ROAD SAFETY AUDIT ON MUNICIPAL CORPORATION SAGAR

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Abstract: - This review paper presents a comprehensive road safety audit conducted in Sagar, an urban center facing challenges in ensuring the safety of road users. The audit focuses on evaluating the existing road infrastructure, identifying potential hazards, and proposing effective safety measures. It employs a systematic and multidisciplinary approach, involving a thorough review of traffic data, accident records, and local regulations, as well as field surveys and active engagement with stakeholders. The audit identifies various safety risks and shortcomings, including inadequate signage, poor lighting, insufficient pedestrian facilities, traffic congestion, and hazardous intersections. Driver behavior, traffic regulation enforcement, and public awareness campaigns related to road safety are also examined. Based on the findings, a series of recommendations are proposed to mitigate the identified risks and enhance road safety in Sagar. These suggestions encompass short-term and long-term measures, considering economic feasibility, effectiveness, and compatibility with existing infrastructure. Proposed interventions include improving pedestrian infrastructure, implementing traffic calming measures, enhancing road visibility through better lighting, optimizing signal timings, and promoting awareness campaigns to educate road users on safe practices. The outcomes of this road safety audit provide valuable insights for local authorities, policymakers, and stakeholders involved in traffic management and infrastructure development in Sagar. The implementation of the recommended measures is expected to lead to significant reductions in road accidents, injuries, and fatalities. Furthermore, the findings and methodologies of this audit can serve as a reference for other cities facing similar road safety challenges, aiding in the formulation of evidence-based strategies to ensure safer transportation systems.

1. Introduction: -

The significant global issue lies in the remarkable surge in the number of drivers, leading to an alarming rise in traffic accidents worldwide. These accidents impose a heavy burden on the socio-economic structure, despite the implementation of several laws and regulations aimed at improving traffic safety. Negligence and nonchalant handling of traffic safety and rules by drivers account for about 90% or more of most traffic accidents.

According to the World Health Organization's 2009 Global Status Report, India records the highest number of traffic accident-related deaths globally. The country experiences an annual increase of 8% in traffic fatalities due to the growing number of vehicles, which contributes to road width changes and a subsequent rise in accidents. A significant portion of these traffic fatalities occurs in road construction areas, where numerous workers are injured or killed annually. In 2012, about 50 million people were injured, and approximately 1.2 million lost their lives in various road accidents worldwide, with developing countries, particularly low- or middle-income nations, bearing the brunt of these fatalities. Pedestrians, cyclists, and two-wheeled vehicle riders were among the most affected victims. The World Health Organization's report predicts that traffic accidents will be the fifth leading cause of death globally by 2030.

Recognizing the increasing road traffic accidents, the World Health Organization declared 2004 as the Year of Road Safety and designated April 7th as World Health Day to draw attention to this critical issue. The impact of road safety has become a matter of utmost importance in recent decades, with the socio-economic cost of road accidents estimated to be 3% of India's GDP. Given the heavy reliance on roads for daily commuting to schools, workplaces, institutions, and business centers, ensuring road safety is paramount. Safety auditing places a primary emphasis on ensuring that the road network aligns with safe design principles to safeguard all road users.

1.1 Road Safety Audit: - A road safety audit is a systematic evaluation of an existing or proposed road or highway project to identify potential safety risks and propose appropriate measures to mitigate those risks. It is conducted by a team of professionals with expertise in road design, traffic engineering, and safety. The goal of a road safety audit is to enhance the safety performance of the road infrastructure by identifying and addressing potential hazards that may contribute to accidents or injuries. During a road safety audit, the team examines various elements of the road design, including geometric features, signage, markings, traffic control devices, pedestrian and cyclist facilities, and other relevant factors. They assess the road's potential impact on road users, considering factors such as visibility, driver behavior, speed management, and pedestrian safety. The audit team typically follows a structured process that involves reviewing project plans, conducting site visits, and assessing the road's compliance with relevant safety standards and guidelines. They identify potential safety issues or deficiencies and provide recommendations for

improvements. These recommendations may include modifications to the road design, installation of additional safety features, or changes in traffic management strategies. Road safety audits are typically conducted at different stages of a road project, such as during the initial planning phase, before construction begins, and after completion. By conducting these audits, transportation agencies and road authorities can proactively address safety concerns, reduce the likelihood of accidents, and create road infrastructure that prioritizes the well-being of all road users.

