

Review on Accidental Studies on Roadways.

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Abstract- *The problem of accident is very serious in road transportations, due to its complex flow patterns of vehicular traffic presence of mixed traffic and pedestrians. Traffic Accidents may cause property damages, personal injuries or even lose of life. Main Objective of Traffic engineering is to provide safe traffic flow. Road accidents cannot be totally avoided, but by adequate traffic study and management measures, the accident rate can be reduced considerably*

I. INTRODUCTION

The Mumbai – Pune Expressway (MPEW) is a controlled-access highway that connects Mumbai, the commercial capital of India, to the neighboring city of Pune, an educational and information technology hub. This divided 6-lane roadway is an alternative to the old Mumbai Pune highway and helps in reducing travel time between the two cities. It has a posted speed limit of 80 kmph along most parts of the stretch. Two-wheelers and three-wheelers are not permitted to use most parts of the expressway. Common vehicle types plying the expressway are cars, trucks and buses. The expressway is 94.6 km long and witnesses many traffic crashes, fatalities and serious injuries.

II. OBJECTIVES OF THIS PROJECT

- To study the causes of accidents and suggest corrective measures
- To suggest safety provisions road travelling
- To develop accident proof infrastructure.
- To develop the awareness about road safety.
- To carry out before and after studies and to demonstrate the improvement in the problem.

III. LIMITATIONS

Despite the comprehensive approach to studying accidents on the Mumbai-Pune Expressway, several limitations exist that should be acknowledged:

1. **Availability and Reliability of Data:** The analysis relies on the availability and reliability of accident data and related information obtained from relevant sources. The accuracy and completeness of the data may vary, potentially affecting the precision of the findings.

2. **Data Timeframe:** The study focuses on accidents up until the specified cutoff date. Accidents occurring after this date will not be considered unless specifically mentioned or updated in subsequent research.
3. **Access to Detailed Information:** While the research aims to explore various factors contributing to accidents, certain details such as individual driver profiles, specific vehicle conditions, and confidential investigation reports may not be accessible or publicly available.
4. **External Factors:** The analysis considers various factors contributing to accidents, but external variables such as socio-economic conditions, cultural influences, and regional policies may also impact.

IV. MITIGATION

To avoid accidents on the Mumbai-Pune Expressway, several engineering measures can be implemented. These measures aim to enhance road safety, improve driver behavior, and reduce the likelihood of collisions. Here are some engineering measures that can be considered:

4.1. Road Design and Geometry:

Improve alignment and road layout to minimize sharp curves and gradients, reducing the risk of vehicles losing control.

4.2. Intersection Design and Management:

Install clear signage, signals, and markings at intersections to guide drivers and minimize confusion.

4.3. Safety Barriers and Guardrails:

Install safety barriers and guardrails along the expressway to prevent vehicles from crossing over into opposing lanes or colliding with roadside obstacles.

4.4. Lighting and Visibility:

Ensure proper lighting along the expressway, including streetlights and reflectors, to enhance visibility, particularly during night-time driving.

4.5. Traffic Control and Management:

Implement intelligent transportation systems (ITS) to monitor traffic flow, provide real-time information to drivers, and manage incidents effectively.

V. TRAFFIC SURVEY

• **Aim:**

Traffic surveys aim to capture data that accurately reflects the real-world traffic situation in the area. It may be counting the number of vehicles using a road or collecting journey time information for example, but there are many other types of data that traffic surveys collect.

• **Procedure:**

Determine the Purpose: Clearly defining the purpose of the traffic count, such as assessing traffic volume, determining peak hours, or analysing vehicle types.

Select the Counting Locations: Identifying the specific locations where we want to conduct the traffic count. Considering factors such as road type, intersection characteristics, and the purpose of the study.

Determine the Counting Period: Deciding on the duration of the traffic count, considering factors like traffic patterns, time of day, and the objectives of the study.

Preparing Count Sheets: Preparing count sheets or forms to record the data. Including relevant information such as the date, time, location, direction, and vehicle types/categories.

Set Up Counting Equipment: If necessary, set up any equipment required for the count, such as a handheld clicker counter, a tally sheet, or a video camera for later review.

Conduct the Count: Stand or position yourself at the designated counting location. Observe the traffic flow and manually count the vehicles passing through the location during the specified counting period. Record the counts accurately on the count sheets.

