A study on Black spot analysis in GNT road Chennai

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Abstract- *Transport system in now a days has a major role to play in our day to day life. This results in increased numbers of vehicles and accidents. In 2017, a total of 4,64,910 road accidents were reported in the country, claiming 1,47,913 lives and causing injuries to 4,70,975 persons, This also means that 16 people are killed and another 53 are injured every hour on Indian roads. Especially in a major city like Chennai a total of 7794 accidents are reported in 2018. In this paper, emphasis is been given on the fatal accidents and its effects. A study is made in various locations in Chennai city. The accident data has been collected from the Chennai traffic police station & Commissioner Office for 2018. From the various data collected we have chosen GNT Road (Moolakadai to Padiyanallur) for the study. Preliminary analysis includes the identification of black spots. The black spot identified is then chosen for analysis. The detailed analysis includes the analysis of black spots for the causes of accidents in study area and based on the detailed analysis, the improvement & remedial measures have been recommended. The outcome of the project will be highly useful for the traffic department to ensure road safety measures effectively.*

Keywords- GNT road, black spot identification, accident analysis, recommendations

I. INTRODUCTION

Road accidents are one of the most important problems faced by today's people. Increase in population and increase in economic activities results to the increase in enormous growth of motor vehicles which causes accidents. Many metropolitan cities including Chennai also face this conflict. One of most important cause for these accidents is disobeying the traffic rules. As Chennai is a developing city, the traffic planning is not up to the mark.

Automobile accidents are becoming a curse in disguise by killing and injuring billions of people all around the world. Urbanization is also a cause for the increase in accidents. The traffic movements on city roads have been combined by frequent interruptions, resulting in sudden reduction in speed, which leads to congestion & accidents.

Road accidents cause injury, death, loss of property and damage to vehicles. All these involve a major loss to the economy. There is chance to drop the accident rates by improving roads & by effective traffic planning. The traffic planning should be effective enough to avoid fatal accidents. In case of death or severe injury the recovery of the accident should be quick as possible (arrival of ambulance).

The investigation of accidents should be technical in order to find solution for the decrease the accidents. Proper city planning and regulations for vehicles and drivers along with the co-operation of the public is the only way to reduce accidents.

II. OBJECTIVES

The objectives of this study are specifically given as the following points,

- To develop a methodology to identify and prioritize hazardous locations and to find out the most vulnerable accident stretch.
- To find out most vulnerable accident stretches in Chennai city by applying the methodology developed.
- To identify various traffic and road related factors causing accidents and fatalities
- To provide remedial measures or suggestions to avoid such accidents and fatalities
- To publish and create awareness to the about the road accidents to Chennai city planning for the avoidance of accidents.

III. METHODOLOGY

The project methodology for this study is given as the following points,

- Collection of various data to identify the exact scenario
- Identification of the black spots
- To study the nature and causes of accidents in the selected stretch of road
- To carry out inventory in the existing system

- To provide remedial measures and justifications for the present conditions
- Publish and to create awareness to the traffic department to look out the accident problems in the city

IV. LITERATURE REVIEW

Ashokbhai and Jain [2013], has collected from Zonal Police from 2009-13 and on the basis of that data the spots causing the maximum number of accidents are identified and top 5 black spots are listed down. Inventory survey was conducted on the black spots considering the number of fatal major injury and minor injury accidents. The paper conclude that the accidents are happening due to poor road geometrics like absence of footpath, service lane /parking lane , zebra crossing , traffic signals.

Jadhav et al. [2015], collected data from police station (2011-15). Identification of black spot has been carried out based on Critical crash rate factor method in which RMV (Rate per 100 million vehicle kilometers is determined using the following expression:

RMV= A X 100,000,000 / VT

A = No. of crashes, total at the study location during a given period;

VT = vehicle kilometers of travel during the given period

=ADT x (No. of days in study period) x (No. of years) x (length of road segment).

Analysis has been carried out considering daily variation of accident, Timely variation of accident, gender wise analysis, and vehicle wise distribution and age wise analysis. It is concluded that maximum crash rate happen between the month of August to December and in rainy season of July. Accidents happen due to improper lane marking, missing of speed breakers and manholes.

Rahman et al. [2006], Accident data has been collected from 2002-06 from accident research institute (ARI), BUET Bangladesh. Accident Severity Method and Accident Exposure Method are been used for analysing the data. Comparison has been done between three National highways of Bangladesh i.e. NH-1, NH-2 and NH-5. Analysis has been done considering the factors like type of vehicles involved in accident, different time of the day, location of accidents. Large buses and trucks are responsible for fatal accidents and number of accidents are greater in daylight rather than in night.

Lad et al [2013], The accident data has been collected from 2008-12 from Sola high court police stations. On the basis of the data collected 5 black spots are declared. Inventory survey was conducted in which the width of the road, footpath, median, and service lane are measured. Analyses are being carried out using Speed studies, Volume studies and Pedestrian studies. It has been concluded that the accidents are happening because of deficiency in geometric design of road like absence of speed breakers, absence of foot path, improper marking of zebra crossing, non working of traffic signals, and illegal parking of vehicles at intersections. At last no facility was provided to pedestrians to cross the road thus leading to fatal accidents.

Kumar et al. [2015], has collected data from two sources i.e. from Police station in the form of FIR's and data collected from PWD (2009-14). Five Black spots are been identified out of which three of them lies on T-junction and rest on the intersections. Causes of the accident are over speeding by the vehicles, presence of narrow bridges and absence of pedestrian paths.

