CONCEPT OF ROAD SAFETY AUDIT AT STATE HIGHWAY 2D,7,2B (NARAYANPURA TO MAKRANA)

Jagdish Khardiya[1] , Deepak Mathur[2]
[1]M.Tech Scholar, [2]Associate Professor
Department of Civil Engineering (Transportation),
Kautilya Institute of Technology & Engineering, Jaipur
[1]jagdishkhardiya.jk@gmail.com, [2]mathurdeepak1507@gmail.com

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. STATE HIGHWAY (Narayanpura To Ghati chouraha Makrana SH2B, SH7,SH2D) (total length= 22.8K.M), for present study the accident data were collected at identified road stretch and black spots namely Nawa thiraha ,Narayanpura, Manglana Marg, Ghati Marg makrana bypass 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 oberserved at identified location. It was found that the public transport system including mini bus and Rikshaw shared 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, rehabilitation, improvements and maintenance in existing road network

INTRODUCTION

India has the second largest road network in the world, spanning about 66.71 Lakh km, which includes national highways, state highways, district roads, and rural roads. This extensive network ensures connectivity across various regions of the country.

National Highways (NH) play a very important role in the economic and social development of the country by enabling efficient movement of freight and passengers and improving access to market. They account for 2% of the total road network and carry over 40% of total traffic. The pace of NH construction has increased consistently due to the systematic push through corridor-based National Highway development approach, from about 12 km/ day in 2022-23.

REVIEW OF LITERATURE

The Road Safety Audit (RSA) is as systematic approach for evaluation of existing or new roads by an independent operation and maintenance to achieve accident free road and to enhance overall safety on roads (Jain,S.S.,2011). Several studies on Road Safety Audit have been carried out in the different parts of the world by various researches. Some research studies have been discussed as under:

I Karamanlis and et.al (2023) has reviewed the literature on Greek Road Networks' Deep Learning-Based Black Spot Identification. In conclusion, both public and commercial organizations continue to place a high priority on road safety and the detection of black spots. Finding "black spots," or regions with a higher risk of traffic accidents, is a spatiotemporal phenomenon that calls for the fusion of multiple data sources and cutting-edge analytical methods. In the current study, information on traffic accidents and safety was gatherd from a variety of sources, including police reports, construction companies, and scholarly specialists, in order to comile the Black Spot Dataset of North Greece (BSNG). Spreadsheets were used to organize and clean the data, and elements like driver and vehicle identification, accidents location, and incident details were extracted

S Nuli and et.al (2022) has read the review of the literature on Black Spot Identification and Road Safety Audit. The iRAP programme is used in this study to conduct a safety audit of a rural road that runs from the Rallaguda bridge to Vardhaman College of Engineering. Star ratings are used to measure the safety levels for both rural and urban areas. Additionally, a number of steps were recommended to raise the standard of safety for regular users of the roads. Apart from conducting road safety audits, the Rajiv Gandhi International Airport police station identifies sites that are prone to accidents by analyzing accident data and estimating severity indices. Lastly, the steps taken to lessen accidents in these areas also recommended.

Z Wang and et.al (2022) has read the review of the literature on Black Spot Identification and Road Safety Audit. The iRAP programme is used in this study to conduct a safety audit of a rural road that runs from the Rallaguda bridge to Vardhaman College of Engineering. Star ratings are used to measure the safety levels for both rural and urban areas.

D Yadav and et.al (2021) has reviewed the literature on applying the safe system approach to mitigate black spots on highways. The goal of this study is to identify Kerala's hotspots. The accident locations were ranked using the accident Severity Index (ASI) approach. It was discovered that this technique worked well for locating the blackspots. The study and findings show that the threshould value is 240, the standard deviation is 71.87, and the ASI is 132.41.

K.N Thakare and et.al (2021) has read the review of the literature on A Review of the Study of Various Black Spot Identification Techniques. This study makes the case for understanding the impact of various

approaches, techniques, and parameters on the BS identification process while conducting a thorough examination of previously used methodologies. The literature research demonstrated that several available variable and characteristics play a role in determining the degree of success and precision of an applied BS identification approach.

SUMMARY

The intricate relationship between speed and safety has been observed. Speed appears to be a factor in collision incidence, even if the data is inconclusive. Deviation from the average speed of traffic also appears to be a factor in crash risk. Research indicates that the likelihood of being involved in an accident decreases at the average speed of traffic and increases with higher or lower driving speeds than the average. When it comes to the association between speed and crash involvement rate, speed variance seems to be the most significant factor. According to this perspective, the main goals of road safety campaigns and enforcement tactics have to be to lessen speed variation and the disputes that arise from significant speed disparities

OBJECTIVES

1. To analysis the accident Data of Kuchaman-Didwana District
2. Deficiencies at selected road stretch.
3. To check and analyze the RSA performance Indicators at road section.
4. Incorporation of Road Safety measures in existing road

Table:- Site Selection Plan State Highway Used Road

S.No.	Sh No.	Name of Road	District	Length (KM)	Used Length (KM)
1	2D	Makrana-Bidiyad-Parbatsar	Nagaur	22.3	4.2
2	7	Kisngarh to Sangaria	Ajmer, Nagaur, Sikar, Charu, Hanuman garh	389.05	7.9
3	2B	Palari (SH-7) to Khatu (SH-19) via Maglana	Nagaur, Kuchaman, Didwana	53	9.7