1.2 Elements of Road Safety Audit

A road safety audit typically assesses various elements of the road design and traffic environment to identify potential safety risks. Here are some key elements that are commonly considered during a road safety audit:

- **Road Geometry:** The audit evaluates the geometric features of the road, such as horizontal and vertical alignments, lane widths, curves, intersections, and roundabouts. It assesses if the road layout provides adequate sight lines, minimizes driver confusion, and accommodates safe maneuvering.
- **Traffic Control Devices:** This element examines the presence, visibility, and effectiveness of traffic signs, signals, markings, and other control devices. It ensures that these devices are appropriately placed, easily understood by road users, and provide clear guidance for safe driving.
- **Pedestrian and Cyclist Facilities:** The audit reviews the provision of sidewalks, crosswalks, pedestrian signals, cycling lanes, and other facilities for non-motorized road users. It assesses the safety and accessibility of these facilities, including adequate separation from vehicular traffic and appropriate signage.
- **Roadside Features:** This element considers the presence of roadside barriers, guardrails, crash cushions, and other protective features. It evaluates their effectiveness in reducing the severity of accidents and minimizing hazards associated with roadside obstacles or hazards.
- **Lighting and Visibility:** The audit assesses the adequacy of lighting conditions, particularly in areas such as intersections, pedestrian crossings, and road segments with low visibility. It ensures that appropriate lighting levels are maintained to enhance visibility and promote safety.
- **Traffic Flow and Management:** This element examines the overall traffic flow, including factors like speed management, lane configurations, signal timings, and the effectiveness of traffic calming measures. It aims to identify potential congestion or operational issues that could impact safety.
- **Road User Behavior:** The audit considers the behavior and interactions of different road users, including drivers, pedestrians, cyclists, and other vulnerable road users. It assesses factors such as driver expectancy, compliance with traffic rules, and the provision of clear guidance for all road users.
- **Accident Data Analysis:** The audit may analyze historical accident data to identify patterns, high-risk locations, and recurring safety issues on the road. This analysis helps in targeting specific areas or elements that require improvement.
- **Emergency Services Access:** The audit evaluates the accessibility of the road for emergency vehicles and the provision of appropriate infrastructure to support their response in case of incidents or accidents.

These are some of the key elements considered during a road safety audit. The specific elements and their depth of evaluation may vary depending on the scope and objectives of the audit, as well as the relevant guidelines or standards followed by the auditing agency.

1.3 Benefit of road safety Audit

Road safety audits offer several benefits in improving the safety of road infrastructure and reducing the risk of accidents. Some of the key benefits include:

- Accident Prevention: Road safety audit help identify potential safety hazards and risks in the road design and traffic environment. By addressing these issues proactively, road safety audits can prevent accidents and reduce the severity of collisions.
- Improved Road Design: The findings and recommendations from road safety audits contribute to the development of safer road designs. This includes optimizing geometric features, enhancing signage and markings, improving visibility, and integrating safer infrastructure for pedestrians and cyclists.
- Cost-Effectiveness: Conducting road safety audits during the planning and design stages of road projects can result in cost savings over the long term. Identifying and rectifying safety issues early on helps avoid costly modifications and retrofitting in the future.

- Enhancing Road User Experience: Road safety audits aim to create road environments that are user-friendly and promote safe and efficient travel for all road users. By improving road design, signage, and traffic management, road safety audits contribute to a more pleasant and comfortable experience for drivers, pedestrians, and cyclists.
- Compliance with Standards and Guidelines: Road safety audits ensure that road infrastructure meets the required safety standards and guidelines set by regulatory bodies and transportation authorities. This helps maintain consistency and uniformity in road design practices, promoting safer road networks.
- Reduced Legal and Liability Risks: Implementing the recommendations from road safety audits demonstrates a commitment to road safety. This can reduce legal and liability risks for road authorities and project stakeholders, as they have taken proactive steps to identify and mitigate potential safety hazards.
- Stakeholder Engagement: Road safety audits involve engaging with various stakeholders, including engineers, planners, designers, and local communities. This collaborative approach allows for a comprehensive evaluation of safety concerns and incorporates different perspectives, leading to better-informed decisions and improved road safety outcomes.
- Continuous Improvement: Road safety audits are not limited to new road projects; they can also be conducted on existing roads to assess their safety performance. Regular audits help identify areas for improvement and support the ongoing monitoring and enhancement of road safety.

Overall, road safety audits provide a structured and systematic approach to enhance road safety, reduce accidents, and create road environments that prioritize the well-being of all road users. By addressing potential safety risks early on, road safety audits contribute to safer and more sustainable transportation networks.

1.4 Objective of Road Safety audit

The primary objectives of a road safety audit are to assess and improve the safety performance of road infrastructure. Here are the key objectives of a road safety audit:

