

Pedestrian Safety Audit At Construction Site In Urban Area (Case Study Of Construction Of Subway On Sangvi-Kiwale Road At Kaveri Nagar)

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Abstract- Rapid increase in infrastructure development in urban area leads to traffic problem. Out of which road accident is major aspect. The Traffic fatalities, including injuries are happening almost every day not only in Indian cities but in other developing countries as well. Unplanned Project sites, rapid increase in vehicles, limited road space and lack of traffic management plan at project area are these facts compel policy makers and planners to create sustainable safe traffic movement system in and around project area. Pedestrian and vehicle safety audit is one of the tools is a cost and time effective solutions for Pedestrian and vehicle safety concerns, as per American Association of State Highway and Transportation officials (AASHTO) guidelines. A Road Safety audit (RSA) is the formal safety performance examination of an existing or future road safety issues and identifies opportunities for improvements in safety for all road users. Also IRC: SP 55 – 2001 Guidelines on safety in road construction zones gives guidelines to promote the Pedestrian safety in road construction zones. Pimpri Chinchwad Municipal Corporation has constructed a network of 112 Km BRTS System. Out of which 14.5 Km stretch constructed along SH 56 Sangvi –Kiwale Road, which is a system with centrally located BUS STOPS, due to the structure coming up at Kaverinagar junction, which is a major vegetable market, which attracts large number of Pedestrians. Remaining road width will be 5.5m to 6m is the cause of Concern. Therefore it is mandatory to have an appropriate road safety measures to reduce the future accidents along this stretch.

Keywords- Traffic fatalities, traffic management, safe traffic movement system, Pedestrian and vehicle safety.

I. INTRODUCTION

Pedestrians are most vulnerable in a traffic accident. Currently in Bangalore, more than 50% of the fatalities on the road involve pedestrians. Hence improving conditions for the safety of the pedestrians should be of utmost concern for local urban planners, engineers, municipal administrators. As the road accident prediction studies involve various complex

systems namely the human, road, vehicle and all other environmental factors, it is vital to develop dynamic simulation model to understand the interactions between the various complex systems. Road accidents are imposing considerable social and economic burdens on the victims, and various direct and indirect costs. Road accidents are essentially caused by improper interactions between vehicles, and other road users or roadway features. The situation that leads to improper interactions could be the result of the complex interplay of a number of factors such as pavement characteristics, geometric features, traffic characteristics, road users, behaviour, vehicle design, driver's characteristics and environmental aspects. Thus, the whole system of accident occurrence is a complex phenomenon.

II. ROAD SAFETY SCENARIO

Every day thousands of pedestrians are killed and injured on roads. Men, women or children walking, biking or riding to school or work, playing in the streets or setting out on long trips, will never return home, leaving behind shattered families and communities. Millions of people each year will spend long weeks in hospital after severe crashes and many will never be able to live, work or play as they used to do. Road traffic injuries constitute a major public health and development crisis, and are predicted to increase if road safety is not addressed adequately.

The World Health Organization (WHO) and the World Health Assembly has been concerned with this issue for a long time. Among other international organizations, the United Nations Economic Commission for Europe, the United Nations Development Fund and the United Nations Children's Fund, have all stepped up their road safety activities over the past decade. Over 1.2 million people die each year on the world's roads, and between 20 and 50 million suffer non-fatal injuries. In most regions of the world this epidemic of road traffic injuries is still increasing. A comprehensive approach to improving road safety and reducing the death toll on their roads is much required. Low income and medium income

group countries have higher road traffic fatality rates (21.5 and 19.5 per 100000 populations, respectively) than high-income countries (10.3 per 100000). Over 90% of the world’s fatalities on the roads occur in low-income and middle-income countries, which have only 48% of the world’s registered vehicles.

