



Accident Analysis and Improvements to Yeshwanthpur Junction in Bangalore City

KEYWORDS

Traffic count, black spots, prioritization, signal timings

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ABSTRACT An accident black spot is a term used in road safety management to denote a place where road traffic accidents have historically been concentrated. It may have occurred for a variety of reasons, such as a sharp drop or corner in a straight road, so oncoming traffic is concealed, a hidden junction on a fast road, poor or concealed warning signs at cross-roads. Transportation contributes to the economic, industrial, social and cultural development of any country. Transportation by road is the only mode which could give maximum service to one and all. Due to the increase in population, number of vehicles is increasing day by day which leads to the increase in road network. It has been estimated that over 30,000 persons die and over 10 to 15 million persons are injured every single year in road accidents throughout the world. The present work intended to analyze a black spot (accident prone location) Yeshwanthpur in BANGALORE city. The causes of accidents are studied and suggested different remedial measures to reduce number of accidents.

1. Introduction:

Accidents, tragically, are not often due to ignorance, but are due to carelessness, thoughtlessness and over confidence. William Haddon¹ has pointed out that road

Accidents were associated with numerous problems each of which needed to be addressed separately. Human, vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution. This paper lays emphasis on accident studies on Yeshwanthpur Junction in Bangalore city. It is a major urban arterial junction with shoulder and side drains. The open side drains exist for some part of the study stretch. For the purpose of the study, a Junction Traffic Accident (JTA) was defined as accident, which took place on the road between two or more objects, one of which must be any kind of a moving vehicle.

1.1 Literature Review:

In literature there is no universally accepted definition of a black spot. According to The Bureau of Transport and Regional Economics of Australia (2001) locations are in general classified as black spots after an assessment of the level of risk and the likelihood of a crash occurring at each location. At certain sites, the level of risk will be higher than the general level of risk in surrounding areas. Crashes will tend to be concentrated at these relatively high-risk locations. Locations that have an abnormally high number of crashes are described as crash concentrated, high hazard, hazardous, hot spot or black spot sites. Sites with potentially hazardous features are sometimes described as grey spots.

In general, the number of crashes is affected by three factors:-

- The road environment
- The condition of vehicles using the road system
- The skills, concentration and physical state of road users.

The demands of the road environment vary due to factors such as traffic flow rates, geometric features of the road and type of road. Drivers normally adapt their performance level to the demands of the road system. A crash occurs when the driver's performance level is insufficient to meet the performance demands of the road environment. Most of the time, driver capabilities exceed performance demands. Black

spots are points of peak performance demand. Engineering improvements in the road network lower performance demands on the driver. This increases the safety margin between the driver's performance level and the performance demands of the road environment, and reduces the probability of a crash.

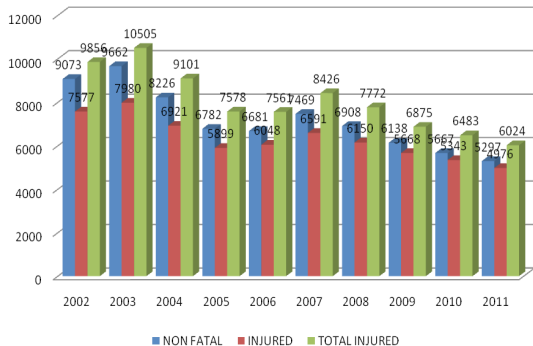
2.0 Accident Scenario in Bangalore

Central Road Research Institute (CRRI) Study report, (2008) reveals that the accident record of the country is among the worst in the world. Road accidents have registered a sharp increase recently following rapid growth in vehicle ownership, construction of high speed roads and expressways. Accident rates could go up further unless both traffic rules and road safety measures are enforced strictly. A review on the road crash analysis world over implies that the human factor attributes to the majority of accidents. A similar instance has been observed in India as well as in Bangalore. In Bangalore about 47% of road users killed are pedestrians & 40% are two-wheeler users. In additions to this annually more than Rs 1550 crores are paid as compensation to the victims & their dependents. Overall Bangalore's accident statistics is presented in the Table 1.

Table No .1 BANGALORE ACCIDENT DATA

YEAR	FATAL	KILLED	NON FATAL	INJURED	TOTAL
2002	783	820	9073	7577	9856
2003	843	883	9662	7980	10505
2004	875	903	8226	6921	9101
2005	796	836	6782	5899	7578
2006	880	915	6681	6048	7561
2007	957	981	7469	6591	8426
2008	864	892	6908	6150	7772
2009	737	761	6138	5668	6875
2010	816	858	5667	5343	6483
2011	727	757	5297	4976	6024