V. DATA COLLECTION

The following are the data collected regarding the accidents in the GNT road are given in the table shown below

Sl.no	Name of the location	Fatal	Non fatal			
			SI	MI	NI	Total
1	Puzhal Jail	4	2	5	8	15
2	Puzhal Camp	5	5	3	16	24
3	Vadakari	6	8	5	20	33
4	Madhavaram roundabout	6	3	7	19	29
5	Madahavarm bus depot	2	0	1	4	5
6	Retteri	2	0	1	9	10
7	Moolakadai	1	0	0	5	5
8	Padiyanallur signal	6	8	12	21	41
9	Kanaganchathiram	3	3	3	9	15
10	Old GNT road	3	0	2	8	10
11	Kavanagarai signal	3	3	5	4	12
12	Pallavayal	2	0	2	8	10
13	Kathirvedu	1	0	3	4	7
14	MAnagar	2	0	1	2	3
Total		46				219

Where,

SI = Serious Injury (at least one or more victims hospitalized for more than 24 hours)

MI = Minor Injury (victims suffers minor injuries which are treated on-scene (first aid) or in hospital as outpatient)

NI = No Injury (no injuries are sustained by any of the involved persons. Usually only vehicle damage occurs as a result of the accident)

VI. SITE SELECTION

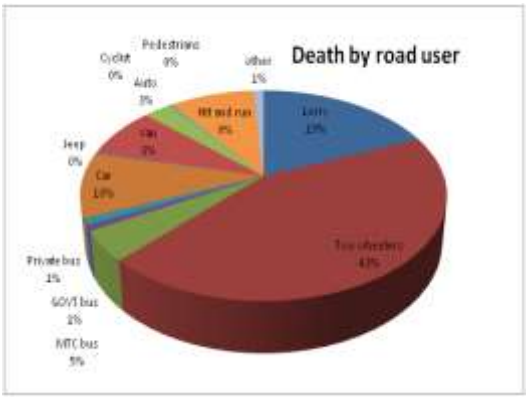
Based on the collision diagram and the data collected the black spots are identified.

The following are the list of black spots identified in the GNT road, they are:

- Puzhal central prison
- Puzhal camp junction
- Vadakarai signal
- Madhavaram Roundabout
- Padiyanallur signal
- Kanagachathiram
- Kavangarai signal

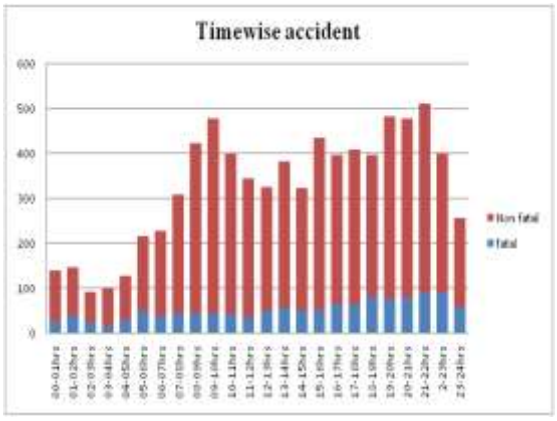
VII. PROBLEMS IN GNT ROAD

In GNT road the most predominant vehicle that causes accidents are Two-wheelers. This occurs due to the increase in collision between the Two-wheelers with Lorries. Most of the accidents occur due to volition of traffic rules. The fig given below clearly shows that 43% Two-wheelers are responsible for the accidents occurred



80% of the total accidents in GNT road occurred during 4.00hrs to 22.59hrs. In early mornings the numbers of accidents are low because of the low traffic volume count

The following figure gives the details about the frequency of the accidents in GNT road (Moolakadai to Padiyanallur) with respect to time in hrs.



Roads are not in good conditions and there is a lack of pedestrian facilities like pedestrian crossings, pedestrian signals, etc., Signal timings and slopes in roads should be revised under the IRC standards.

Proper traffic calming facilities like speed barkers, barricades, etc should be provided to slow down the speed of the vehicles at intersections

The above given fig shows that the GNT road is most dangerous road of North Chennai with more number of fatalities and its very risk to drive. So the study about the accident in GNT road should be encouraged to find better ideas to reduce the accidents

VIII. REMEDIAL MEASURES

The following are the remedial measures to be adopted to reduce the accidents in GNT road, they are:

- The defective traffic signals should be repaired and maintained properly.
- Pedestrian facilities should be provided to ensure the safety of the pedestrians.
- Rules must be followed by every road users who uses the road.

- Protection gears like helmets and seatbelts should be weared.
- Speed control program should be conducted to explain about the effects of over speeding.
- Educate to use the safety features like indicators and headlights in vehicles
- Provide information like signboards, LED screens and signals to the drivers about the road nature and condition
- Laws and enforcements should be hard to reduce the accidents
- Reducing the clearance of vehicles which are provided more in heavy vehicles.

IX. CONCLUSION

Based on the on-site crash investigations made in the GNT road, this study concludes the following for the study area

- Human or Man-made errors are the predominant reason for the accidents. A total of 53% of the accidents are caused due to Human errors (i.e. violation of rules and regulations and reckless driving)
- Vehicle errors also plays an important role in the accident study because a total of 32% accidents are occurred due to the vehicle errors and this is most commonly seen in heavy vehicles like lorries and trucks.
- Pedestrians who uses the road are faced a total of 8% of accidents in 2018. The pedestrian safety is very important for a highway or roads design and management.

All the data and investigations are preceded based on the conventional method of data manipulation. The traffic investigation should be technical and it should not be based on the police report & investigation.

Even the data collected & analyzed may not be accurate the data collection and accidents records should be properly maintained by using new technologies and methods.

The accidents analyzed for this study provides a primary understanding of the characteristics of accidents occurred in GNT road. More data and analysis will improve these findings; the study we made will provide a solid start for the police and government to make decision and to make necessary actions to reduce the accidents.

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