



Black Spot Study

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Abstract:

Places where more than regular accidents occur in particular road junctions are termed as black spot. Finding out the reasons/causes for those accidents and to suggest remedial measures in order to reduce and if possible to eliminate the causes which contribute to the accidents. The analysis of road accidents for selected zones in this study includes the problems of the selected zones. It also contains number of accidents taken place from the year 2012-2016 and traffic volume for three particular days from morning 7:00-10:00 is been tabulated with respect to particular junctions which proves that in the selected zones traffic volume are considerably more in number and poor lane discipline. To overcome this corresponding remedies have been suggested according to Indian Road Congress (IRC) and in-situ conditions are compared with IRC.

Keywords: Black spot, Traffic Volume Study, Comparison, Number of accident, Present Conditions.

I. INTRODUCTION

Mysore being second fastest growing city in the state of Karnataka, India is also contributing its share of accidents. It is in this connection thought it was proper to take up the present work of locating the accidents. A Road Traffic Accident (RTA) can be defined as, 'An event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed or causing loss or damage to property, where at least one moving vehicle is involved. Thus RTA is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles'. Road Traffic Accidents are a human tragedy. They involve human suffering in larger volumes and socio-economic costs in terms of premature deaths, injuries, loss of productivity, and so on. Of all the systems with which people have to deal every day, road traffic systems are the most complex and the most dangerous.

1.2 Types of Accidents:

- **Physical accidents-** Physical accidents maybe collision between vehicles, between vehicles and pedestrians, between vehicles and animals or between vehicles and geological objects.
- **Non-physical accidents-** Non-physical accidents maybe unintentionally revealing a secret or otherwise saying something incorrectly, forgetting an appointment etc.

1.2 Black Spot:

The present work deals only with the physical accidents. A black spot is a stretch of road or a particular point or a junction in which road traffic accidents occurs very frequently at an alarming rate. This portion of road may also be regarded as a high risk location for crashes. Globally, as projected by the WHO, the road traffic Disability-Adjusted Life Years (DALYs), loss of life due to accidents is expected to scale up from being the ninth leading cause of death in 1999 to the third leading cause by year 2020. Road accidents have earned India a dubious distinction with over 130,000 deaths annually. The country has overtaken China and now has the worst road traffic accident rate

worldwide. In India, the motor vehicle population is growing at a faster rate than the economic and population growth. The surge in motorization coupled with expansion of the road network has brought with it the challenge of addressing adverse factors such as the increase in road accidents. Road accidents have not only caused loss of lives and disability to the Indians but also substantial damages to the country's economy. It was estimated that the economic losses due to road accidents in India are over 20 Billion USD per year. The problem in road safety transcends the transport sector. It is an issue concerning health, social, and economic problems as well. The health sector would have to stretch its bed capacity in order to administer to the victims while overseeing other important illnesses. Families are displaced and their futures shattered because of the sudden demise of their breadwinners, which is a social welfare problem. Accidents lay off workers, which eventually, if summed up, will translate to millions of persons of potential lost productivity thereby affecting domestic production and the economy. It was observed that in Metro Manila, traffic management policies have been implemented without much study, translating to confusion and eventual mishaps. The scale and magnitude of the effects of road accidents on the lives of the people involved and the society in general must be clearly defined for purposes of raising awareness and as an input to the planning and evaluation. Hence, traffic safety has become a major area of concern for the authorities. The development of urban transport system has not kept pace with the traffic demand both in terms of quality and quantity. As a result, the use of personalized transport, mainly two wheelers and intermediate public transport is growing at a rapid speed. The disproportionate growth in the traffic vise-versa growth in road length along with unauthorized encroachments on road space, lack of traffic and lane discipline and deficiencies in traffic control have contributed to the increasing problem of congestion in urban areas. The RTA is a result of various factors like faulty vehicle design, untrained drivers, drunken driving, bad road conditions like improper sight distance, improper overtaking sight distance, and poor vehicle conditions etc. but all these do not come within the ambit of our study.