- Identify Potential Safety Issues: The audit aims to identify potential safety hazards and risks associated with the road design, traffic management, and infrastructure. By thoroughly examining these aspects, the audit team can identify areas where safety improvements are needed.
- Prevent Accidents and Reduce Severity: The objective of a road safety audit is to proactively identify and mitigate safety risks to prevent accidents from occurring. By addressing potential hazards, the audit helps reduce the likelihood of accidents and minimizes the severity of collisions if they do occur.
- Ensure Compliance with Safety Standards: Road safety audits aim to ensure that road infrastructure adheres to the relevant safety standards, guidelines, and best practices. This includes compliance with national or regional safety regulations and the incorporation of proven safety measures and design principles.
- Improve Road Design and Layout: The audit seeks to enhance the overall road design and layout to make it safer for all road users. This may involve optimizing geometric features, such as alignments, curves, intersections, and crosswalks, to improve visibility, reduce driver confusion, and promote smoother traffic flow.
- Enhance Traffic Control and Management: The objective is to assess the effectiveness of traffic control devices, such as signage, signals, and markings, and ensure that they provide clear and consistent guidance to road users. The audit may recommend improvements in traffic control measures to enhance safety and traffic flow.
- Promote Accessibility and Safety for Vulnerable Road Users: Road safety audits consider the needs of vulnerable road users, such as pedestrians, cyclists, and individuals with disabilities. The objective is to provide appropriate infrastructure and facilities that enhance their safety, accessibility, and mobility.
- Support Decision-Making and Prioritization: The audit provides valuable information and recommendations to decision-makers, transportation agencies, and road authorities. The objective is to assist in prioritizing safety improvements based on identified risks, available resources, and anticipated benefits.
- Foster Collaboration and Stakeholder Engagement: Road safety audits involve collaboration among various stakeholders, including transportation professionals, engineers, planners, designers, and local communities. The objective is to engage all relevant parties to gather diverse perspectives, share knowledge, and build consensus for implementing safety measures.
- Monitor and Evaluate Road Safety Performance: Road safety audits contribute to the ongoing monitoring and evaluation of road safety performance. By periodically conducting audits on existing roads, authorities can assess the effectiveness of implemented safety measures and identify areas for further improvement.

The objectives of a road safety audit are geared towards creating safer road infrastructure, reducing accidents, and improving the overall safety and functionality of the transportation network.

2. Objective of Research Work

Main specific objectives of the thesis are

- Collection and Evaluation of data in aspect of road safety audit of Municipal Corporation Sagar.
- Performance of Road Safety Audit of Municipal Corporation Sagar, on major intersections, where the probability of accidents is more.
- Calculation of Score on the basis of collected data to categories intersections on the basis of Road Safety of Municipal Corporation Sagar.
- Speed Analysis on the on major intersections and roads of Municipal Corporation Sagar.

