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Road Safety Audit and Safety Management - A Case Study from Bhor to Mahad 47Km

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ABSTRACT: This article examines the relationship between elements that improve highway traffic safety and indicators of economic growth in India and other transitional economies. It finds that this relationship does not always result in improvements to traffic safety. In these nations, the increase in population motorization, or automobile density, is typically not accompanied by effective steps to lower the accident rate. Among the elements that improve traffic safety on highways are the effectiveness of traffic infrastructure planning (altering and eliminating traffic patterns from city centres, generating a significant quantity of pedestrian and Isolated bike lanes from traffic flows) and coordinating safety objectives with physical infrastructure, guaranteeing that the built transportation infrastructure is coupled with a decline in the percentage of private car fleet and an increase in the percentage of public transportation.

KEYWORDS: countermeasures, vulnerable road users, road safety audit, Hidden Black spot, Safety management

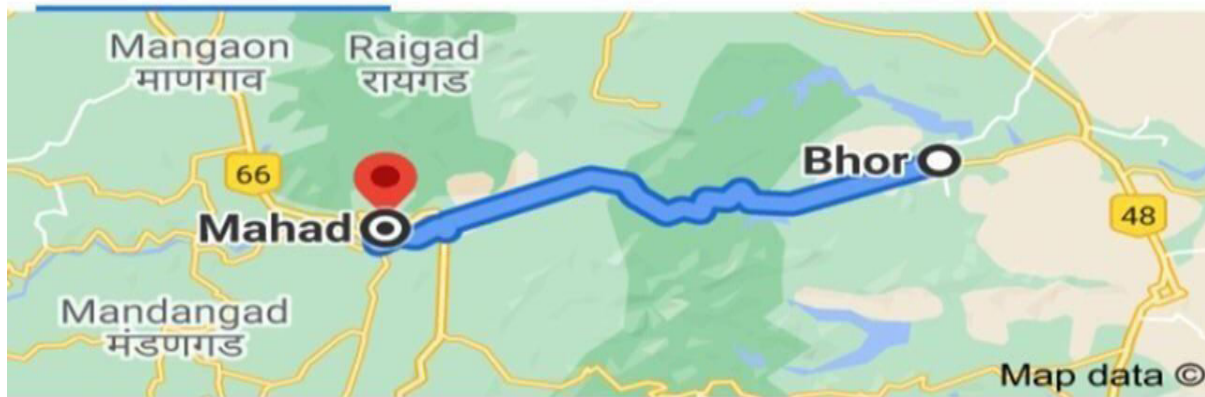
I. INTRODUCTION

A public road is called a highway because it is a designated path for the use of vehicles, bicycles, pedestrians, and other travelers. Historically, 'highwaymen' was the term used for robbers who targeted travelers on these roads. Engineering involves the design, construction, and maintenance of structures. Thus, highway engineering is the discipline that deals with the planning, construction, and maintenance of public roads. Roads are one of the most cost-effective and commonly utilized modes of transportation, accessible and available to the entire community. It makes it easier for you to move construction materials and labour throughout the nation. It facilitates national integration and offers opportunities for both economic and national growth. It is a crucial piece of infrastructure that connects to other transportation options like rail, air travel, and so on. Therefore, to support trade and commerce and meet the needs of a reliable transportation system globally, an effective and sustainable road network is essential. Highway networks are necessary for the movement of people and goods throughout the world, as should be noted. It is significant to remember that transportation of people and things makes highway networks possible everywhere in the world. It is significant to remember that transportation of people and things makes highway networks possible everywhere in the world. After the wheel was invented, a man became the first carrier on the roadway, followed by a camel, a donkey, a horse, and numerous more wheeled vehicles. Even thousands or even hundreds of years before our time, man was already familiar with the process of designing highways. Congestion, funding, administration, building, maintenance, and other highway engineering challenges were addressed and handled by those who came before us in their own unique ways to meet their needs. a multidisciplinary, unbiased panel evaluating the legal performance of current and upcoming road safety or intersections. It correctly evaluates and documents possible problems with road safety and finds ways to make all road users' safety better. A road is a path or road that connects two or more locations and is used for the movement and transportation of people, products, etc. using two- and four-wheeled vehicles like bicycles and motorbikes. An equal plan for the Indian Road Development Plan, known as the "Nagpur Road Plan" by the Indian Road Congress (IRC), was prepared in 1943 during a conference of the Central Engineers of the Central and Provincial Government of India, Nagpur, given by the central government.

II. SITE SELECTION FOR STUDY

Indian National Highway 965DD, is a national highway. It is an alternate route leading off of National Highway 65 Operating in Maharashtra State is NH-965DD. Two-lane NH965DD (47 km from Bhor to Mahad) Bhor is situated in India in latitude 730'84'20" E and longitude 180' 14'58" N. Mahad is situated in India at latitude 730'42'24" E and

