

ROAD SAFETY AUDIT OF NH-52 FROM MANPUR TO KHALGHAT

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Abstract – In India, road transport is the most favorable mode of transport for both passengers and goods transfer for several years. The rate of growth of population, motorization and urbanization is very high in the country which has made the road users vulnerable to frequent road accidents which result in injuries, disabilities and sometimes even fatalities. To reduce these accidents the primary step is the conduction of the Road Safety Audit (RSA) to study the basic causes leading to the accidents. Furthermore, these causes may be rectified that would result in the reduction of road accidents i.e. reduction in the number of injuries, disabilities and fatalities. In the present paper Road Safety is performed on NH – 52 from Manpur to Khalghat. Condition of the existing road section was studied for parameters like road markings, road signs, medians, side approaches, pedestrian facilities, bus bays, truck lay byes etc. and the improvements have been suggested.

Key Words: Road Safety Audit, Fatalities, Road Accidents, Road Markings, Bus Bays, Truck Lay Bays, Hazard Marking, Crash Barrier, Horizontal Curve etc.

1. INTRODUCTION

Road traffic has been a major developmental issue, a public health concern and is the leading cause of death and injury across the world killing almost 1.35 million people globally in 2016 as reported in the Global Status report on Road Safety 2018. It also stated that almost 90% of these casualties took place in the developing countries.

Accidental scenario in India is even worst. In year 2018, road accidents in India have claimed over 1.5 lakhs lives in the country. As per the ministry of road transport and highways (MORTH), road accidents in India in 2018 have increased by 0.46 percent and persons killed has increased by 2.4% as compared to 2017.

India has been ranked as number one in the number of road accident deaths across the 199 countries reported in the World Road Statistics (2018) followed by China and United States. India alone has almost 11% of the total accidental related deaths in the world (according to the World Health Organization Global Report on Road Safety - 2018),

There is always a conflict between the needs for increased capacity with higher speed and safety of the road user. The main objective of this study was to identify the safety deficiencies and accident prone spots of NH - 52

section from Manpur to Khalghat (approx.40 kms). Based on which recommendations for appropriate safety measures that needs to be provided at accident prone locations where being made as per the Guidelines for the existing road network as per IRC: SP: 88-2019 and various short -term and long -term remedies were suggested. The study aimed at preventing the occurrence of crash or to reduce the severity of crash on the Manpur to Khalghat section of NH-52, thereby making the road journey safe for its users and surroundings.

2. JUSTIFICATION OF THE STUDY AREA

- This study mainly focused on the identification of existing and potential safety hazards to the road users on NH-53 Section from Manpur to Khalghat and thereby making necessary road safety recommendations.
- This section was chosen for Road Safety Audit (RSA) as it already existed just like most of the 3.3 million km of other road networks in India which already exist. Now to these roads changes in geometry and alignment cannot be made easily which could otherwise prove to be very expensive and difficult to improve upon as per the IRC: SP: 88 Guidelines.
- This Audit estimated the potential road safety issues and measures to be taken to prevent the frequent occurrences of accidents or at least to reduce their severity, thereby making the journey safer for the road users and its surrounding area.

3. OBJECTIVES OF THE STUDY

The following are the objectives of the present study:

- To review “Guidelines for Road Safety Audit” as per IRC 88.
- To develop/ modify checklists as per standard safety audit guidelines as per IRC 88.
- To collect data on roadway geometric design and operating conditions, hazardous locations and other road side features as per modified safety audit checklists.

- To collect traffic and road inventory of Manpur to Khalghat section
- To investigate potential safety hazards using road safety auditing and to recommend possible options for remedial treatment if required

4. METHODOLOGY

4.1 Methodology Adopted

Research methodology followed in this research consists of a variety of approaches. Before starting the work it was mandate to develop sufficient knowledge not only in road safety audit but also on road safety engineering, traffic management, highway design standards, road user behavior, maintenance, local knowledge, enforcement etc.

Initially 02 days field visits were done for observation of local specialties, study of road and design standards and related literatures helped in the development of checklists.

The entire audit was conducted under the guidance of the learned supervisor using modified checklists. After collecting necessary background information, data was reviewed.

Several numbers of site visits and field reviews were carried out (11 days including night inspection). Based on collected data and field observation, analysis was done to organize audit findings.

Road safety audit report was then written identifying safety hazards and suggesting remedial measures.

4.2 Checklist

Checklists are useful to assist the audit team. These checklists describe the performance and situations that can affect the road safety of selected type of project. The checklist covered road safety audit under following major heads:

- Road Signs
- Road markings
- Traffic signals
- Pavements condition
- Pedestrian facilities
- Delineation
- Intersections
- Alignment
- Service road
- Roadside Barrier
- Roadside Facilities

5. GENERAL OBSERVATIONS

The following are some of the basic observations made for the entire 40 km stretch of Manpur to Khalghat.

- Pavement marking:

There were no kerb markings at several places on either sides of the road. The edge line and center line were also missing at several places and needed maintenance at remaining areas. Markings for median openings and object marking were also missing in several places. The pedestrian marking also requires maintenance.

- Intersections:

Provision for service roads at densely populated area and markets. It would also accommodate local mixed traffic which can connect adjoining side roads; driveways etc. and commercial property entrances, petrol pumps etc. thus reducing side frictions. Junctions were found to having no road marking and no delineators. Vegetation needs to be cut regularly from median opening and shoulders in order to have sufficient set back and sight distances for intersection area.