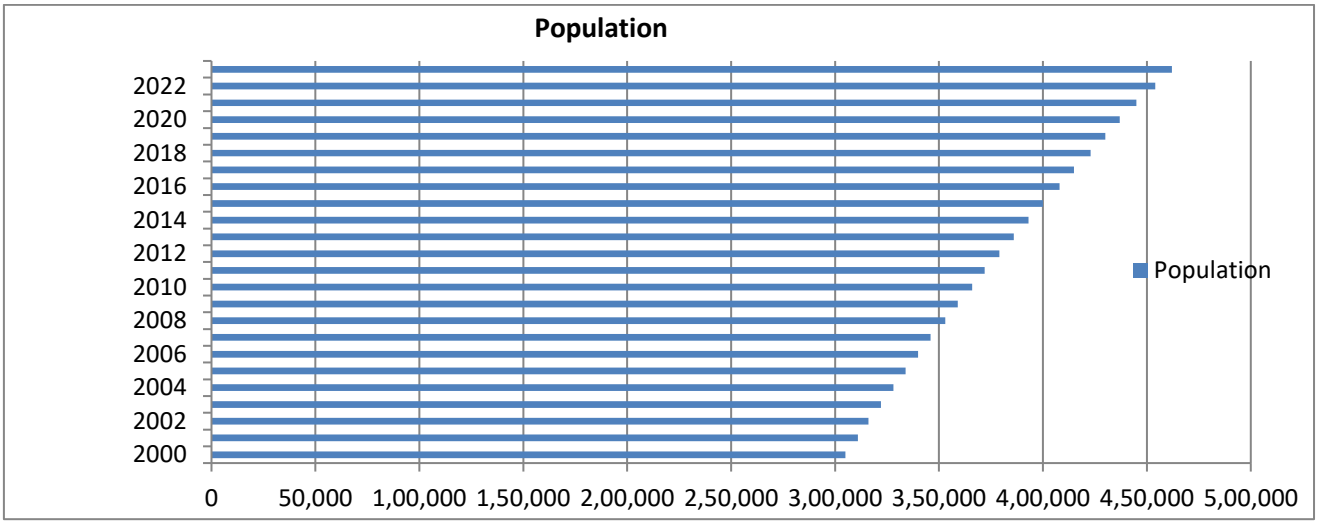
3. Literature Review

- **"Road Safety Audit of Highways in India: A Review" by Madan, A., et al. (2014):** This study provides an overview of road safety audits conducted on highways in India. It examines the existing practices, challenges, and benefits of road safety audits in the Indian context. The research emphasizes the need for a standardized approach, capacity building, and institutionalization of road safety audits to improve road safety outcomes.
- **"Road Safety Audit in India: A Review" by Pandey, A., et al. (2016):** This review paper discusses the status of road safety audit implementation in India. It examines the challenges and potential solutions for effective implementation of road safety audits. The study highlights the importance of integrating road safety audits into the road planning and design process and the need for institutional support and capacity building in India.
- **"Evaluation of Road Safety Audit Practice in India: An Assessment of Current Status and Challenges" by Chakrabarti, D., et al. (2019):** This research evaluates the current status of road safety audits in India and identifies the challenges faced in their implementation. It examines the effectiveness and limitations of road safety audits in improving road safety in the Indian context. The study emphasizes the importance of addressing institutional and capacity-related challenges to enhance the effectiveness of road safety audits in India.
- **"Road Safety Audit of Urban Roads: A Review of Current Practices in India" by Sarkar, A., et al. (2019):** This literature review focuses on road safety audits of urban roads in India. It discusses the current practices, methodologies, and challenges associated with urban road safety audits. The study highlights the need for context-specific approaches, stakeholder involvement, and knowledge sharing platforms to improve road safety audit practices in urban areas of India.
- **"Road Safety Audit for Indian Highways: A Review" by Mishra, S., et al. (2020):** This review paper provides an overview of road safety audits conducted on Indian highways. It evaluates the effectiveness of road safety audits in improving safety outcomes on Indian highways. The study emphasizes the need for regular road safety audits, monitoring and evaluation mechanisms, and the involvement of all stakeholders to enhance road safety in India.
- **"Road Safety Audit: A Review of Current Practice and Future Directions" by Taylor, M. A., & Lynam, D. A. (2004):** This study provides an overview of road safety audit practices worldwide. It discusses the objectives, methodologies, and effectiveness of road safety audits, highlighting the importance of proactive safety assessments during the design and planning stages of road projects.
- **"Evaluation of the Effectiveness of Road Safety Audit in Reducing Accidents" by Wong, S. C., & Wong, Y. D. (2011):** This research evaluates the effectiveness of road safety audits in reducing accidents. The study examines the relationship between the implementation of road safety audit recommendations and changes in accident rates. It highlights the positive impact of road safety audits on improving road safety performance.
- **"Road Safety Audit: A Review of International Practice" by Hughes, B. P., & Hughes, T. (2012):** This review paper provides an overview of road safety audit practices across different countries. It explores the common methodologies, key challenges, and success factors in conducting road safety audits. The study emphasizes the need for standardized practices and collaboration among stakeholders to enhance road safety outcomes.
- **"Road Safety Audit: A Comprehensive Review of Methodologies and Procedures" by Silva, A., et al. (2016):** This comprehensive review paper examines the methodologies and procedures employed in road safety audits. It discusses various audit frameworks, risk assessment techniques, and evaluation criteria. The study also identifies areas for improvement and future research in road safety audit practices.

- **"Road Safety Audit: State-of-the-Art and Future Directions" by Raj, A., et al. (2019):** This paper provides an overview of the current state-of-the-art in road safety audit practices. It explores emerging trends, technological advancements, and innovative approaches in conducting road safety audits. The study emphasizes the importance of data-driven decision-making and the integration of new technologies for enhanced safety outcomes.
- **"Road Safety Audit for Rural Roads in India: A Review" by Rao, P. S., et al. (2021):** This review paper focuses on road safety audits specifically for rural roads in India. It examines the unique challenges faced in auditing rural road infrastructure and highlights the importance of considering the needs and characteristics of rural areas in the audit process. The study emphasizes the integration of road safety audits into the planning and maintenance of rural road networks to enhance safety outcomes.
- **"Effectiveness of Road Safety Audit in India: A Case Study Approach" by Kumar, S., et al. (2021):** This study investigates the effectiveness of road safety audits in improving safety outcomes on Indian roads through a case study approach. It evaluates the impact of road safety audit recommendations on accident rates and identifies the key factors influencing the implementation of audit recommendations. The research provides insights into the practical effectiveness of road safety audits in the Indian context.

4. Collection of Data of Sagar

Sagar City is a significant urban center in Madhya Pradesh, India, known for its historical and cultural heritage, agricultural productivity, and economic growth. Located on the banks of Lake Sagar, the city has a population of approximately 275,000 people and spans an area of 25 square kilometers. Throughout its history, Sagar City has been ruled by various dynasties, leaving their architectural and traditional imprints on the city. The presence of forts, palaces, and temples attracts tourists and history enthusiasts. The city's economy is primarily driven by agriculture, with a focus on wheat, soybean, pulses, and oilseeds. There has also been growth in industrial sectors such as textiles, cement, and chemical manufacturing. Education is highly valued, and the city is home to several educational institutions ranging from primary schools to universities. Sagar City has a vibrant cultural scene with diverse festivals, cuisine, art forms, and folk music. In terms of connectivity, the city is well-connected via railway stations and national highways. Notable features of Sagar City include the picturesque Sagar Lake, renowned educational institutions, its status as an agricultural hub, natural beauty in the surrounding countryside, good connectivity, and a diverse culinary experience. Population growth in last 22 year is shown in the following graph.



The Researcher has conducted the survey on the below mentioned roads in order to know the volume of the road and vehicular composition on a full 24 hour Day.