1.3 Reasons and Factors:

- a. Vehicle design
- b. Road environment
- c. Geometric design of roads
- d. Alignment- Route of road, defined as a series of horizontal tangents and curves.
- e. Profile- It is a vertical aspect including crest and sag curves.
- f. Cross section- It provides the cross slope and banking details of the road. After understanding the reasons and factors causing accidents, we will move on to understand the code recommendations in case of geometric design shortcomings. The IS codes that we are referring are IRC86:1983 IRC99:1988 IRC93:1985 IRC62:1976 IRC73:1980 IRC67:2010 IRC35:1997 IRC38:1988. It is in this connection we envisage, through this project to study the causes of accidents within the limits of the Mysuru City Police Commission rate and suggest the remedies to reduce the frequency of crashes at locations experiencing a poor crash record, thereby reducing the significant trauma and suffering by crash victims, family and friends.

II. METHODOLOGY AND DATA ANALYSIS:

Based on the collected data LIC to JSS Dental College junction and Columbia Asia Hospital to Siddalingapura road were selected for analysis. The whole idea behind this study is to provide the possible solution to the in-situ condition, traffic volume and comparing them with the standard set by the governing body- Indian Road Congress (IRC).

2.1 LIC to JSS DENTAL COLLEGE junction:

Figure.1 shows the geographical location of selected blackspot as seen in map. The fact profile of the selected blackspot can be seen in figure.2 and figure.3. Visited the site on 12/12/2016 to conduct reconnaissance survey, to check the vehicles volume and recorded a few comparable data that are specified in IRC as the road classified this road under urban road with cross intersection. The data recorded of traffic volume and with the standard set for those components by IRC is tabulated in table.2 and table.4. Taking reference from table.1 the graph.1 and graph.2 are plotted, it represents the total number of accident occur at LIC to JSS Dental College junction from 2012-2016 and percentage of accident in LIC to JSS Dental College junction from the year 2012-2016 respectively.

2.1.1 Identified problems in site:

- a) Speed limits are not specified.
- b) Dividers are not provided.
- c) Sight distance provision as shown in the fig.
- d) No road humps are provided at the site.
- e) Informatory signs are not specified.
- f) No traffic signal and traffic police at site.
- g) Road markings are not provided properly.
- h) Proper lightings during night is not provided at the rotary intersections.

2.1.2 Remedial measures as per IRC:

- a) Provide traffic signals at intersections following IRC 93:1985 and IRC 67:2010.
- b) Proper road markings should be provided complying to IRC 35:1997
- c) As per IRC 99:1988, Provide speed breakers.

- d) Provide sign boards as per IRC 67:2010.
- e) To overcome sight distance problems we have to take care of sign post, speed breakers and speed limit should be specified.
- f) Bus-stop at intersection should be avoided if not it causes collision (accidents) or inconvenient to other vehicles which are coming behind. Bus-stop should be provided 30m away from intersection.
- g) Strict traffic rules have to be enforced to maintain proper lane discipline.

2.1.3 Possible solutions:

- a) Sign board: Both warning and informatory sign board are provided at the site. The informatory sign board like hump, median opening, zebra crossing and intersection indicating sign board are placed 30m away from those geometric structures.
- b) Road Humps: Humps should be provided on both minor and major road 10m away from the intersection and hump indicating sign board provided 30m away from it.
- c) Traffic Signal: Traffic signal is too adopted at site and proper maintenance of the traffic signal should be taken care of.
- d) Lightings: More number of accidents is happening during night time, install road lightings.
- e) Visibility: Make sure that the junction is visible in all approaches and that there is enough sight distance, obstructing the sight from the secondary road towards the main road. It is important that there are no billboards, advertisements, signs etc., obstructing the sight from the secondary road towards the main road.

2.2 Columbia Asia to Siddalingapura road:

Figure.4 shows the geographical location of selected blackspot as seen in map. The fact profile of the selected blackspot can be seen in figure.5. Visited the site on 12/12/2016 to conduct reconnaissance survey, to check traffic volumes and recorded a few comparable measurement that are specified in IRC as the road classified this road under urban road with cross intersection. The data recorded of traffic volumes and with the standard set for that component by IRC is tabulated in table.3 and table.5. Taking reference from table.1 the graph.3 and graph.4 are plotted. It represents the total number of accidents occurred from the year 2012-2016 and percentage of accident in Columbia Asia to Siddalingapura from the year 2012-2016.