ACCIDENT DATA OF NON FATAL INJURED AND TOTAL CASSES IN BANGALORE



ACCIDENT DATA FATAL AND KILLED IN BANGALORE

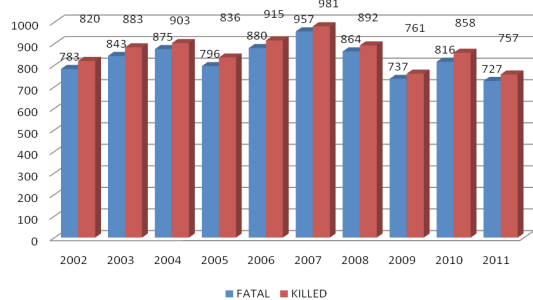


Table No.2 Accident data at Yeshwanthpur Junction

Year	Yeshwanthpur Junction				
	Fatal	Killed	Non Fatal	Injured	Total cases
2004	42	43	480	351	522
2005	43	44	348	279	391
2006	39	39	339	265	378
2007	34	35	460	372	494
2008	46	46	317	292	416
2009	29	29	302	256	339
2010	23	23	266	219	289
2011	27	28	230	198	257
2012	39	41	228	227	267

ACCIDENT DATA OF YESHWANTPUR JUNCTION

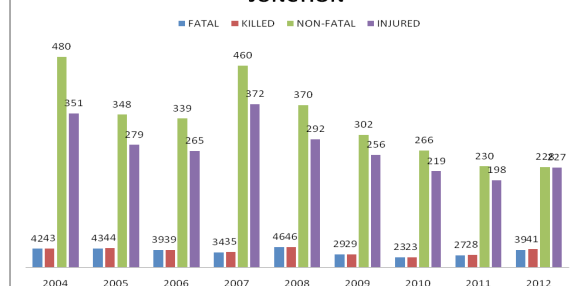
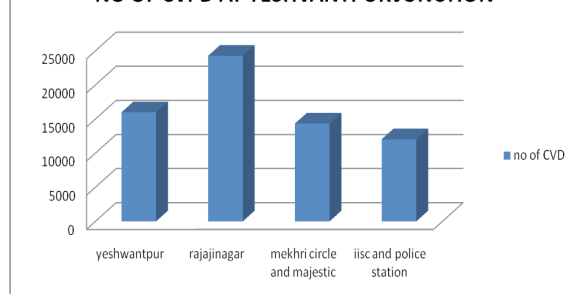


Table No.3 Classified volume Count Data at Yeshwanthpur Junction

DIRECTION TOWARDS	TOTAL CVPD
FROM YESHWANTPUR BUS STAND	15981
RAJAJINAGAR	24281
MEKHRI CIRCLE & MAJESTIC	14331
IISC & POLICE STATION	12028

NO OF CVPD AT YESHWANTPUR JUNCTION



SIGNAL TIMINGS OF THE AFOREMENTIONED JUNCTIONS

SIGNAL TIMINGS OF YESHWANTPUR JUNCTION

1. Towards Rajajinagar = 90 secs
2. Towards Mekhri circle & majestic=120 secs
3. From IISC & police station=60 secs
4. From Yeshwanthpur bus stand=60 secs

2.1 Motorization in Bangalore

The conversion of Bangalore from being once a "Garden City" to present "Black City" has been rapid. Bangalore has grown exponentially in the past two decades. The Booming Software, Biotech and manufacturing industries have magnified the requirements of basic and service employments, which generated and magnified urban sprawl into problematic proportions. Improvement in the quality of life along with substandard public transportation has resulted in spiraling growth of private automobiles. The resultant offshoot of such a high automobile growth along with supply intensive actions of the government is accidents. The Motorization index calculated by the author (vehicles for 1000 persons) best describes the high intensity of vehicular growth, which projects that nearly every 3rd person owns a private vehicle. Motorization index has nearly doubled within a decade. This calculation is highly conservative since it does not consider high intensity of migration of persons with their vehicles from other parts of state to Bangalore. The high intensity of vehicular growth can be known from the simple area analysis. Karnataka State has 1,91,791 sq.kms of area whereas capital Bangalore as per revised

Estimates have 561 sq.kms of developed area, which works out to 0.29% of state area. Nearly 39-40% of vehicles registered in Karnataka state belong to Bangalore. Such a massive number of vehicles occupy 4.8% of total road length available in Karnataka. Availability of such a massive number of vehicles results in violation of individual spaces thus contributing to accidents.