Sr	Name of the road	Non motorized vehicle	Two wheeler	Car/ Jeep / Auto	Bus /Truck	Total
1	Katra Maszid Choraha					
	Jama Maszid To Manohar Takij	1251	1852	552	22	3677
	Jhama Maszid To Raja Tigadda	1121	1812	422	11	3366
	Jhama Maszid To Manic Chawk	1053	1721	245	13	3032
	Jhama Maszid To Gaur Murti	1152	1242	454	18	2866
2	Gaur Murtii Tiraha					
	Gaur Nurti Tiraha to Kotwali Road	1121	1812	422	11	3366
	Gaur Murti to Parkota Road	1053	1721	245	13	3032
3	Rahatgarh Bus stand tiraha					
	Rahatgarh Bus stand tiraha to Mata Madiya	725	920	542	24	2211
	Rahatgarh Bus stand tiraha to bhagwan ganj	842	941	420	12	2215
	Rahatgarh Bus stand tiraha to Bhagyodaya road	674	851	410	37	1972
4	Namak Mandi tiraha					
	Namak Mandi tiraha to lacchu choraha	922	1852	552	9	3335
	Namak Mandi tiraha to parkota	974	1812	422	8	3216
5	Lacchu choraha					
	Lacchu choraha to galla mandi gate	1053	1721	245	13	3032
	Lacchu choraha to shastri market	1152	1242	454	18	2866
	Lacchu choraha to cantt area road	984	1020	452	15	2471
6	Tili Choraha					
	Tili Choraha to DIG bunglow	725	920	542	24	2211
	Tili Choraha to bakoli square	842	941	420	12	2215
	Tili Choraha to rto road	674	851	410	37	1972
	Tili Choraha to Old Rto campus	842	941	420	12	2215
7	Motinagar Choraha					
	Motinagar Choraha to bhopal Khurai Bypass	1152	1242	454	18	2866
	Motinagar Choraha to dharmashree	725	920	542	24	2211
	Motinagar Choraha to city kotwali	842	941	420	12	2215
	Motinagar Choraha to rahatgarh Bus stand	674	851	410	37	1972
8	Makroniya choraha					
	Makroniya choraha to railway crossing	1252	1512	1512	102	4378
	Makroniya choraha to Bamhori Tiraha	1125	1214	1135	74	3548
	Makroniya choraha to Civil Line	552	523	123	72	1270
	Makroniya choraha to Cant Railway crossing	1523	1102	1033	76	3734
9	Radha Tiraha					0
	Radha Tiraha to railway station road	2152	1522	152	45	3871
	Radha Tiraha to apsara takij	1226	1374	533	99	3232
10	Degree College Choraha					
	Degree College Choraha to pil kohi	1523	1102	1033	25	3683
	Degree College Choraha to teen madiya	1245	1214	1422	66	3947
	Degree College Choraha to bangali kali	1825	1214	1235	22	4296
	Degree College Choraha to byr pass road	552	523	123	88	1286

5. Methodology of Road Safety Audit

The concept of road safety audit was developed by transportation professionals and experts in the field of road safety. While it is challenging to attribute the concept to a single individual, road safety audit has evolved over time through the collaborative efforts of various organizations and experts worldwide.

Here are some common criteria for conducting a road safety audit:

- **Speed:** Evaluate speed limits, speed zones, and speed-calming measures to ensure they are appropriate for the road conditions and surrounding environment.

- **Footpath and Pedestrian accessibility:** - Footpaths, also known as sidewalks or pedestrian walkways, play a crucial role in road safety and the overall mobility of pedestrians. When conducting a road safety audit, it is important to assess the design, condition, and functionality of footpaths to ensure the safety and convenience of pedestrian. Assess the provision and quality of facilities for pedestrians and cyclists, including sidewalks, footpaths, bike lanes, shared paths, and crossings, to ensure safe and convenient movement for vulnerable road users.

- **Lighting:** Evaluate the adequacy of lighting along footpaths, particularly during nighttime hours. Proper illumination improves visibility and reduces the risk of accidents or crime.

- **Signage:** Assess the presence and visibility of signage, markings, or directional information on footpaths to guide pedestrians and alert them to potential hazards or route changes. Clear and informative signage improves pedestrian navigation and awareness.

- **Vehicle safety:** - Vehicle safety is a crucial aspect of road safety that focuses on ensuring the safety of occupants, other road users, and minimizing the risk of accidents. When conducting a road safety survey or audit, evaluating vehicle safety measures is important.

- **Intersection safety:** - Intersection safety is a critical aspect of road safety as intersections are often high-risk areas where different streams of traffic converge. When conducting a road safety survey or audit, evaluating intersection safety is essential.

5.1 Speed Audit

Following checklist is needed to be filling for considering one hour.

