

“Road Safety Audit: Challenges And Remedies”

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ABSTRACT

The Road Safety Audit (RSA) is a technique to investigate the road crashes potential and safety performance in the provision of new road planning's, rehabilitation, improvements and maintenance in existing road network. This investigates the road infrastructure deficiencies that may influence crashes occurrence and suggests the guidelines for appropriate improvement measures. The present study aimed to evaluate the Road Safety deficiencies and improvements on existing road network. NH-12 ((Durgapura Bus Stand to India Gate) (total length= 10.500Km)), for present study the accident data were collected at identified road stretch and black spots namely India Gate, Haldighati Marg and Pinjrapole Goshala were indentified. The road safety deficiencies such as improper intersection designing's width of carriage way low maintenance of road markings, road sign, unauthorized median openings, unavailability of Bus-Stops, confusing behavior of Pedestrian etc., were observed at identified location. It was found that the public transport system including mini bus and low floor bus shared a major part of carriageway width and creating the traffic hazards to the other fast moving vehicles. Further, Improper vehicle tuning movements and unauthorized median openings at road intersections, were also responsible for accidental crash.

Keywords: Road safety audit, Road safety improvement, Human factors, Freeway road inspection

I. INTRODUCTION

India has 34 lakh km of road network and is the second largest in the world. India have 79243 km National Highway which is 1.7% of total length of road which carries about 40% of road traffic (Source: www.nhai.org). It is observed that the road traffic is growing at an annual rate of 7-10 percent, with the vehicle population growing rate at 12 percent per year (Katiyari and Ghodmare, 2014). During past two decades, the life style of middle class population of India has been changed, drastically. Increasing, traffic demand, directly causes the unpredictable road safety challenges an Indian road network.(Singh, A.P., etal.,(2011)). The road safety management system is poor in India. Inadequate road design, and low awareness of knowledge of traffic rules, traffic control and policing (enforcement) are major responsible factors for the accidents.(Katiyari and Ghodmare; 2011).

Road safety audit is a technique to evaluate the accidental probability and safety performance in road network planning. (Dhemla, etal., 2015). The road safety audit identifies the safety principles for designing of new or rehabilitated road sections, which prevents the frequent accident and reduce the severity of road accident.

II. OBJECTIVES OF THE STUDY

To study the various roads traffic characteristics and road traffic crash data at identified road stretch. (NH-

12 Durgapura Bus Stand (9/800) to India Gate (20/300) Sitapura Tonk Road, Jaipur)

- 1) Identification of Black-Spots and road safety deficiencies at selected road stretch.
- 2) To check and analyze the RSA performance Indicators at road section.
- 3) Incorporation of Road Safety measures in existing road layout.

III. STUDY AREA

Jaipur-Jabalpur National Highway (NH-12) serves two states i.e. Rajasthan and Madhya Pradesh. It starts from Jaipur as its eastern terminal and ends at Jabalpur as its western terminal. The total length of the highway is 886 kilometers out of which 400 kilometers are covered within the boundary of Rajasthan. In this 400Km spell a road stretch from 9/800 to km 20/300 of NH-12 was selected for the present study. The identified road section passes through the Durgapura area of Jaipur city which is densely populated. The vehicular population has increased drastically in the recent years in this area. Due to the presence of the Sitapura Industrial Area and Pratap Nagar residential colony, the vehicular traffic on this road from Airport fly over to Chokhi-dhani fly over has increased drastically. During the can 2 decades huge numbers of educational institutions have also come up in this area.

The detailed route map and location map of the identified study road section is shown in figure 3.1 and 3.2, respectively. These National Highway is

maintained and operated by National Highway Authority of India (NHAI) under the Ministry of road Transport and Highways (MoRTH). Which is in the residential & industrial part of city.

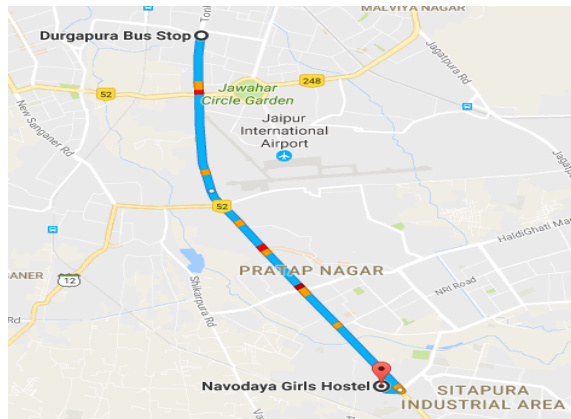


Figure: 1 Durgapura Bus stand to India Gate

IV. METHODOLOGY

Road Safety Audit (RSA) is carried out as per on the guidelines given in IRC: SP: 88-2010 (Road Safety Manual). The procedure includes three key players such as: Client, Designer, Auditor and the Road User.

The Road Safety Audit is based on standard checklist developed in IRC: SP: 88-2010(RSM). These checklists cover planning, alignment, cross section, junction, link road, traffic sign, road marking, road lighting, road side hazards, road side furniture, vulnerable road users, cross-drainage structure etc. The Road Safety auditor visits the sites for identifying the deficiencies from safety angle of the safety stretch suggests the remedial measures. The auditor checks the planning, vulnerable road users signs, markings and lighting also road side hazards, if any.(IRC:SP: 88-2010)

The standard checklist prescribed in IRC: SP 88-2010, Road Safety Manual has three sections in standards checklist. The topics listed in first section covers the more common elements of design and practice. It includes the brief description of identified location with the details of existing roadway segment. The second section deals with the details of the existing roadway segment. It highlighted the type of vehicles frequently used on existing road section, also covered the accidental status during last three years at identified road stretch. The third section checklist has five sub-divisions. The first sub-division covers the pedestrian facilities on the study location. It focuses on the safe use of road layout by pedestrian. It covers availability of footpath, presence of guard rails and pedestrian crossing, respectively. The second sub-division deals with the availability the bicycle facilities.