3.0 Present Investigation

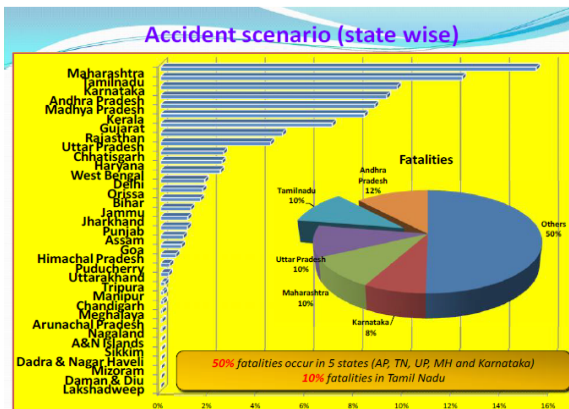
In the present study Yeshwanthpur Junction is considered. The detail of accident in the junction is taken from nearest Traffic Police Station and 24 hours classified volume count survey was conducted at the junction. The details of accident and classified traffic volume count were given in Table No.2

Figure No.3 Pictures at Yeshwanthpur junction

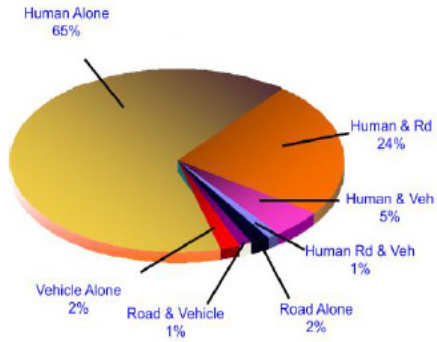


4. Discussions

From the accident scenario of India, we observed that Karnataka stands at the fifth position out of 27 states and 50% fatalities will occur in five major states within India (AP,TN,UP,KA, MH)



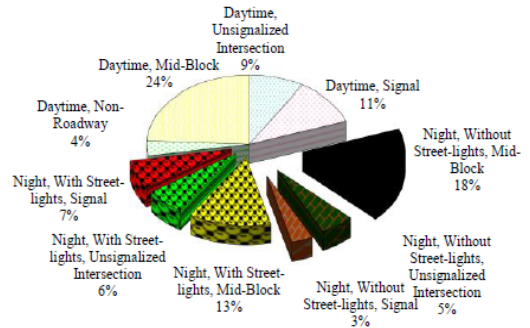
From the studies it has been observed that 65% of the accidents are alone due to human behavior and 24% of the accidents is due to the human and the road interface and 2% is due to road alone.



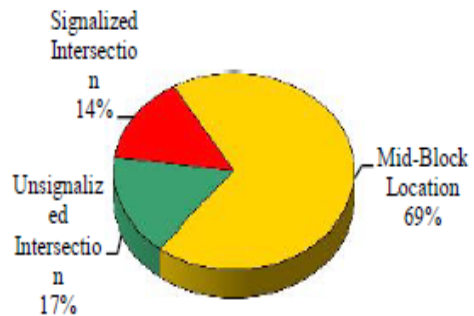
5. Remedial Measures:

The remedial measures suggested for Improvements of Yeshwanthpur junction are

1. Pedestrian green time required for major and minor roads are based on walking speed which is equal to 1.2 m/s and initial walking time of 7 sec. This is the minimum green time required on major and minor roads for vehicular traffic.
2. From the accident data, it has been witnessed that 48% of the accidents were occurring at day time and 52% of accidents are occurring at night time out of which 18% amounts at locations without street light and along the mid block. Hence street lights are essential.



3. Provision of Road humps before the pedestrian signals.
4. Provision of Road Humps in the stretches before Intersection or Junction point.
5. Signalized intersection reports to 14% fatal cases due to signal jumping, high speed crossing at the last minute of green phase, hence cameras have to be installed in these junctions.



6. Installation of proper sign posts aside the roads.
7. Improving the sight distance at the intersection by increasing the set back distances in the junctions.
8. Increasing the signal timings by twice to avoid the accumulation of vehicles to reduce the jam lengths.
9. Increasing the signal rest timings by twice to avoid accidents.

10. Repairs of cracked surface and filling up of pot holes to reduce the accidents.
11. Installation of cat eyes and road reflectors in the junctions and also near the road humps

REFERENCE

[1] G D Jacobs and I.A. Sayer "Road accidents in developing Countries- urban problems and remedial measures" TRRL Supplementary report 839. | [2] M N Shreehari and Ms. Ashwini: Scientific Analysis of Accidents and Mitigative measures-A case study for Bangalore-India, 26 April 2013 National Conference Proceedings Race 2013, Belgaum. | [3] B. Srinivas Rao and E. Madhu "Accidental study on National Highway – 5 between Anakapalli to Vishakapatnam" Proceedings of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 1973 - 1988, 2005. | [4] K. R. Shanmugam: Valuations of Life and Injury Risks- Empirical Evidence from India- Environmental and Resource Economics 16: 379-389, 2000. | [5] Mishaps HC suggests change in compensation pattern: Times of India-Bangalore edition, 13 Sep 2001 | [6] Mahesh Chand: Accident Scenario in Metropolitan Cities of India- published in Urban Transport journal-September2002 | [7] Nikhil T R, Harish J Kulkarni and Sarvada H: Identification of black spots and improvements to Junctions in Bangalore City-published in International Journal of Scientific Research, Volume 2 Issue 8, Page no 139-139 August 2013