Time	multi-axle	Truck	**Bus**	LCV	Car /Jeep	Auto/ Rickshaw	**Scooter/** Motor **cycle**	**Pedestrian**
0 - 10 min								
10-20 min								
20-30 min								
30- 40 min								
40-50 min								
50-60 min								
Avg. speed per hour								

Vehicle	**Criterion**			**Score**
	(1pt.)	**(0.5 pt.)**	**(0.2 pt.)**	
Truck Multi Axle	< 50 km/h	>50 km/h	> 80 km/h	
Truck	< 50 km/h	>50 km/h	> 80 km/h	
Bus	< 50 km/h	>50 km/h	> 80 km/h	

LCV	< 50 km/h	>50 km/h	> 90 km/h	
Car /jeep	< 50 km/h	>50 km/h	> 90 km/h	
Auto Rickshaw	< 50 km/h	>50 km/h	> 90 km/h	
Scooter /Motorcycle	< 50 km/h	>50 km/h	> 90 km/h	
`Overall				

Percentage Score for Speed = (Obtained Score / Total Score)*100

5.2 Footpath and Pedestrian accessibility

Indicator	Criterion			Score
	(1pt.)	**(0.5 pt.)**	**(0.2 pt.)**	
Pavement Type	Paver Blocks/ Concrete Blocks/Interlocking blocks	tiles	Unpaved Rough Surface	
Width of Footpath	1.5m to 1.8m	1.2m to 1.5m	<1.2m	
height of footpath	150mm	200mm	300mm	
cleanliness and maintenance	Good	Fair	Poor	
Provision of amenities	Good	Fair	Poor	
frequency of crossings	<500m	500m- 700m	.>700m	
Time taken for crossing	10-20sec	20-30 sec	>30 sec	
Overall				

Percentage Score for Footpath and Pedestrian accessibility = (Obtained Score / Total Score)*100

5.3 Lighting

Indicators	**Criterion**			**Score**
	(1pt.)	**(0.5 pt.)**	**(0.2 pt.)**	
Distance between Light Poles	20m	20m-40m	>40m	
visibility	>40lux	20lux - 40lux	<20lux	
Provision of lighting for pedestrians for crossing	Good	Fair	Poor	
Overall				

Percentage Score for lighting = (Obtained Score / Total Score)*100

5.4 Signage

Indicators	**Criterion**			**Score**
	(1pt.)	**(0.5 pt.)**	**(0.2 pt.)**	
Visibility	**Good**	**Fair**	**Poor**	
Clarity and Conciseness	**Good**	**Fair**	**Poor**	
Information Relevance	**Good**	**Fair**	**Poor**	
Proper Positioning and Distance	**Good**	**Fair**	**Poor**	
Maintenance	**Good**	**Fair**	**Poor**	
Community Engagement	**Good**	**Fair**	**Poor**	
Overall				

Percentage Score for Signage= (Obtained Score / Total Score)*100

5.5 Vehicle safety

Indicators	**Criterion**			**Score**
	(1pt.)	**(0.5 pt.)**	**(0.2 pt.)**	
Distance of Speed Limit Sign	20m	20m-40m	>40m	
Safety Measures for Construction sites along Road	**Good**	**Fair**	**Poor**	
Safety of median design	**Good**	**Fair**	**Poor**	
Safety of Kerb design	**Good**	**Fair**	**Poor**	
Management of Vertical Hazards on Kerb	**Good**	**Fair**	**Poor**	
Overall				

Percentage Score for vehicle safety = (Obtained Score / Total Score)*100

5.6 Intersection Safety

Indicators	Criterion			Score
	(1pt.)	(0.5 pt.)	(0.2 pt.)	
Type of Intersection	Signalized	Police Controlling	Without controlling	
Provision of Rotary / Roundabout	Good	Fair	Poor	
Provision of Pedestrian Crossing	Good	Fair	Poor	
Provision of Speed Humps	Good	Fair	Poor	
Load on Intersection due to number of lane	Excessive	medium	Low	
Management of Obstruction	**Good**	**Fair**	**Poor**	
Overall				

Percentage Score for Intersection Safety = (Obtained Score / Total Score)*100

4.4Final Score Sheet of Road Safety Audit

Criteria	Obtained Score	Weightage of Criterion	Final Score	Total Score
	A	B	A×B	B×100
Speed Audit Score				
Footpath and Pedestrian accessibility audit Score				
Lighting Audit Score				
Signage audit Score				
Vehicle safety audit Score				
Intersection Safety audit Score				
			Sum=	**Sum=**

Percentage Score of Road Safety audit = (Obtained Score / Total Score)*100

The results of a road safety audit provide a comprehensive assessment of the safety performance of a road or transportation project. They serve as a basis for prioritizing safety improvements, guiding design decisions, and ensuring the integration of safety considerations into transportation planning and implementation processes.