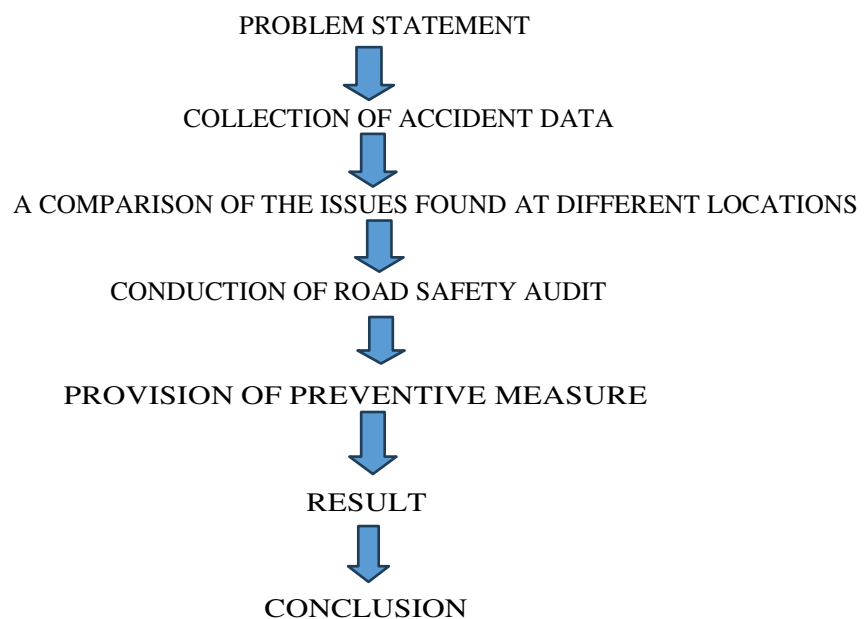
longitude 180°0'80" N. Linear Distance: 28.1 miles, or 45 Kms and 200 meters. 1 hour and 24 minutes is the travel time. Bearing and direction: 260° WEST



III. OBJECTIVE

- Decrease the amount of preventive action required after the road project is operational
- Detect high-risk regions for highways.
- Examine how traffic patterns and road shape affect this particular route.
- Increasing knowledge of road engineering safety management concepts.

IV. METHODOLOGY





V. PROBLEM STATEMENT

The main problem with this road is landslides during the rainy season, yet it was chosen since it is shorter, has stunning scenery, and has enhanced transportation and development in distant areas. As a result of heavy rain, we found landslides, damaged road surfaces, and disturbance in contact in multiple sites. Thus, we selected these route with the intention of minimizing unintentional incidents and managing safety measures along the way.

VI. DATA COLLECTION

Accident data was acquired from the appropriate police department's Bhor office, as the project is located in Pune District, Maharashtra. Data was collected across five years, from January 2019 to December 2023. At each accident site, the following criteria are recorded: date, time, location, type of accident, division of accident, Cause, road traffic, intersection details, responsible vehicle, and the value of impacted persons. This information is utilized for additional risk assessments. The design tunnel saw 79 accidents during a five year period (Jan2019 to December 2023).



Accident raw data summary is given below in table and chart format:

Table -1: Cumulative Data of 05 years (2019- 2023)

SR. NO	DESCRIPTION	2019	2020	2021	2022	2023
1	TOTAL NO. OF ACCIDENT	21	18	18	6	20
2	FATAL ACCIDENT	3	2	1	0	2
3	GRIEVOUS	6	8	5	2	7
4	MINOR	7	5	6	3	7
5	NON-INJURED	4	2	5	1	3

Sr. No	Nature of Accidents	Number of Accident	% of Accidents
1	Overturning	15	18.98
2	Head on collision	5	6.32
3	Rear end collision	4	5.06
4	Collision brush/Side Wipe	1	1.44
5	Right turn collision	1	1.44
6	Skidding	29	36.70
7	Left turn merging	0	0.0
8	Other	23	29.11

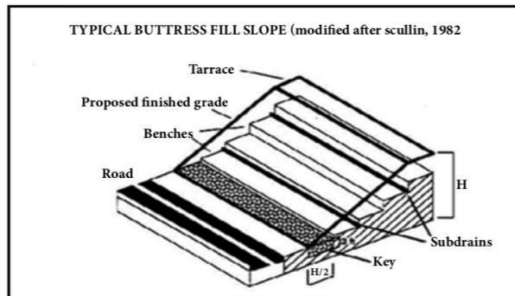
SR.NO	ACCIDENT LOCATION IN KM	LOCATION	NO. OF ACCIDENT IN LAST 5 YEAR
1	0 To 10	Vadgaon Dal to Ambeghar	16
2	10 To 20	Ambeghar To Nigudaghar	18
3	20 To 30	Nigudaghar To Hirdoshi	11
4	30 to 47	Hirdoshi To Varandha ghat	34

Sr. No	Risk Element	Risk factors	Proposed Countermeasures
1	 <p>Horizontal Curves</p>	1)Limited viewing Distance. 2)Vehicles overtaking on blind corners 3)Inadequate super Elevation.	Use flexible pole barriers to separate opposing direction traffic from areas Of dispute. 2. Rumble strips placed in the center and edge lines to inform and Caution cars 3. Warning signs and delineation should be provided
2	 <p>Intersection</p>	1. Limited visibility from minor routes 2. Driving under the influence and excessive speed	1. There should be warning signs and delineation. 2. When feasible, channelize vehicle movements 3. Use speed bumps to slow Down on the minor road before Joining. 4. Flaring the corners will Improve turning maneuverability. Signage and road markings must be installed.

Recommendations for Countermeasures

1. **Benching:**

As the reduce slope's height, horizontal benches can be excavated into a slope to provide the best protection against steep slope failure



2. **Creating Support for Overhang:**

Sandbags can be used as a substitute for appropriate, sturdy material while building a wall or scaling an overhanging rock.

3. **Retaining Wall:**

By preventing the material from moving laterally, retaining walls sustain the sloped Material. The design of a retaining wall is influenced by soil factors such as bearing capacity.



4. Constructed Gabion wall



5. Rock bolting technique

6. Soil grouting / Strengthening

VII. FUTURE SCOPE

- The goal of the study is to lower the number of accidents on the road network, as well as their severity and the necessity for expensive repair work.
- Examining current accident issues in terms of the location, time, and condition of the accidents

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