Following is the traffic survey collected on average basis for a Peak Hour on Day 1: -

Day no.	Car	Bus	Truck	Minivan	Heavy load Vehicle
01	2820	890	1308	213	188
Percentage	52.03%	16.42%	24.13%	3.93%	3.46%

VI. CASE STUDY

Following is the traffic survey collected on average basis for a period of 15 Days: -

Name of Road: - Ahmednagar road, wagholi		Date and Time: -29/05/2023 @ 09:00 am to 10:00 am		
Section: - State Highway 27		Weather: - Sunny day		
Direction: - East - West		No. Of observers: -4		
Time	2-wheeler	3-wheeler	4-wheeler	8-wheeler
00-15	228	321	226	112
15-30	345	468	348	87
30-45	190	327	304	166
45-60	243	286	281	73
PHF	0.72	0.74	0.83	0.65
Total	1006	1396	1159	438

Note: The Heavy vehicle i.e., 12 or more-wheeler is not allowed in city during the day as per the guidelines.

Day no.	2-Wheeler	3-Wheeler	4-Wheeler	8-Wheeler
1.	2820	890	1308	213
2.	3210	1120	1481	1107
3.	4322	893	421	98
4.	3422	2201	581	1108
5.	4232	2400	812	413
6.	2234	1120	720	729
7.	2322	821	370	520
8.	2820	920	821	320
9.	1824	624	318	413
10.	3205	1103	609	1318
11.	2234	899	481	651
12.	4834	1418	320	718
13.	2419	590	480	628
14.	3241	485	420	748
15.	2283	1220	580	573
PHF	0.62	0.46	0.42	0.48
TOTAL	45,422	16,766	9532	9557

VII. HIGHWAY INITIATIVES.

7.1 HIGHWAY MRITYUNJAY DOOT

1st March 2021 marked the inception of the Highway Police, Maharashtra State initiative, "Highway Mrityunjay Doot". Every year, nearly 1.5 Lakh people die from road crashes in India. After conducting a detailed and rigorous analysis into the causes of deaths in cases of road crashes, it was noticed that unavailability of immediate medical aid was the major cause of concern. In many cases, the injured weren't evacuated and transported appropriately, which aggravated their injury and medical condition.

While many good Samaritans do come forward for the help and rescue of such victims, some onlookers and passersby refrain from extending help to victims in such situations to avoid police investigations and follow-up court procedures.

The Highway Police, Maharashtra State, has launched the "Highway Mrityunjay Doot" Project to avoid all such scenarios and to enable quick and efficient transfer of victims injured in crashes, within the "Golden Hour", which is crucial.

As a part of this initiative, employees of nearby Malls, Petrol Pumps, Local Dhabas and Hotels, of adjoining villages form groups of up to 4-5 people. These groups are called "Mrityunjay Devdoof (Angels of God) and are provided with training in First Aid (including conducting CPRS, precautionary methods for lifting and transporting injured victims, etc.) with the help of Government/Semi-Government or Social Organizations.

7.2 OPERATION HIGHWAY SAFETY: -

Mumbai-Pune Expressway & NH 48 (Navi Mumbai-Pune-Kolhapur)

It is observed that heavy vehicles ply on the fast lane of the carriageway which is the rightmost lane. As a part of this initiative, the pilot scheme "Operation Safety on Highways" is being conducted on Mumbai-Pune Expressway and Mumbai-Pune-Kolhapur Highway (NH-48) to prevent crashes and actions are being taken against such heavy vehicles

7.3 THE GOLDEN HOUR INITIATIVE: -

The concept of 'Golden Hour' was introduced from 21st November, 2016 on weekends. As a part of this initiative,

multi-axle vehicles, ODCs (Over Dimensional Cargo) and other heavy vehicles are kept on hold at stretches, for nearly 4 hours, to ease traffic for small vehicles and other vehicles carrying essential commodities. This has resulted in smooth traffic movement for weekend commuters on Mumbai-Pune Expressway.

VIII. RESULT

Location of traffic aid posts, ambulances and hospitals

- Once an emergency call is received, it is important to attend to it with a quick response time. This requires adequate numbers of response teams strategically located such that they can respond to a call as quickly as possible. The response teams usually include Traffic Aid Post personnel of the Maharashtra State Highway Police and the Ambulance service personnel.
- The Mumbai-Pune Expressway has 4 Traffic-Aid Posts (TAPs) handled by the Maharashtra State Highway Police.