6. Result Analysis

Sr	Location	Obtained Score * Weightage						Total Score	Grand Score	Avg of score at intersection
		Speed	**Footpath and Pedestrian accessibility**	**Lighting**	**Signage**	**Vehicle safety**	**Intersection Safety**			
		400	400	300	200	100	300	1700	100	100
1.	Bakoli Choraha									
	a. Bakoli Choraha to bangali kali	177	0	200	166	40	160	743	43.71	
	b. bakoli choraha to teen madiya	177	0	200	166	40	160	743	43.71	
	c. bakoli choraha to degree college road	268	0	200	200	40	160	868	51.06	48.09
	d. bakoli choraha to sanjay drive (Left)	268	0	200	133	40	160	801	47.12	
	e. bakoli choraha to sanjay drive (Right)	367	0	200	166	40	160	933	54.88	
2.	Jhama Maszid katra									
	a. Jhama Maszid To Radha Takij (Left)	400	0	250	0	80	160	890	52.35	
	b. Jama Maszid To Radha Takij (Right)	400	0	250	0	80	160	890	52.35	
	c. Jhama Maszid To Raja Tigadda (Left)	400	100	250	0	80	160	990	58.24	
	d. Jhama Maszid To Raja Tigadda (Right)	400	100	250	0	80	160	990	58.24	
	e. Jhama Maszid To Manic Chawk (Left)	400	50	250	0	80	160	940	55.29	55.29
	f. Jhama Maszid To Manic Chawk (Right)	400	50	250	0	80	160	940	55.29	
	g. Jhama Maszid To Gaur Murti (Left)	400	50	250	0	80	160	940	55.29	
	h. Jhama Maszid To Gaur Murti (Right)	400	50	250	0	80	160	940	55.29	
3.	Rahatgarh Bus Stand Tiraha									

	a. Rahatgarh Bus Stand Tiraha to mata madiya (Left)	400	0	250	0	80	160	890	52.35	
	b. Rahatgarh Bus Stand Tiraha mata madiya (Right)	400	0	250	0	80	160	890	52.35	
	c. Rahatgarh Bus Stand Tiraha to motinagar (Left)	320	100	250	0	80	160	910	53.53	52.94
	d. Rahatgarh Bus Stand Tiraha to motinagar (Right)	320	100	250	0	80	160	910	53.53	
	e. Rahatgarh Bus Stand Tiraha to railway crossing	360	50	250	0	80	160	900	52.94	
4.	Lacchu choraha									
	a. Lacchu choraha to galla mandi gate	400	0	250	0	80	160	890	52.35	
	b. Lacchu choraha to shastri market	320	100	250	0	80	160	910	53.53	54.26
	c. Lacchu choraha to cantt area road	360	50	250	0	80	160	900	52.94	
	d. Lacchu choraha to kirti stambh	400	100	250	0	80	160	990	58.24	
5.	Kirti Stambh choraha									
	a. Kirti Stambh to parkota	400	0	250	0	80	160	890	52.35	
	b. Kirti Stambh to lachhu choraha	400	0	250	0	80	160	890	52.35	55.29
	c. Kirti Stambh to Zhama Maszid (Left)	400	100	250	0	80	160	990	58.24	
	d. Kirti Stambh to Zhama Maszid (right)	400	100	250	0	80	160	990	58.24	
6.	Tili Tiraha									
	a. Tili Tiraha to rto choraha	177	285	200	0	0	160	822	48.35	
	b. Tili Tiraha to DIG bulglow (Left)	177	285	200	0	0	160	822	48.35	
	c. Tili Tiraha to DIG bulglow (Right)	300	285	250	0	0	160	995	58.53	53.95
	d. Tili Tiraha to Sanjay Drive (Left)	300	285	250	0	40	160	1035	60.88	
	e. Tili Tiraha to Sanjay Drive (Right)	177	285	250	0	40	160	912	53.65	
7.	RTO Road Tiraha									
	a. RTO Road Tiraha to RTO Office	400	242	250	133	60	250	935	55.00	
	b. RTO Road Tiraha to tili Tiraha	300	242	300	166	60	250	1018	59.88	51.88
	c. RTO Road Tiraha to dharmashree	367	0	250	133	60	250	693	40.76	
8.	Teen Madiya tiraha									
	a. Teen Madiya tiraha to degree college choraha	400	0	200	200	80	0	480	28.24	
	b. Teen Madiya tiraha to gau ghat (Left)	400	0	200	133	80	0	413	24.29	28.26
	c. Teen Madiya tiraha to gau ghat (Right)	300	0	250	166	80	0	496	29.18	
	d. Teen Madiya tiraha to Bakoli choraha	367	0	300	133	100	0	533	31.35	
9.	Sanjay Drive Tiraha									
	a. sanjay drive tiraha to Bakoli Choraha (Left)	177	342	200	133	60	160	1072	63.06	
	b. sanjay drive tiraha to Bakoli Choraha (Right)	177	342	200	133	80	160	1092	64.24	
	c. sanjay drive tiraha to Tili Tiraha (Left)	300	342	200	133	60	160	1195	70.29	67.33
	d. sanjay drive tiraha to Tili Tiraha (Right)	300	342	200	133	60	160	1195	70.29	
	e. sanjay drive tiraha to Kanera Dev Tiraha (Left)	177	342	250	133	60	160	1122	66.00	
	f. sanjay drive tiraha to Kanera Dev Tiraha (Right)	177	342	300	133	80	160	1192	70.12	
10.	Motinagar Choraha									
	a. Motinagar Choraha to dharmashree	268	0	200	166	0	160	794	46.71	
	b. Motinagar Choraha to Kotwali	268	0	200	166	0	160	794	46.71	
	c. Motinagar Choraha to rahatgarh bus stand (Left)	400	0	200	166	0	160	526	30.94	65.38
	d. Motinagar Choraha to rahatgarh bus stand (Right)	400	0	200	166	0	160	526	30.94	
	e. Motinagar Choraha to Lehdara naka (Left)	300	285	250	200	0	160	895	52.65	
	f. Motinagar Choraha to Lehdara naka (Right)	367	285	300	166	0	160	911	53.59	
11.	Degree College Choraha									
	a. Degree College Choraha to Pili kothi (Left)	177	342	200	166	100	200	1185	69.71	
	b. Degree College Choraha to Pili kothi (Right)	177	342	200	166	100	200	1185	69.71	
	c. Degree College Choraha to gopalgunj	268	0	250	200	100	200	1018	59.88	62.49
	d. Degree College Choraha to old byepass	268	0	300	133	100	200	1001	58.88	
	e. Degree College Choraha To teen madiya	177	0	300	166	80	200	923	54.29	
12.	Civil Line Choraha									
	a. Civil Line Choraha to Makroniya (Left)	177	342	200	166	60	200	1145	67.35	69.79
	b. Civil Line Choraha to Makroniya (Right)	177	342	200	166	60	200	1145	67.35	

