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Fatal Accident Analysis in Southern Part of Jaipur City Using GIS Application

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Abstract—*In today's life day by day increasing population and density of vehicle and due to this the rate of accidents is increasing day by day.and around 50 lakh people is dead all over the world by the road accidents due to many reason i.e. from the bad condition of road on specific point and the due to colliding the vehicle. In India the road accidents is increasing day by day so it should be needed to always time to time analysis road accident of every main city of states. Therefore in this research, GIS tool is used to analyze fatal accident data of Jaipur. To analyze road accident in Jaipur and accident causes death due to any reason. Identify hot spots locations, where more accidents are taking place using GIS application with this it will help to take precautionary measures for those hot spot locations. It is found in the research that particular reason of accident may vary from location to location. Main reasons are due to poor road and due to elevation of road etc.*

Keywords*: Accident Study, GIS, Jaipur city.*

1. INTRODUCTION

According to the world data India is 7th biggest country in the world and the density of Population in India's rank is 2nd i.e. after China, and in today's life the transport system is raising consistently, with the increase in population of India [1]. Due to this, roads in the city have high density of vehicle and increase in the probability of collision between vehicle and people [2]. Bus services in particular area have deteriorated and their efficiency and quality of services have been declined so inducing passenger to turn towards personalized modes [2]. This results not only for prohibited the traffic flow, but also affect the road users at high risk. The total number of fatal accidents as well as related fatal accidents in the city is increasing over the years. Almost 45 people died per 100 accidents in 2000, which is alarmingly situation for the society. The pedestrian deaths percentage is more than 89% of all road accident are also extremely high during the last years in the all road fatal accidents [1].

Fatal registered data more than 80% of all accident is happened with young age people due to lack of safety measure [3]. So that particular road safety audit for this location should be carried by a responsible team of experts to give their opinion on corrective measures. In this era, where everything can be located through GPS and GIS application, from this anyone can explore the city. So GIS tool should be used for transport system improvement [4]. In this study fatal accident analysis is performed for southern part of Jaipur city using GIS. The main objectives of the study are to examine the reasons for accident and examine existing design. GIS application is used to identify the black spot area and figure out peak hour of each location for accident data.

2. STUDY AREA

In this study, southern part of Jaipur city is selected as city is growing rapidly in this direction. Therefore Sanganer area and Malviya nagar areas are included this study. These areas also have much dense in traffic movement especially in peak hours. Different location of Sanganer and Malviya Nagar area such as India gate, Kumbha marg, Sanganer pulia and b2 by pass etc are selected based on traffic density. The main objectives of the study can be given as the following.

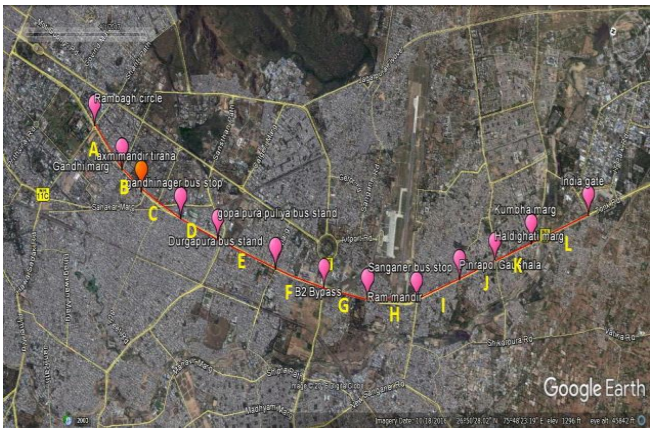

Fig. 1: Study Area (Source: Google Earth)

3. METHODOLOGY OF STUDY

Identification of accidental black spot is the procedure to find spots that are particularly dangerous where accidents had occurred [2]. Accident data of these locations collected from

traffic police department of Jaipur city. Detailed analysis of the identified black spots is conducted through field survey. To find out the peak hour of each location to analysis of fatal accident causes by physical survey of each location of study area. All the locations are brought in to GIS by collecting the latitude and longitude. Accident location Map is generated using these locations in GIS. Identify fatal accident locations using past accidents of particular location as well by using population density.

The black spot were analyzed using GIS tool.

4. RESULT AND DISCUSSION

The data are analyzed and some significant outcome found in this research. As shown in Table1 about the location wise fatal accident took place in Sanganer and Malviya Nagar area of Jaipur.

Table 1: Location wise Accident details

Place	Fatal	Minor injuries	Total
Sanganer	28	100	128
Malviya Nagar	9	78	87

In Sanganer area total 28 fatal accident took place whereas in Malviya Nagar only 9 in the same period. Minor injuries were 100 and 78 in Sanganer and Malviya Nagar respectively.