The hospitals identified are listed below:

- MGM Hospital, Kamothe
- Parmar Hospital, Lonavala
- Yash Hospital, Lonavala
- Kamshet Hospital, Kamshet
- Pawana Hospital, Somatane
- Bade Hospital, Somatane
- Pioneer Hospital, Somatane
- Aadhar Hospital, Dehu road
- Lokmanya Hospital, Nigdi
- Upcoming Emergency Medical Care Centre, Ozarde.

IX. APPLICATIONS

- Identification of location of points at which unusually high number of accidents occur.
- Detailed functional evaluation of critical accident location to identify the causes of accidents.
- Development of procedure that allows identification of hazards before large number of accidents occurs.
- Development of different statistical measures of various accident-related factors to give insight into general trends.

X. CONCLUSION

10.1 Causes of accident:

- Over Speeding: Over-speeding poses a significant risk on the roads, increasing the chances of accidents and severe injuries. It is essential to abide by speed limits and prioritize responsible driving to ensure the safety of oneself and others.
- Drunken Driving: Driving under the influence of alcohol impairs judgment, coordination, and reaction time. It is vital to never drink and drive, instead opting for alternative transportation methods or designating a sober driver to prevent accidents and potential loss of life.
- Distractions to Driver: Distracted driving, such as using mobile devices, eating, or engaging in other activities while behind the wheel, diverts attention from the road and can lead to accidents. Drivers must remain focused on driving and eliminate any distractions that may compromise their safety.
- Red Light Jumping: Disregarding traffic signals, particularly running red lights, is dangerous and can result in severe collisions with other vehicles or pedestrians. It is essential to respect traffic signals and exercise patience, ensuring the safety of all road users.
- Avoiding Safety Gears like Seat belts and Helmets: Neglecting safety equipment like seat belts and helmets significantly increases the risk of injury or fatality in the event of an accident. Wearing seat belts and helmets is a simple yet effective way to protect oneself and reduce the severity of injuries.
- Taking shortcuts: Taking shortcuts or engaging in reckless maneuvers to save time can have severe consequences. It is crucial to adhere to traffic regulations, follow designated routes, and avoid risky behavior to prevent accidents and ensure safe journeys.

10.2. Development of infrastructure:

- Flyovers at busy crossings alleviate traffic congestion and improve the flow of vehicles, enhancing overall road safety. These elevated structures provide smooth transitions and eliminate the need for vehicles to navigate complex intersections, minimizing the potential for collisions.
- Maintenance is a key aspect of infrastructure development. Regular inspections and upkeep are necessary to address any structural issues promptly. Well-maintained infrastructure ensures the safety and reliability

of roads, bridges, and flyovers, minimizing the risk of accidents caused by structural failures.

- Visibility is paramount when it comes to road safety. Ensuring that turnings are clearly visible to the human eye helps drivers anticipate upcoming intersections and make timely and accurate decisions. Clear signage, road markings, and proper lighting are essential to enhance visibility and prevent confusion or misjudgment.
- By prioritizing these aspects of infrastructure development, we can create a transportation network that promotes safety, efficiency, and convenience for all road users.

10.3. Awareness programs:

In an awareness program for road safety in Pune, several initiatives can be undertaken to promote safe and responsible practices among the residents. Here are some key actions that can be implemented:

- Education and Outreach: Conduct workshops, seminars, and interactive sessions in schools, colleges, and community centers to educate students, teachers, parents, and the public about road safety rules, the importance of following traffic regulations, and the potential consequences of reckless behavior on the road.
- Public Campaigns: Organize public campaigns and awareness drives in collaboration with local authorities, NGOs, and community groups. Utilize various mediums such as social media, billboards, radio, and television to disseminate road safety messages, emphasizing the significance of obeying traffic rules and practicing defensive driving.
- Road Safety Training: Offer training programs on road safety for different groups, including drivers, pedestrians, cyclists, and two-wheeler riders. Provide practical demonstrations, simulations, and guidance on defensive driving techniques, understanding road signs, and adopting safe behavior on the road.
- Engage with Local Businesses: Collaborate with businesses, corporate organizations, and transport companies to integrate road safety practices into their operations. Encourage employers to conduct regular safety training for their drivers, promote the use of seat belts, and discourage mobile phone usage while driving.

XI. EXPECTED OUTCOMES

- Be able to explain different approaches to traffic safety

- Be familiar with typical data items that are collected and stored
- Know types of accident analysis typically conducted
- Know how to conduct site analysis
- Be familiar with different safety countermeasures and their cost effectiveness.
- To prevent the upcoming accidents and providesafety to the personnel.