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# ACCIDENT STUDY & ROAD SAFETY AUDIT: CASE STUDY ON A STRETCH OF 62.8 KM FROM SIVASAGAR TO SAPEKHATI IN STATE OF ASSAM

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**Abstract –** *The present study aims to get a whole idea of existing scenario of the accident black spots in the country where the accidents are causing injuries, deaths & loss of property due to accident black spots. The country like India where the cities are congested, different terrain of lands, encroachment along the road sides are the issues dealt by the concerned road development authorities. The study is made on the existing conditions of roads which are causing the road accidents on various roads in India one case study is made of the road in Assam state to a whole idea how the geometrical, social constraints are causing the formation of accident black spots on that specific road. The details of accident data collected from the police department, traffic movement stud & counts, street inventory, pavement inventory is made to study the accident-causing reasons on the road, the measures & solutions are also given to reduce or neglect the accident spots on that road. Traffic calming devices and techniques, road marking & road signages are briefly studied during the case study & how they can be useful for the improvement of existing condition of the accident-causing spots & locations. Improvement of junctions is major aspect to reduce the accident black spots the brief study is made on the development of the existing junction condition & its development.*

***Key Words***: Road Safety, Data Collection, Road Inventory, Traffic Flow, Accident Black Spots

## 1.INTRODUCTION

India is developing at a rapid pace economically, demanding equally paced Infrastructure Growth for self-sustainable advancement. Heterogeneous nature of traffic plying on Indian roads brings its own set of challenges from accommodating different types of vehicle sizes, traffic regulations & traffic circulation etc. With ever increasing rate of vehicle registration in pan India, rate of accidents is also increasing causing huge loss to Indian Economy. Accidents causes loss of life, damage to property, financial losses and immense social impact. In this paper a case study for a stretch of 62.8 Km from Sivasagar to Sapekhati in state of Assam is considered for Road Safety Audit. Several factors contributing for a location to be termed as Accident Black Spot are discussed further in paper.

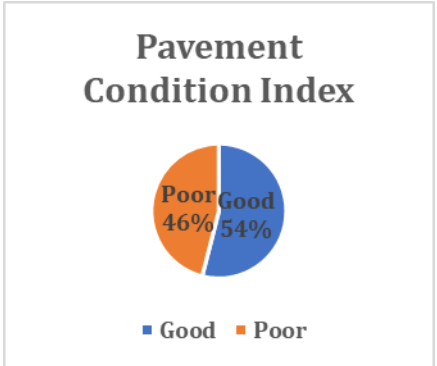
### 1.1 Analysis of Road Stretch

#### 1.1.1 Data Collection

Data collected includes summary of road inventory and pavement condition, traffic details, speed data and accident information then accident data is analyzed for concluding the type of predominantly vehicles involving in accidents and its percentage in comparation to total accidents. Also, the other details like information and list of junctions, sensitive locations like built-ups and schools, water bodies, drains, bridges, signs and markings etc. are included in audit observations. For conducting safety audit on existing roadway sections, the field studies such as Road Inventory, Classified Volume counts, Speed Survey and Collection of First Information Report from police stations and analysis are carried out and described in detailed as follows:

#### 1.1.2 Road Inventory

Road geometry comprised of parameters like road width, shoulder width, footpath, height of embankment, sight distance, horizontal curvature, vertical curvature, etc. The traffic control devices comprise signs, markings, delineators, crash barriers, guard rails, etc. The condition of pavement is represented in below Figure below to understand the condition of existing pavement.



### 1.1.3 Classified Volume Counts

Traffic surveys are carried out to understand the traffic composition and volume on the project road at two different locations for Incoming & Outgoing Traffic. Following Figure showing the percentage wise traffic composition.