III. OBJECTIVE OF PEDESTRIAN ROAD SAFETY AUDIT

The main object of a pedestrian road safety audit is to ensure that all the new construction roadway schemes operate as safely as is practicable. A Pedestrian road safety audit ensures a high level of safety for all road users around construction area on roads, through identification of potential safety problems and consideration of methods to eliminate or reduce the accident probabilities if safety principles are applied during planning, designing, construction, maintenance and operation aspects of the road way. Safety is considered from the viewpoint of roadway users including pedestrians, motorists, motorcyclists, and bicyclists (ETSC, 1997). According to Austroads (2002), the road safety audits are need to be formulated during the feasibility, preliminary design, detailed design, pre-opening stage and/or an existing road network.

Pedestrian Road safety Audit is a complementary action towards accident reduction and accident prevention

- The aim is to ensure that the layout of the project site is safe for all users
- One of the key component of accident prevention involves the use of safety checks or safety audits
- The focus is on the design of alternate road and traffic schemes, re-design of existing roads. **4.3.1**
- Tool to enhance safety for pedestrians. **5.3.1**
- Systematically designed lay out into each project
- Road designers must seek safety opportunities specific to each project and apply sound safety and traffic engineering principles.
- A method for preventive action before unwanted happens.
- Is a process which is of utmost importance in urban bodies in developing countries?

IV. CASE STUDY: CONSTRUCTION OF SUBWAY AT KAVERI NAGAR ON SANGVI-KIVALE ROAD

4.1 BRIEF INFORMATION

Name of the work: - Construction of Subway at Kaveri Nagar on Sangvi-Kivale road.

Tender amount: Rs. 5.86 crores
Duration of work: 10 months

Information about the project

Subway Length: 26.0 m
Width - 10.60m
Height - 2.75 m
Length of the bridge: with ramp Length: 240.0 m

4.1 STUDY OBJECTIVE

The main object of the study is to examine the existing road’s safety performance and suggest various traffic control and management measures to enhance pedestrian safety and mobility of proposed construction corridor.

Pedestrian Safety Audit (PSA) is a procedure for assessing projects accident potential by an independent audit team. PSA can be viewed as a proactive low-cost approach to improve safety. The specific objectives of the study are to ensure a high level of safety in road project, to minimize accident risk.

4.1 RESULTS OF THE STUDY

100 sample survey of all age group including male and females has been conducted in the case study area. Survey results brought home some interesting findings which are presented as under

Pedestrian Side Walk Facility & Crossing Facility

According to the survey conducted 86 % pedestrian user said side walk facilities available are very poor. Pedestrian crossing facility in the case study is very poor according to 90 % people from the survey conducted.

Table – 1: Pedestrian Side Walk Facility Survey

Sr. No.	Questions	Very Poor	Poor	Good	Very Good	Excellent
1	How do you rate pedestrian side walk facility	86	3	3	5	1

4.3.2 Pedestrian Signal Facility

According to the survey conducted 85 % pedestrian user said Vehicle Traffic signal facilities available are Excellent but Pedestrian signal facilities in the case study is very poor according to 90 % people from the survey conducted. This indicates that no focus on the pedestrian safety on the area.

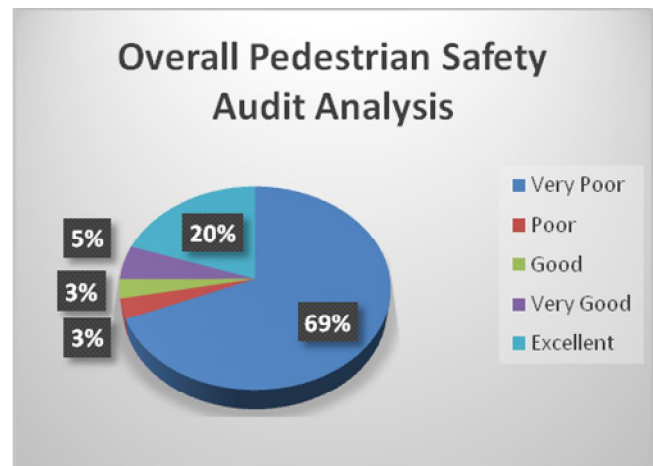
Sr.No	Questions	Very Poor	Poor	Good	Very Good	Excellent
1	How do you rate pedestrian signal facility provided?	90	1	6	2	1
2	Do you follow traffic signals ?	0	1	2	12	85