- Delineators:

Delineator is provided for visual assistance to driver about alignment of the road ahead, especially at night. Delineators are particularly effective in the case of complex locations involving changes in horizontal/vertical geometry and during severe weather conditions such as heavy rainfall, fog etc. Normally reflectors are used on the delineators for better night visibility. The delineators in the form of roadway indicators posts were not being provided on high embankments at many places. At some places they were not visible due to excessive vegetation. Delineator was not being used at median opening as per IRC standards. Many a places the hazard marking was wrongly placed instead of being placed at the beginning of an object like Crash barrier, Minor/Major bridges parapet wall, underpass/box culvert etc.

- Crash barrier:

The crash barriers were not provided with hazard marking sign and at places where they are provided are not maintained properly. There is need to cut vegetation around them because at some places there visibility is poor. Most of the crash barriers were not painted with retro-reflective sheeting. Also they are not provided for

adequate lengths. Provide crash barrier at location where high embankments are provided.

- **Grade separator:**

Road marking on the grade separators are missing at several places. Also there were no roadway indicator and hazard markings. There were no informatory signs showing interchange ahead. Provisions should also be made for bus stops at several places.

- **Pedestrian facilities:**

There were no pedestrian sign board on road crossing and no speed limit control at pedestrian crossing. There is requirement for pedestrian signal at places in order to enhance safer movement for the pedestrians. Places where pedestrian activity is high guard rails should be provided.

- **Bus Bay and Truck Lay By:**

The informatory sign should be placed at proper location ahead of a bus bays/truck lay byes. There were no proper lighting arrangements on any of the Bus/Truck lay byes. There were also no pavement markings for channelizing island at several places. Also there is need for regular maintenance.

- **Kilometer Stone:**

There are only a few kilometer stone placed all along the road length. Some stones already placed are not visible due to growth of vegetation around them. There is need to provide kilometer stones for better information of the road users.

- **Animal Danger:**

There were places where at median, cattle were found grazing. It should be prevented for the safety of the road users by planting those plants the median openings which animals don't graze on. Also adequate steps should be taken for the removal of the dead animals from the roadside as soon as possible.

- **Median Openings:**

At most places on the medians no proper markings were done and many medians were not designed as per the standards. There were many illegal median openings

due to which there are a lot of accidents occurring as it lead to wrong side driving.

- **Improper approaches:**

At several places improper approaches are made by the localides for approaching and leaving the highway which may lead to severe accidents. These approaches need to be checked immediately.

- **Helpline No.:**

There were not enough helpline sign boards which could be used for any kind of emergencies by the road users on the highway. There is need for providing more sign boards regarding the helpline number.

- **Roadside Plantations:**

There was greater need for cutting the vegetation at shoulders and median gap as they affect the visibility of sign along the road. The height of vegetation on the median should be max. 1.5 m, there should be no vegetation at the ends of median opening as they might affect the sight distance and visibility of the delineators placed on median opening edge.

- **Signs:**

The regulatory/ informatory/ warning signs need to be maintained from time to time. Some signs were being obstructed by illegal hoarding which should be removed as early as possible as they may cause confusion to the driver. At many places the size of sign board were found not to be as per the standards. The sign were not placed as per the rules thereby affecting the visibility. If these signs are not placed as per the standards they themselves may cause obstruct to the road users and can led to accidents.

- **Sign Readability:**

In some cases, signs were not readable due to faded color. Generally signs are not readable due to vegetation, low height, displaced or tilted sign post, distance from the carriageway, billboard, faded color and lettering, roadside activities. Some signs were non-standardized retro reflective signs; some signs are non-readable due to faded color in the background, letters, signs and borders.

- Speed control:

There was greater need for speed control at major intersection and other conflict points. As we know at lower speeds a driver will have greater opportunity to react and avoid crash. Speed also affects the severity of crashes. Higher speed crashes involve more severe damage to life and property. The sign board should be placed 60-120m ahead of such conflict points.

6. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

1. There are 15 numbers of illegal median openings at various places in the study section.
2. Manpur service road encroachment was preventing its usage and was largely being misused which was leading to slower traffic movement and reduced carriageway for the highway traffic.
3. A total of 30 sign boards were identified in damaged condition in the study section as well as 46 places were identified to have no sign boards. Thus, there was an urgent need for the repair and installation of sign boards.
4. Illegal hoarding around sign boards and overhead gantry were leading to distraction and confusing among the driver.
5. It was found that at several locations the high embankments were not having delineator or crash barrier with hazard marking and where present were also not of adequate length.
6. Excessive growth of vegetation was affecting the traffic movement and also the visibility of the signs.
7. Stray Cattle near median causes great danger at Manpur service road section.

6.2 Recommendations

1. The frequent illegal median opening can be prevented by studying the suitability of an under passes and side road which will allow safer crossing of highway for surrounding area users.
2. All the crash barrier and guard rails need to be painted with retro reflective colors to enhance night visibility.
3. Illegal hoardings need to be removed as they are affecting the visibility of the sign boards and leading to confusion to the driver.
4. There is urgent need for crash barrier and delineations for high embankments as the driver

are unable to judge high embankments during night time.

5. Parking of vehicle on carriageway and encroachment on Manpur service lane should be prevented by strict enforcement of law and order.
6. There is urgent need to remove the vegetation on the medians and shoulders at regular interval before the rainfall starts.
7. Pedestrian facilities need to be improved by maintaining the pedestrian sign and road crossings.
8. Illegal approach roads and side roads needs to be checked regularly and should be closed as earliest as possible.
9. There should be an annual Road Safety Audit of the roads to check the increasing number of accidents.

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