2.2.1 Identified problems in site:

- a) Sign posts are not provided.
- b) Improper sign boards, markings and reflectors.
- c) No speed breakers are provided at Siddalingapura junction.
- d) Dividers are not provided in Siddalingapura junction (opposite to petrol bunk).
- e) No proper area demarcations for taking turns at the intermediate junctions.
- f) No speed limit is provided at site (Regulatory sign post).
- g) They have not provided two phase signal time considering pedestrians.

2.2.2 Remedial measures as per IRC:

- a) As per IRC 67:2010 provide sign posts.
- b) As per IRC 99:1988, Speed breakers should be provided.

- c) As per IRC 086, Dividers should be provided in Siddalingapura.
- d) Proper area demarcations for taking turns at the intermediate junctions should be provided complying with IRC 35:1997.
- e) As per IRC 067, Speed limit sign post should be specified.
- f) By adopting suitable method of signal designing at intersections.

2.2.3 Possible solutions

- a) Sign board: information sign like curve indicating sign board and mandatory sign board like speed limit sign board must be provide at the site.
- b) Speed breakers.
- c) Dividers.
- d) Speed Limit.



Figure.4. Geographical location of Siddalingapura road



Figure.1. Geographical location of LIC junction

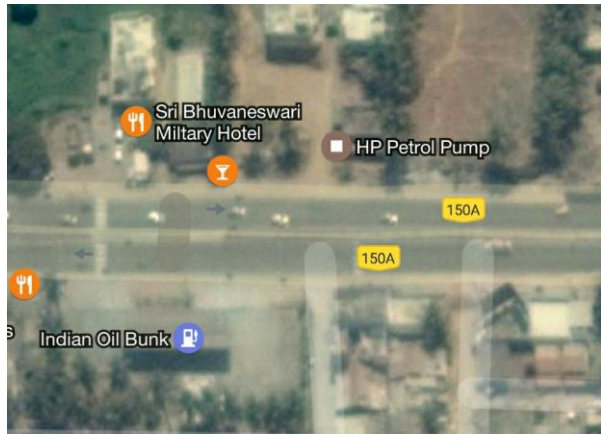
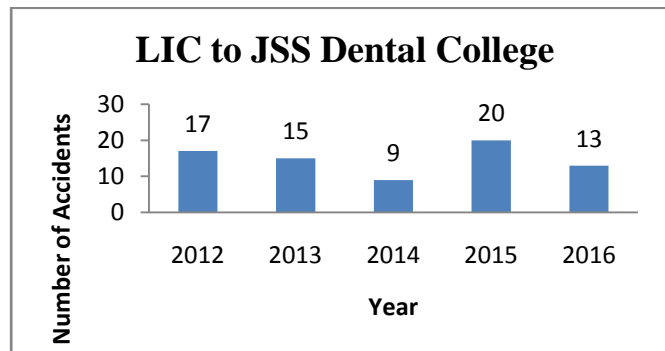


Figure.5. Dividers are not provided at siddalingapura road



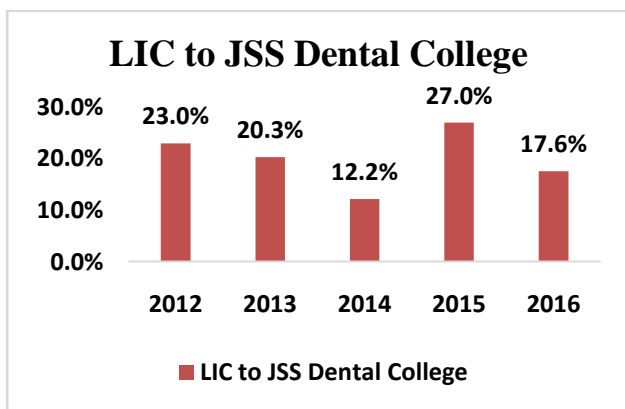
Figure.2. Signal lights and Sign boards are not provided at LIC junction