4.3.3 Visibility during Night&information provided for pedestrian

According to the survey conducted 86 % pedestrian user said that no information has been provided to pedestrian about safety facilities and construction site. 82 % people said lighting facilities at night is excellent in the area that indicates visibility in night is excellent.

S. No	Questions	Very Poor	Poor	Good	Very Good	Excellent
1	How do you rate the information provided for pedestrian?	86	2	6	4	2

2	How do you rate the visibility during Night?	2	0	1	15	82
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After analysing all the fact and figures emerging out of the survey conducted at the site it shows that the safety measures taken for the pedestrians is very poor.

4.2 Observations and Major Findings

During road inventory survey the following major safety concerned elements were observed and studied in details.

- Pedestrians from inner road are directly coming on to the main road.
- Pedestrian from one side has to cross dedicated BRTS corridor.
- No safe passage for the pedestrians to approach BRTS bus station located at the centre of the road.
- Improper crossing facility for pedestrians at T junction.
- Footpath observed at construction is at grade and is in broken condition.

Following results have been derived from the data.

1. Conflict /collision spots – There is one conflict in every hour between vehicle and Pedestrian which needs to be addressed.
2. Vehicle passing through this area has created following problems
 - Delay
 - Pedestrians and vehicle Conflicts.

According to traffic survey major share in traffic count is of pedestrians with lack of facilities which is leading to conflicts which has to be rectified and given proper provisions. After analysing all the fact and figures emerging out of the survey conducted at the site, it shows that the safety measures taken for the pedestrians are very poor.

- No proper side walk facilities
- Lack of Pedestrian crossing facilities
- No signals are available for pedestrian and Vehicles
- Due to encroachments on side walk pedestrians are forced to walk on carriageway.
- Lack of segregation in the form of marking and signals for Pedestrian from internal road to main road, may cause conflicts with General traffic and the BRTS. Signage / Information boards are not available.
- BRTS Bus stations: No proper pedestrian crossing facility to access the BRTS bus station making it unsafe for pedestrians to cross the road.

4.3 Recommendations/ Solutions

1. Merging/Diverging BRTS

- Three sets of rumble strips should be fixed in the conflict area.
- Give way Sign boards and road marking is recommended.
- Signal for Pedestrian
- Zebra Markings

2. T junction

- Design a traffic signal of, 20 Sec time to traffic from inner road
- Information Boards for pedestrians
- Signal for Pedestrian.

- Zebra Markings

3. BRTS Bus stops

- Pedestrian crossing sign boards and marking installation.
- Pelican Signal at the point of pedestrian crossing is recommended.

4. Others

- Good lighting Facility need to be installed in and around the project area.
- Service road should be kept in good condition.
- Storm water drain / drainage covers should be kept at grade to the road surface.
- Synchronized signal arrangement is recommended.

V. CONCLUSION

Pedestrian safety audit is emerging as an important tool to create safe and sustainable environment for safety. Due to cost effective and Proactive nature it can be adopted easily by any urban local bodies for their road safety issues and the can incorporate necessary clauses in the Tender itself. After the analysis from survey for selected case study area, it derives that the case study area is not at all safe for the pedestrians. It is necessary to implement the safety measures as per IRC guidelines (IRC 103, IRC 67, IRC SP 88, IRC SP 55 etc.) This research recommends preparation of traffic plan for pedestrian safety like

- i. During planning and designing stage
- ii. During construction stage.
- iii. Pre-opening stage.

There should be an involvement of Multilevel planning authorities for e.g. Traffic Police, traffic consultants, and transportation department of Local Urban Body.

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