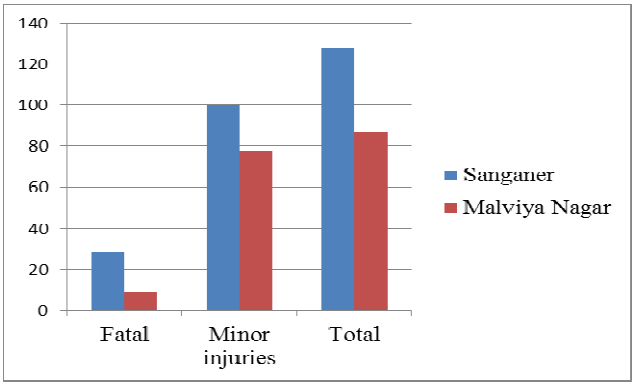

Fig. 1 Graphical Representation of Accidents

If we compare both areas then it is found that minor injuries were very high in Malviya Nagar compare to Sanganer area, especially the difference between total numbers of accident took place in both areas.

Table 2: Causes of Accident in Percentage

Place	Geometry Problem	Human Error	Signal Problem
Sanganer	20%	70%	10%
Malviya Nagar	12%	80%	8%

The main causes of accidents are geometry problem, human error, signal problem found by road side survey of all locations. In Jaipur city, these three factors are inducing accident, which are further converting in to fatal and minor accidents. Field survey and secondary data analyzed and based on that accident reasons found that 20% geometry problem, human error 70%, 10% signal problem in Sanganer however in Malviya Nagar 12% geometry problem, 80% human error, 8% signal problem. Most of the accident took place at the intersection such as T section, skew symmetric section and rotary.

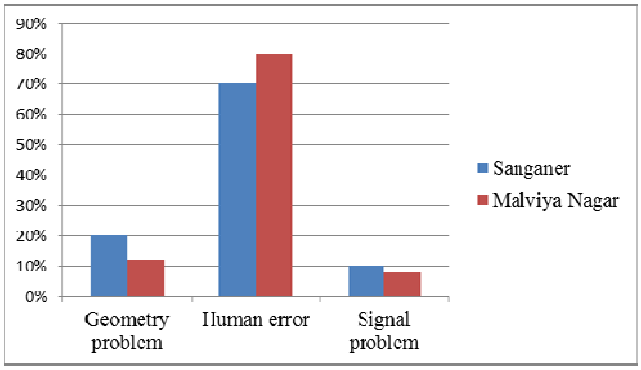

Fig. 2: Graphical Representation of Accident Causes

From this graph the percentage of human error is very high comparatively signal problem and the geometry problem**.** This can reduced when the people will aware regarding the traffic rule and regulations. Such as lack of PIEV theory [3]for the particular section of Jaipur city the no of accident is high, for every location the accident is more than the 4 accident which is fatal. This is assumed as the black spot for that region. 80% of all traffic accidents happening in developing country.

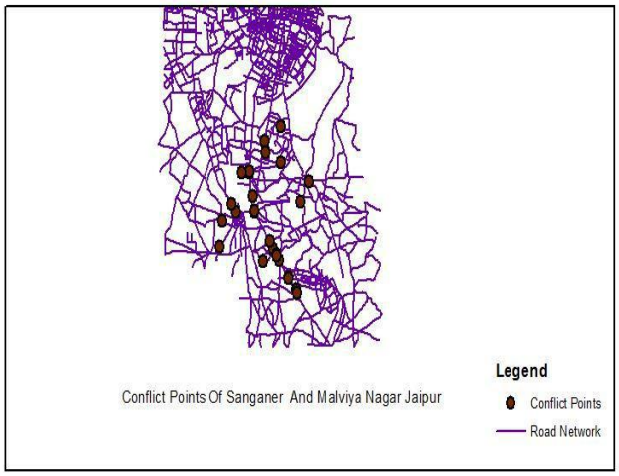

Fig. 3 Black spot point of Malviya Nagar and Sanganer

5. CONCLUSIONS

In this study it is found that 37 fatal accidents took place in Sanganer and Malviya Nagar in 2017. These all accidents are causes due to improper geometrical design, Signal problem

Human error (PIEV theory), Lack of safety In modern era the accident is increasing day by day and In Jaipur city also increasing accident i.e. fatal even in all State, so in future for overcoming the accidents the collected data will be analysed easily through GIS and will be implemented where hot spot is greater and Overcome the issue related transportation system.

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