	c. Civil Line Choraha to Pili Kothi (Left)	300	342	250	200	80	200	1372	80.71	
	d. Civil Line Choraha to Pili Kothi (Right)	300	342	300	133	80	200	1355	79.71	
	e. Civil Line Choraha to Cant Post office (Left)	177	0	300	166	80	200	923	54.29	
	f. Civil Line Choraha to Cant Post office (Right)	177	0	250	133	80	200	840	49.41	
	g. Civil Line Choraha to kalicharan choraha (Left)	268	342	300	166	80	200	1356	79.76	
	h. Civil Line Choraha to kalicharan choraha (Left)	268	342	300	166	80	200	1356	79.76	
13.	Makroniya Choraha									
	a. Makroniya choraha to bansal hospital (Left)	177	285	200	133	0	160	955	56.18	68.53
	b. Makroniya Choraha to bansal hospital (Right)	177	285	200	133	0	160	955	56.18	
	c. Makroniya Choraha to Rajakhedi (Left)	300	285	250	200	0	250	1285	75.59	
	d. Makroniya Choraha to Rajakhedi (Right)	300	285	300	166	0	250	1301	76.53	
	e. Makroniya choraha to Makroniya thana (Left)	268	285	300	166	0	250	1269	74.65	
	f. Makroniya choraha to Makroniya thana (Right)	268	285	250	166	0	160	1129	66.41	
	g. Makroniya Choraha to Civil Line (Left)	268	285	300	200	0	160	1213	71.35	
	h. Makroniya Choraha to Civil Line (Right)	268	285	300	200	0	160	1213	71.35	
14.	Bhagwan Ganj Tiraha									
	a. Bhagwan Ganj Tiraha to sani mandir	333	0	300	166	60	200	1059	62.29	47.87
	b. Bhagwanganj Tiraha to Hero showroom	333	0	250	166	60	200	676	39.76	
	c. Bhagwan ganj Tiraha to apsara takij (Left)	300	0	300	200	60	200	760	44.71	
	d. Bhagwan ganj Tiraha to apsara takij (Right)	333	0	300	200	60	200	760	44.71	
15.	Radha Tiraha									
	a. Radha Tiraha to katra maszid (Left)	400	0	300	166	80	250	796	46.82	46.5
	b. Radha Tiraha to katra maszid (Right)	400	0	250	166	80	250	746	43.88	
	c. Radha tiraha to Apsara takij	300	0	300	200	60	250	810	47.65	
	d. Radha tiraha to Raiway station Road	367	0	300	200	60	250	810	47.65	

Conclusions

Following are the major Conclusions of the road safety Audit

1. Allowed speed of vehicles on the city roads and junction is 30 km/hr. but in this audit we observe the speed of the vehicle is going upto 50km/hr which is leading to an increased risk of fatal accidents. These roads typically high traffic volume, which further amplifies the potential for severe injuries, particularly for bikes and cars traveling at speeds exceeding 50 km/hr. on outer or connecting intersection or roads vehicle speed is crossing 70 km/hr. Consequently, the high speed of two-wheelers stands out as a significant contributing factor. There is extreme need for immediate speed reduction measures.

2. Score of road safety audit shows that no intersection is found to be witch is crossing the score of 80. Score of most of the intersection are lies between 50 to 80 witch shows Sagar city roads are just average on the safety measure. They required a large exercise to improve their performance.

3. Bakoli Choraha, Teen Madiya Tiraha, Radha Tiraha and Bhagwanganj Tiraha got below average score. This means the road safty is very poor on these places. Extreme measure is need to be taken on these intersections

4. Road safety score is impressive on civil line choraha due to perfect signalization, pedestrian facility lighting monitoring through camera.

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