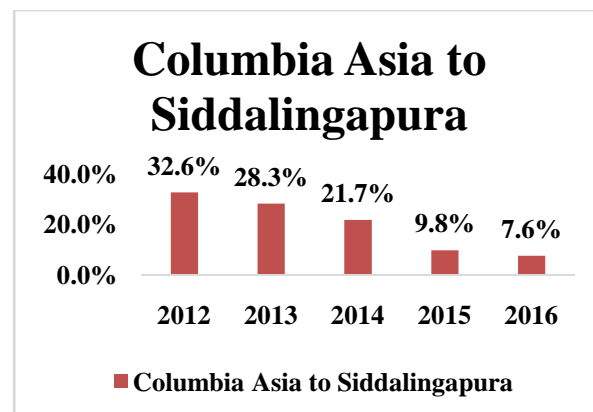
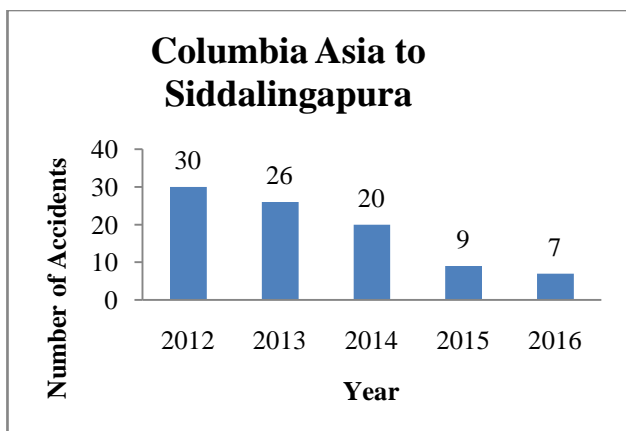
Graph.1. Number of accident details of LIC junction from 2012-2016



Figure. 3. Improper islands at LIC junction



Graph.2. Percentage of accidents in LIC to JSS Dental College from the year 2012-2016



GRAPH.3. Number of accident details of Columbia Asia road from the year 2012-2016

GRAPH.4. Percentage of accidents in Columbia Asia to Siddalingapura from 2012-2016

Table.1 Number of accidents in both the zones during 2012-2016

Year	2012	2013	2014	2015	2016
LIC to JSS Dental College	17	15	9	20	13
Columbia Asia to Siddalingapura	30	26	20	9	7

Table.2 Traffic volume from LIC to JSS Dental college

Duration (minutes)	Days	Total number of accidents
7:00-10:00	Day 1	4180
7:00-10:00	Day 2	3996
7:00-10:00	Day 3	4220

Table.3 Traffic volume from Columbia Asia to Siddalingapura

Duration (minutes)	Days	Total number of accidents
7:00-10:00	Day 1	4505
7:00-10:00	Day 2	4681
7:00-10:00	Day 3	4684

Table.4 Comparison of IRC standards within-site conditions (LIC to JSS Dental road)

Serial No	Characteristics	Existing site condition	IRC recommendation	Remark
1	Sign Board	Not provided	Mandatory warning and informative sign board	Improper
2	Traffic signal	No	If required	Improper
3	Lighting	Improper	Required	Required
4	Speed breakers	No	Required	Required
5	Speed limits	No	Required	Required
6	Dividers	No	Required	Required
7	Provision for pedestrians	Improper	1.5m	Required
8	Island	Yes	Yes	If necessary

Table.5 Comparison of IRC standards within-site conditions (Columbia Asia to Siddalingapura road)

Serial No	Characteristics	Existing condition	site	IRC recommendation	Remark
1	Sign Board	Not provided		Mandatory warning and informative sign board	Improper
2	Speed breakers	No		Required	Required
3	Speed limits	No		Required	Required
4	Dividers	No		Required	Required

III. CONCLUSION AND SCOPE FOR FUTURE WORKS:

The methodology includes analysis and data collected for the two blackspots in Mysore. Also the comparison made with the standards given by IRC. It clearly shows that the relatively more number of accidents at these places were not entirely because of failure of geometrical/technological shortcomings, but because of poor lane discipline, increase number of vehicles and other factors. In a country like ours, mixed traffic is a very big challenge to overcome, which is deliver to have contribution for lot to the increase in accidents. The two selected spots are no different and host a verity of vehicles. The mixed traffic condition cannot be completely over turned but with a proper traffic/transportation plans, it is possible to bring it under control. The regular measures to be taken advocates in support of separate lanes for separate type of vehicle which may not be possible with a road infrastructure this country has, such plan consume a lot of finance. Hence the need for planned development of road infrastructure gains a lot more importance and the need for alternatives. Have worked out few solutions to the crunch area of the city. The city of Mysore being a well-planned, this has a parallel road to almost every busy road.

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