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Urban Road Safety

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ABSTRACT

Road accidents are a human tragedy. They involve high human suffering and monetary costs in terms of untimely deaths, injuries and loss of potential income. Although we have undertaken many initiatives and are implementing various road safety improvement program the overall situation as revealed by data is far from satisfactory. During the calendar year 2010, there were close to 5 lakh road accidents in India, which resulted in more than 1.3 lakh persons. These numbers translate intone road accident every minute, and one road accident death every 4 minutes. Unfortunately, more than half the victims are in the economically active age group of 25-65 years. The loss of the main bread winner can be catastrophic. Road traffic accidents are amenable to remedial action. Many a countries have curbed the menace of road accidents by adopting a multipronged approach to road safety that encompasses broad range of measures, such as, traffic management, design and quality of road infrastructure, application of intelligent transport system, safer vehicles, law enforcement, effective and quick accident response and care etc. The Government alone cannot tackle road safety problems. There is a need for active involvement of all stake- holders to promote policy reform and implementation of road safety measures.

Addressing road safety is comprehensive manner underscores the need to involve multiple agencies and sectors like health, transport and police. The present study provides the magnitude and various dimensions of road accident in India. The analysis on road accidents in this study will help to create awareness, guidelines and assist in informed decision making on road safety

INTRODUCTION

Urban population is growing at a very rapid rate. Added to this the liberalization of economy has contributed to accelerated growth of socio-economic standards of urban residents. The result is increased demand for travel. The growing travel demand and heavy concentration of population have resulted in high volumes of passenger and vehicular flows on urban roads. The supply of infrastructure has not been able to keep pace with the growing demand, since it requires huge investment to be made. The widening gap between these two has manifested itself in the form of increased congestion on the roads, increasing air and noise pollution, wasteful consumption of fuel, and raising accident rates. Accidents are of prime concern since they result in loss of life, injuries, damage to property and in turn loss to the community.

Road safety is considered as one of the most important problem facing in the modern society. It is mainly because of increasing in number of accidents due to increasing in personalized vehicles. According to WHOstatistics (2011) about more than 1.2 million people die and 20 - 50 million people injured every year in road accidents around the world.

According to Institute of Road Traffic education (IRTE, 2011) injuries in global crashes is about 50 million and deaths in global crashes is about 1.3 million and still raising. 91.5 percent of accidents occurring in low & middle income countries and between 35 to 70 per cent of all crashes occur in urban areas.

ACCIDENT SCENARIO IN INDIA

Road accident Studies have indicated that accident rate in developing countries are high compared with those

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in developed countries. In India according to official statistics 105,725 persons were killed in road traffic crashes in India in 2006. According to these statistics 324,377 persons were injured in 2006. The National Crime Records Bureau (NCRB) and WHO states that at least 13 people dying every hour on Indian roads, India has topped the global list of deaths in road accidents, leaving behind the world's most populated country – China. It is estimated that annual cost of road accidents at present is about 55,000 crores; Road accidents in India are Cause for growing concern and road accidents cost around two percent of Annual Gross domestic Product (GDP).

Various Studies indicate that the actual number of injuries could be 15 to 20 times the number of deaths. Accident risk is quite serious in the metropolitan cities of India. The most vulnerable group involved in road traffic accidents is of non-motorized road users. The non-motorized road users consisting of pedestrians, cyclists and other slow-moving vehicle riders are the most vulnerable group involved in road traffic accidents in almost every city in India. Maximum fatalities occur among the pedestrians and cyclists as the majority if metropolitan cities of India, it was observed that pedestrian facilities are quite inadequate and improper. The footpaths are either non-existing or are being encroached for various non-transport usages. Motorized two wheelers and cars have a higher involvement in non-fatal crashes than in fatal crashes.