METHODOLOGY

ABOUT ROAD SAFETY AUDIT STAGES

a) **New Construction**

- While conducting a feasibility study-Stage 1 Audit.
- In the course of the preliminary design-Stage 2 Audit
- Finalization of the Detailed Design - Stage 3 Audit
- In the course of the construction stage-Stage 4 Audit
- Finalization of Construction (Primary Access) - Stage 5 Audit

b) **Existing Roads**
- Regarding Current Routes (Observation) - Observation

Site Section of Study

It begins at the eastern terminal of Kuchaman-didwana and finishes at the western terminal of Dausa-Jaipur. Out of the 170 kilometers in overall length, 400 kilometers are included inside Kuchaman's boundaries. A 400-kilometer stretch of NH-12 route, spanning from km 9/800 to km 20/300, was chosen for the current investigation. The selected road stretch goes through Kuchaman City's heavily populated maglana neighborhood. In recent years, there has been a significant growth in the number of vehicles in this region. The Makrana Industrial Area and Makrana Residential Colony have resulted in a significant increase in vehicle traffic on the route connecting the Makrana railway over bridge and the Manglana railway over bridge. A significant number of educational institutions have also emerged in this region within the last two decades

Road Safety Audit Cam Be Conducted On Road Projects As Diverse As

a) New freeway
b) Major divided roads.
c) Pedestrian and bicycle routes.
d) Deviated local roads near major projects.
e) Local area traffic management schemes and their component parts.
f) Signal upgrading.

Team Selection

For large or significant projects, it is likely to have at least two members in the audit team, but not more than four members. For small projects ,single team member will be sufficient. One of the team member should be nominated as RSA manager. The one essential ingredient in RSA team is road safety engineering experience. It is also better to include local experienced people.

Audit Organization

Practically two options are there for conducting a road safety audit:

- Audit by specialist auditors.
- Audit by those within the original design team or by any other road designers.

$Ka=cK1\ K2\ K3….K14$

Where

$K1$ = Volume of traffic, vehicles/day $K2$ = Roadway width, m

$K3$ = Shoulder width, m

$K4$ = Radius of horizontal curve, m $K5$ = Radius of horizontal curve, m $K6$ = Sight distance, m

K_7 = Difference between width of roadway on bridge and on approach road, m K_8 = Length of straights, KM

K_9 = Kind of road intersection

K_{10} = At-grade intersection with minor road at volume of traffic on main road, vehicle/day K_{11} = Sight distance ensured at an intersection from the minor road, m

K_{12} = Number of traffic lanes

K_{13} = Distance from buildings to roadways, m

K_{14} = Characteristics of pavement /Co-efficient of friction.

Analysis of Data

The local police stations known as Makrana Police Station provided the accident statistics for the chosen road segment. Five years, from 2018 to 2023, saw the analysis of the accident data that had been gathered. The place of the accident and the points of interest for the seriousness of the accidents-fatal, major injury, and property damage, respectively- made up the accident data that could be accessed from police records. Table provides the details.

Table:- Road Accidents Detail for Study Area's SH-2B, SH-2D, and SH-7

Year	Total no. of Accidents	Total no. of Deaths	Total no. of Injuries
2018	30	20	9
2019	37	17	24
2020	34	18	24
2021	30	19	39
2022	36	21	17
2023	31	17	18

Source: Police Station Narayanpura to Makrana

Figure:- Number Of Accident Data In Site Selection Police Station Makrana
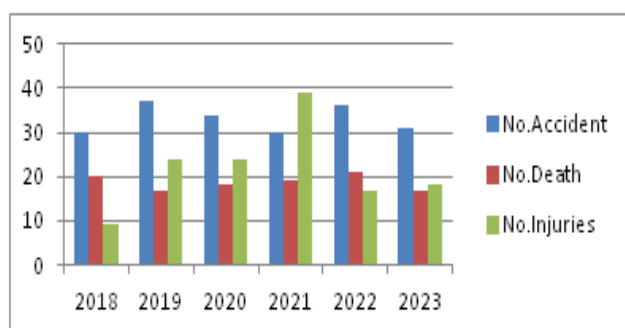
Road Safety Audit

Help from a separate team was provided for the RSA. There were four members of the team, three of them were B.Tech students with extensive backgrounds in transportation engineering and management. The RSA team's Principle Investigator was Jagdish Khardiya.

CONCLUSION

Urban land use planning, safer car options, legislation, law enforcement, and road infrastructure construction and administration are all aspects of road safety. Reducing the likelihood of accidents in the future is the main goal of the RSA.

The current study examined the state of service and safety shortcomings on a designated road segment from Narayanpura bypass to Makrana toward State Highway SH2B,SH2D ,SH7 JAIPUR,AJMER , TO KUCHAMAN link Road The area's mixed land use revealed a sharp rise in both vehicle traffic and traffic accidents over the previous five years.

It was noted that there were extremely few bus shelters available, which exacerbated the unpredictability of the public transportation system on the road network. In the future, because certain roads lacked traffic signs and road markings, vehicles' turning patterns became increasingly erratic and confused, increasing the likelihood of traffic accidents.

Detailed Bus-Shelter designing, which incorporates the turning action of the vehicles,

was offered as a way to avoid the conflict sites. It has been noted that by enhancing road infrastructure, conflict spots may be decreased as well as the road itself, which immediately improves road safety conditions along the chosen route segment.

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