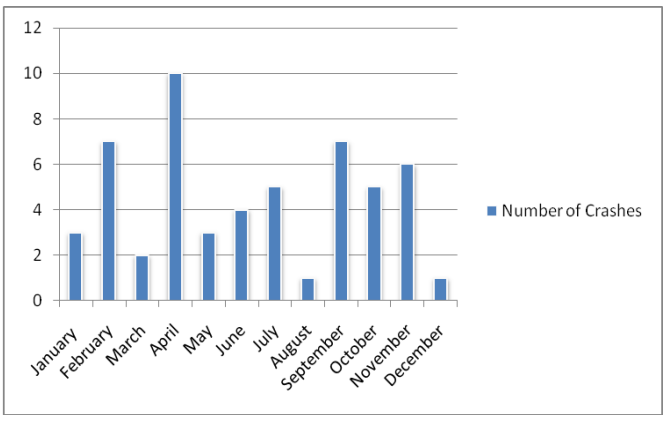

Fig -2: Monthly variation of crashes.

Fig. 2 shows that the crashes in the month of February, April, September and November tells the significant role in losing lives due to seasonal variations in the city.

5.3 Crash Identify according to Victim Vehicle

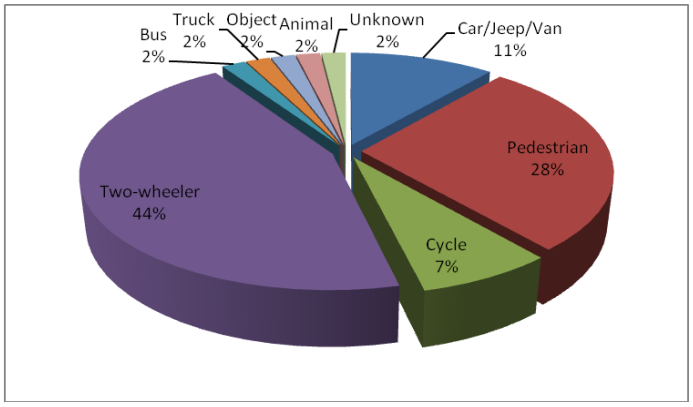

Fig -3: Variation of crashes according to victim vehicle.

Fig. 3 shows the maximum no. of crashes occurred in the city including victim vehicles. The two-wheelers (44%) and pedestrians (28%) are mostly affected by the other large vehicles in the city, as there is much movement of these vehicles and are more vulnerable. This may be due to large number of access points and rush in the city. Also, due to lack of traffic signals and poor condition of link roads in the stretch.

5.4 Crash Identify according to Accused Vehicle

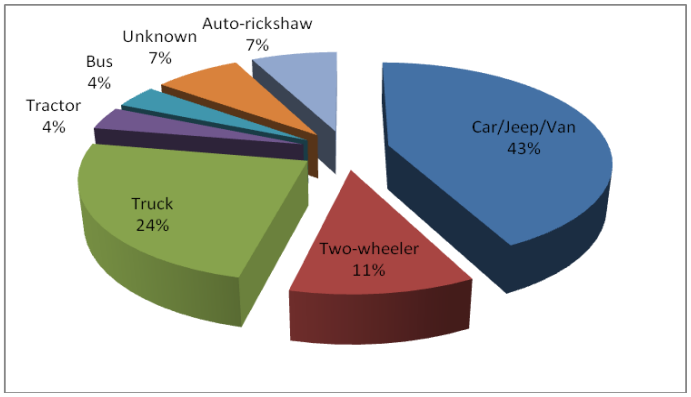

Fig -4: Variation of crashes according to accused vehicle.

Fig. 4 shows that car/jeep/van (43%) and truck (24%) are affecting the pedestrians and two-wheelers more as compared to other vehicles. This may be due to the fact that the vehicles might be running more that the design speed as specified in the streets and also due to of good pavement markings and poor road infrastructure.

5.5 Crash Identify according to Type of Collision

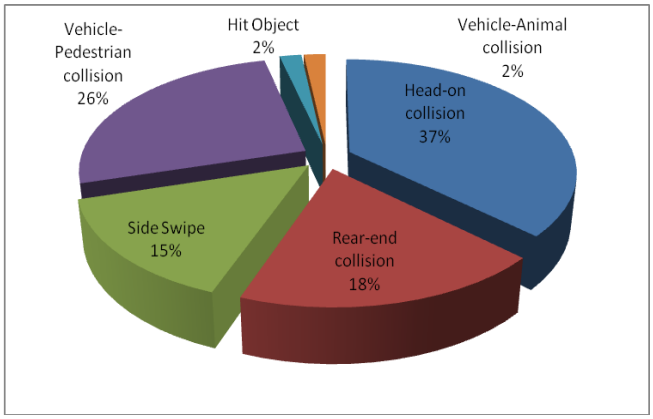

Fig -5: Variation of crashes according to collision type.