ACCIDENT CAUSAL FACTORS

Accidents and the fatalities on road are the result of inter-play of a number of factors such as fault of drivers, inadequate and improper traffic control devices, inadequate care in design, construction and maintenance of roads, inadequate knowledge about Road Safety; non observance of traffic rules; etc. Road users in India are heterogeneous in nature, ranging from pedestrians, animal-driven carts, bi-cycles, rickshaws, handcarts and tractor trolleys, to various categories of two / three wheelers, motor cars, buses, trucks, and multi-axle commercial vehicles etc. the elements responsible for accidents may be broadly classified into four categories:

1. Road way Geometric factors
2. Vehicle related factors
3. Road User related factors
4. Environmental factors

Road Way Geometric Factors

The Road Way geometric factors include such as

1. Carriageway width
2. Shoulders
3. Curves and grades
4. Sight distance
5. Number of intersections
6. Skid resistance

Carriageway width

The carriageway width is the width of the road provided for the passage of vehicles. This should be adequately provided for free movement of vehicles. The carriageway width is 3.75 meters as per Indian Road Congress guidelines for a single lane road for vehicles having maximum width of 2.44 meters. For pavements having two or more lanes, width of 3.5 meters per lane is sufficient.

Shoulders

Shoulders are utilized for crossing and overtaking of vehicles, they must be sufficient width. They are needed for parking, stopping for broken- down vehicles. This requirement demands that shoulders be of adequate width and should be maintained properly in good condition if accidents are to be avoided. Indian Road congress has recommended 2.5 meters of shoulder for smooth and safe flow of vehicles.

DATA COLLECTION AND PRELIMINARY ANALYSIS

GENERAL

In this chapter we present the various types of field and secondary data collected and its analysis. The data includes geometric information of existing road, traffic volume, speed data collection and accident data of the selected road stretch in Hyderabad city.

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STUDY AREA DESCRIPTION

About

Hyderabad was historically known as a pearl and diamond trading centre, and it continues to be known as the City of Pearls. Many of the city's traditional bazaars, including Laad Bazaar, Begum Bazaar and Sultan Bazaar, have remained open for centuries. However, industrialization throughout the 20th century attracted major Indian manufacturing, research and financial institutions, including Bharat Heavy Electricals Limited, the National Geophysical Research Institute and the Centre for Cellular and Molecular Biology. Special economic zones dedicated to information technology have encouraged companies from across India and around the world to set up operations and the emergence of pharmaceutical and biotechnology industries in the 1990s led to the area's naming as India's "Genome Valley". With an output of US$74 billion, Hyderabad is the fifth-largest contributor to India's overall gross domestic product

The most commonly used forms of medium distance transport in Hyderabad include government owned services such as light railways and buses, as well as privately operated taxis and auto rickshaws Bus services operate from the Mahatma Gandhi Bus Station in the city centre and carry over 130 million passengers daily across the entire network Hyderabad's light rail transportation system, the Multi-Modal Transport System (MMTS), is a three line suburban rail service used by over 160,000 passengers daily. Complementing these government services are minibus routes operated by Setwin (Society for Employment Promotion & Training in Twin Cities) The Hyderabad Metro, a new transit system, is to be added to the existing public transport infrastructure and is scheduled to operate three lines by 2015.

ACCIDENT DATA COLLECTION FROM SECONDARY SOURCES

In India, police officers are responsible for recording road accidents. The accident data was collected from concern police stations. Data consisting details of accidents for all the two stretches for past 4 years from 2012 to 2015. Accident details includes date, day of occurrence, time of accident, type of area, nature of accident, vehicles involved, classification of accident, number of deaths, number of injured, type of maneuver, responsibility of driver, cause of accident etc. and are presented in Appendix A.