The third sub-division is assessment of the availability of public facilities. It suggests the provision of Bus-Stops, and designated space for route information map of each Bus shelter. The fourth sub-division incorporates the road side parking facilities. The fifth sub-division focuses on the Road way design. It included the lane width, shoulders, medians and other cross sectional features in accordance with standard design.

V. GENERAL OBSERVATIONS AND SAFETY RECOMMENDATIONS
ROAD DEFICIENCIES ANALYSIS As per the guidelines given in the standard checklist (IRC: SP: 80:2010) the following major road deficiencies were observed at the identified road stretch.

(a) The kerb height of footpath should be at least 100-150mm as per IRC guidelines.



Figure: 2 Discontinue kerb at footpath

Figure 2 showed that the footpath was not properly present at the site further the kerb was also not present continuously.

(b) Figure 3 showed that although zebra marking for Pedestrian crossing was present at the site but due to poor maintenance it was faded and was not clearly visible



Figure: 3 Faded Zebra Crossing at Kubhamarg

No proper sign board for Pedestrian crossing was present near the zebra crossing. Further, individual traffic signal time was also absent in traffic signals. This directly develops the confusing behavior among

Pedestrians and created conflicts points specially at Intersections. (c) Figure 4.3 showed that the although guard rails were present on median But, the wide, or irregular openings in guard rail with no proper road sign, created a lot of problems. Due to wide openings in guard rail, the two wheeler and bicyclist could cross the road in both directions. Further, wider openings leads to free movement of cattle in both direction.



Figure: 4 Irregular opening of Guard Rail at Kalyan Nagar

(d) Figure 5 to Figure 6 showed that the Bus - Stop locations were also not present orderly. As per IRC guidelines, the Bus Stops should be 50m apart from each other. It was observed that only Three Bus-Stops were present on the selected road length of 10.500Km. Due to lack of availability of Bus-Stops, Roadways Buses as well as private Buses stopped randomly. Further, people also waited for public transport system on road side and created lot of congestion problems on road side.



Figure: 5 Absence of Bus Stop at Sanganer Booking



Figure: 6 Absence of Bus Stop at Sector-3 Pratap Nagar

(f) No independent parking space was provided on road side therefore, the vehicles parked randomly on road side and covered a very wide area of the road way.



Figure: 7 Randomly Vehicle Parked at Goshala Bus-Stop

(g) Figure 8 showed that the drainage system was also insufficient and inadequate. It was not covered, properly at many places which directly turned in to a major accidental creating situation among pedestrians.



Figure: 8 The Drainage System are Inadequate at Taruchhaya Nagar

VI. RESULT & DISCUSSION

Road Safety Improvements And Recommendation

1. The identified location surrounded by institutional & Industrial area, the footpath should be provided with at least 2.5m wide as per IRC guidelines.
2. The zebra crossing can be 3m-5m wide for safe pedestrian crossing.
3. The sign post related with speed, gap in median, narrow bridge, fly over, etc should be placed at every point.
4. The table top surface should be provided on pedestrian crossing at mid-block crossings.
5. Installation of delineation devices such as lane markings, guide posts, chevrons lines, to facilitate and guide traffic movement.
6. Treatment of road side hazards trees, ditches, other fixed objectives
7. Installation and up gradation of median barriers, edge barriers, at turning roads and refuse island.
8. Provision for augmentation of adequate pedestrian facility(crossing, urban and rural footways, safety zones)
9. General Improvement and future Recommendation
10. Incorporation of safety features in the design and construction of new road schemes.
11. 11 Parking area are n't present at many location. Therefore to avoid enchochment networks. Vendors etc. the non vending should be marked at road side. The separate "Vending Zones"
12. Should be developed by Jaipur Nagar Nigam.
13. Road side safety barriers should be installed wherever required
14. The pedestrian pathway should be clearly marked to avoid conflict points
15. All unauthorized median opening should be closed immediately
16. Footpath and pedestrian accessibility condition like pavement type, height of footpath, availability of crossing etc are not in the proper condition. They need to be repair immediately.

VII. CONCLUSIONS

Road Safety deals with the development and management of road infrastructure, provision of safer vehicles, legislation and law enforcement and urban land use planning etc. The major objective of the RSA is to minimize the risk of accidents occurring in the future. The present study focused on the investigation of road safety deficiencies and level of service on an identified road stretch Durgapura Bus Stand to India Gate. The area was by mixed land use showed drastic increase of vehicular traffic as well as road accident during last five years. It was observed that the, availability of bus shelter was very poor,

which directly increased the random of public transport system on the road network. Future the due to lack of road markings and traffic signs on selected road sketch the, turning behavior of vehicles was also very irregular and confusing, which was very much prone to road accidents.

To avoid the conflicts points, detailed Bus-Shelter designing was proposed, which is incorporating the turning movements of the vehicles. It was observed that by improving the road infrastructure, the not only the conflict points can be reduced, but the road can be improved which directly improved the road safety conditions on the selected road stretch, as well.

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International Journal of Engineering Research and Applications (IJERA) is **UGC approved** Journal with Sl. No. 4525, Journal no. 47088. Indexed in Cross Ref, Index Copernicus (ICV 80.82), NASA, Ads, Researcher Id Thomson Reuters, DOAJ.

Hetram Sharma*.Road Safety Audit: Challenges And Remedies”.” International Journal of Engineering Research and Applications (IJERA), vol. 08, no. 01, 2018, pp. 05–09.