Fig. 5 that number of crashes occurred due to Head-on-collision type (37%) and then vehicle-pedestrian collision (26%); this may be due to speeding of vehicles, rash driving and overtaking from wrong side or due to obstruction of any public property or a street pole in the city.

5.6 Crash Rate

The crash rate is generally defined as the total number of crashes occurred on a particular stretch of each highway and street classification.

Crash rate = total number of crashes including fatal and non-fatal/length of particular stretch taken under study.

$$R = A/L$$

Where R is the crash rate

A is the total number of crashes (fatal and non-fatal)

L is the total length of stretch taken for study

Therefore, R = 54/8 = 6.75

The crash rate on the selected stretch is 6.75, which implies that more the crash rate, more the number of lives will lose, but the fatal crashes are less as compared to non-fatal crashes. The non-fatal crashes mostly constitute grievous injury on NH-52.

6. CRASH CLUSTER

The crash clusters have been created by using google maps. The fatal and non-fatal crashes have been classified by different color i.e. black is for fatal crashes and orange is for non-fatal crashes. It has been observed that the maximum crashes are taking place on the outside stretch of the city; this might be because vehicle driver may speed up the vehicle as soon as it reaches the outer part of the city, which further causes more number of fatal crashes as shown in fig. 6 & 7.

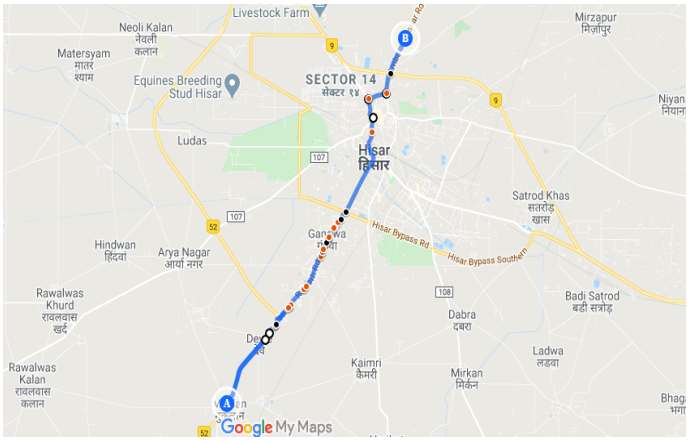

Fig -6: Crash cluster using google maps on the selected stretch.

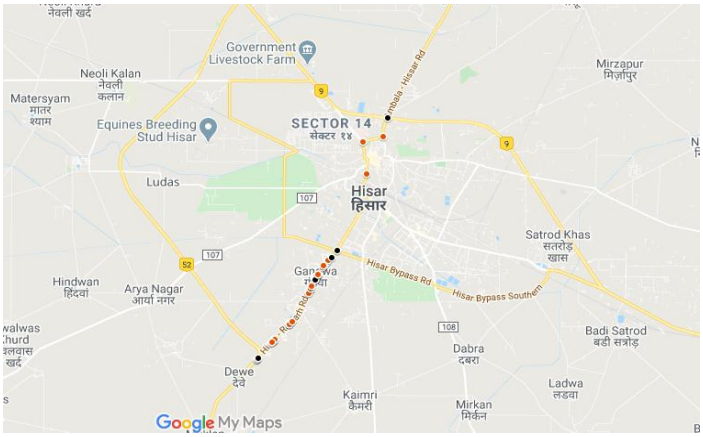

Fig -7: Fatal and non-fatal crashes using google maps on NH-52.

Fig. 7 indicates that non-fatal crashes including fatal and non-fatal crashes include minor and grievous injuries. The maximum number of crashes is taking place in the rural part of the city, which might be due to the fact that the area is not properly developed and pedestrian crossing on the highway is also there, which further increases the risk of crash on the road.

7. CONCLUSIONS

From the crash rate and cluster analysis, it is observed that the maximum number of crashes is occurring on the outside stretch of the city. This may be attributed due to heavy traffic, speeding, poor pavement conditions and formation of ruts, pot holes, cracks and undulations. The crash rate is merely indicating that maximum number of crashes took place on the stretch might results into more number of grievous crashes on NH-52.

Further conclusion has been recorded are as follows:

1) Maximum number of crashes found occurred due to head-on-collision and vehicle-pedestrian collision.
2) The exact reason behind the number of crashes occurring on the stretch includes many factors like speeding, rash driving, improper enforcement by local police, lack of road infrastructure, etc.
3) Two-wheelers and Pedestrians are more vulnerable inside and outside the city. Four-wheelers and cyclists also share some percentage to some extent.
4) Grievous crashes are occurring every season in every month which indicates lack of driver's alertness during bad road conditions, traffic lights, signs, symbols and street lights.
5) The crash rate on the stretch can also be related in the fact that 6.75 crash rate is more as compared to the number of crashes occurring on the highway. These crashes includes fatal and non-fatal but in future, the non-fatal crashes may get converted into fatal one if adequate measures aren't been taken into consideration.
6) The total numbers of serious injuries as well as minor injuries are also high in the city.

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BIOGRAPHIES

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