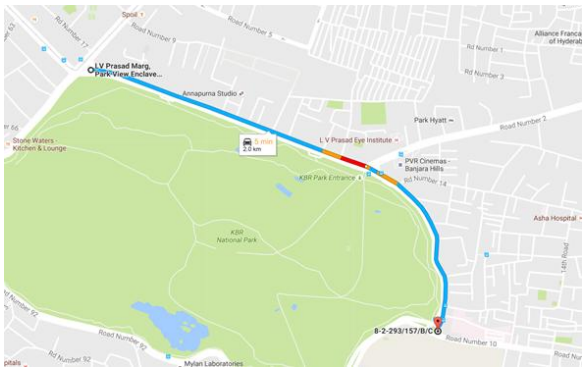

Figure 4.1 Study Area: Jubilee Hills Check Post to Cancer hospital Junction

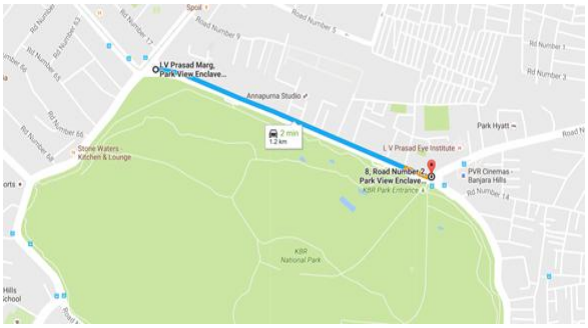

Figure 4.2: Study Area: Jubilee Hills Check Post to KBR Park Entrance Junction

ROAD SAFETY IN THE CONTEXT OF URBAN DEVELOPMENT

Road safety is a serious public health issue throughout the world, with more than one million people killed in traffic accidents each year. Despite the severity of its health impacts, the World Health Organization says that traffic safety is a "neglected" topic. Perhaps this is the case in the India, where traffic accidents are the leading cause of death for people up to age 34, and where the traffic safety record is one of the worst among high-income countries. Other high income countries such as Sweden have much better road safety performance .Differences in road safety between states could be explained by the quality of infrastructure,

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driving conditions, the culture of driving, or the power of enforcement. Each of these elements is shaped by institutional contexts such as design, planning, and policy-making processes. Moreover, research about other technical systems has shown the powerful effect of organization, norms, and communication on safety. This led me to ask: How do our cultural and professional interpretations of safety influence the way we plan, design, and manage streets Based on field studies, statistical analysis of crash and injury data, and interviews with practitioners, I found that professionals in Hyderabad share similar ideas about road safety, such as the roles of driver behavior, the road environment, and the vehicle in producing hazards. Professionals in both cases also face similar conflicts in road safety planning, such as whether to provide greater mobility for cars, or to reduce the speed of traffic to prevent injury. These similarities reflect shared professional and disciplinary backgrounds and sources of information, as well as similarities in the issues that municipalities and regions face. The main differences are in the interaction between road safety ideas and larger institutional contexts such as suburban land development. For instance, in the middle of the 21stcentury, Hyderabad created a multi-modal transportation system that accommodated cars as well as transit, pedestrians, and bicyclists—even in the suburbs. A combination of architects, city planners, and transportation engineers supported this development. Multi-disciplinary policy communities in Sweden found traction for their safety-oriented designs in the relatively integrated transportation and land use planning system. In the India, such Integration was not the norm, and efforts to use design and land use controls to create a safe transportation system often meet resistance from the established institutions of the car-oriented road transportation system. Improving road safety in Hyderabad requires addressing not only the dominance of automobiles, but also recognizing that sectors outside of, but related to transportation, such as housing, public health, and land use planning, need to be key participants in creating a safe road transportation system.

Road safety is a serious public problem throughout the world. Approximately 1.2 million people die each year in traffic-related accidents worldwide. (World Health Organization,**)** In addition to its absolute impact, road safety is also an issue of social equity. More than 90percent of the victims of these accidents, about 1 million people, are in low- and middle-income countries. This disparity holds when accounting for the distribution of population; the traffic fatality rate in low- and middle-income countries is 20.2 deaths per 100,000 populations, whereas the rate is only 12.6 for high-income countries. In addition, more than half of the victims are vulnerable road users, including bicyclists, pedestrians, and other unprotected travelers. (World Health Organization)Road safety is no less a problem in the Hyderabad where motor vehicle crashes were the leading cause of death for people between age five and 34 in 2011, with over 40,000 casualties a year.(National Center for Injury Prevention and Control, 2011)Comparing traffic fatality rates constructed with population as the measure of exposure shows that the overall traffic safety record is far better in many other developed countries with road networks, vehicles, and operations similar to those in the Hyderabad city. In 2011, states such as telangana and Andhra Pradesh had traffic fatality rates below or about 8 per 100,000 populations. States with traffic fatality rates greater than 10 per 100,000 populations included in Hyderabad

CONCLUSION

The following conclusions are drawn from the preliminary analysis:

Maximum numbers of accidents are reported in the months of January, February and May on the roads of the city.

Most accused type of vehicles causing accidents are the 2-wheelers and 3-wheelers and the victims are two wheeler riders and pedestrians.

Head on and Rear end collisions and others (hitting the pedestrians) are observed in more number of accidents.

The more number of accidents were occurring during day time.

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Highest numbers of accidents have occurred near the residential areas and recreational areas of the city.
Almost 96% of the causes of accidents are recorded as the fault of the driver. Most of accused vehicles drivers' age is between 31-40 years
Almost 82% of the accidents are due to exceeding lawful speed of the accused drivers.
The following findings are drawn from the study.
Free movement of pedestrians anywhere on the road forces drivers to take wrong decision. Inadequate sings and markings on the roads make the situation as accident.
Number of horizontal curves, Number of access points, Number of junctions, Peak hour traffic volume and Speed of the vehicles are the positive relation to the accidents on the roads of the Hyderabad city.
Paved shoulder width and unpaved shoulder width are the negative relation to the accidents on the roads of the city.

The following conclusions are drawn by conducting the Road Safety Risk Index
The stretch JB check post to Cancer hospital junction is obtained the highest risk value for both the directions. The accidents are more on this stretch when compared to the other stretches.

REFERENCES

1. Andrew P. Tarko (2003), "Calibration of Safety Prediction Models for PlanningTransportation Networks", Journal of the Transportation Research Board,No. 1950, Transportation Research Board of the National Academies, Washington. D.C., 2006, pp. 83–91.

2. Ali P. Ak¨ungor , Osman Yıldız (2004), "Sensitivity analysis of an accident predictionmodel by the fractional factorial method", Accident Analysis and Prevention 39 (2007)63–68.

3. Dahee Hong and Youngkyun Lee (2005), "Development of Traffic Accident PredictionModels by Traffic and road characteristics in Urban Areas", Asian Society for Transportation Studies, Vol.5, pp2046-2061.

4. Dinesh Mohan (1999), "Traffic Injuries and Fatalities in India", Transportation Research and Injury Prevention Programme, Indian Institute of Technology Delhi, April-2004.

5. ElkeHermans, Da Ruan, Tom Brijs, Geert Wets, KoenVanhoof (2006), "Road safetyrisk evaluation by means of ordered weighted averaging operators and expert knowledge ", Knowledge – Based Systems 23 (2010) 48-52.

6. ElkeHermans, Filip Van den Bossche, Geert Wets (2005), "Combining road safetyinformation in a performance index", Accident Analysis and Prevention 40 (2008) 1337-1344.

7. Fajaruddin Bin Mustakim , Basil David Daniel, Kamaruddin Bin Ambak (2005), "Accident Investigation, Blackspot Treatment and Ac cident Prediction Model At Federal Route FT50 BatuPahat-Ayer Hitam", ISSN 1823-6379, Vol.1, No 2, December 2006,University of Malaysia.

8. Frank Saccomanno, Liping Fu, and Rajeev K. Roy (2004), "Geographic InformationSystem–Based Integrated Model for Analysis and Prediction of Road Accidents", Transportation Research Record 1768 Paper No. 01-2214.

9. Hong, Dahee. & Lee, Youngkyun. (2000), "Development of Accident Prediction ModelsBy Traffic and Road Characteristics in Urban Areas" ,Proceedings Of The Eastern AsiaSociety For Transportation Studies, vol. 5, 2046-2061.

10. I A Sayar (1994), "Accident Black spot

Investigation", Transport Research Laboratory, CrowthorneBerkshine United Kingdom.

11. Institution of Highways and Transportation, Guidelines for the Safety Audit of Highways, 1990, 1996.

12. Institution of Highways and Transportation (IHT) – UK (1996), Guidelines for the Safety Audit of Highways, London.

13. Kamboj Rajeev, Jhansi Rani (2000), "Road Safety Audit: Case Study Delhi", Paper selected for presentation in International conference, Budapest, Hungary.

14. Mohamed RehanKarim, Sulaiman Abdullah, JamilahMarjan (2001), "Road Safety Audit", Journal of the Eastern Asia Society for Transportation Studies, Vol.5, October, 2003.

15. Paul de Leur and TarekSayed (2005), "Development of a Road Safety Risk Index", Transportation Research Record 1784, Paper No. 02-2814.