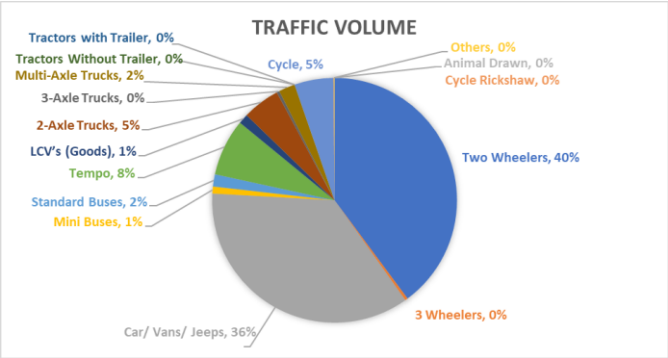



**Figure 1: Sivasagar to Chumoni Percentage wise Traffic Composition (At Hulal)**

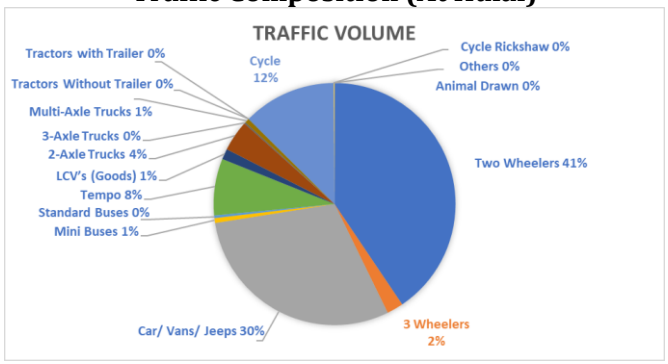



**Figure 2: Chumoni to Sapekathi Percentage wise Traffic Composition (At Teokghat)**

### 1.1.4 Speed Survey

Speed and delay studies were conducted to assess the prevailing speed along the corridor. Average journey speed Between Jorhat To Kamarbandha is 28 to 40 Kmph with. The journey speed is lesser in mostly in settlement areas and due to delays at constraints as Road Damage (Potholes), Speed breakers, School children crossings, Railway Level Crossings, Congestion of traffic at junctions and major built-up locations, Pedestrian Crossings or Animal Crossings, General Traffic, Right turn, Stop Sign, River Bridge etc.

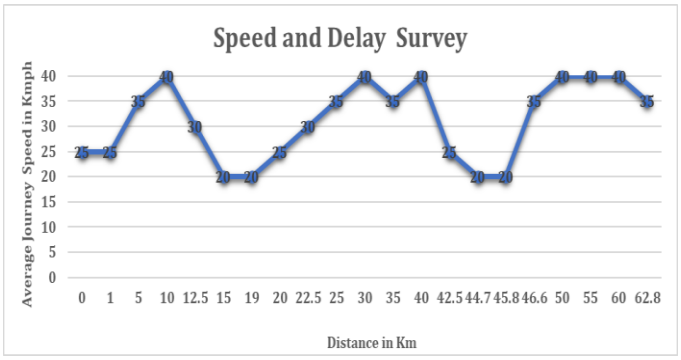



**Chart 1: Percentage wise Traffic Composition**

### 1.1.5 Collection of First Information Reports from Police Stations and Analysis

The detailed summary of the collected data is presented as under in Table

**Table 1-Detailed Summary of collected data**

| Sivasagar to Sapekhati Road | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Year | Severity of Accident | Two-Wheeler | Car/Jeep/Taxi | Auto | Truck | Bus | Tractor | Unknow |
| 2017 | F | 10 | 3 | 1 | 4 | 3 | 0 | 4 |
| | I | 19 | 13 | 0 | 9 | 1 | 1 | 2 |
| 2018 | F | 11 | 8 | 1 | 3 | 3 | 0 | 1 |
| | I | 14 | 11 | 1 | 8 | 1 | 3 | 4 |
| 2019 | F | 14 | 6 | 0 | 3 | 2 | 0 | 3 |
| | I | 7 | 11 | 0 | 5 | 1 | 0 | 2 |

The vehicle percentage wise distribution of the accidental data is presented as below in Figure,

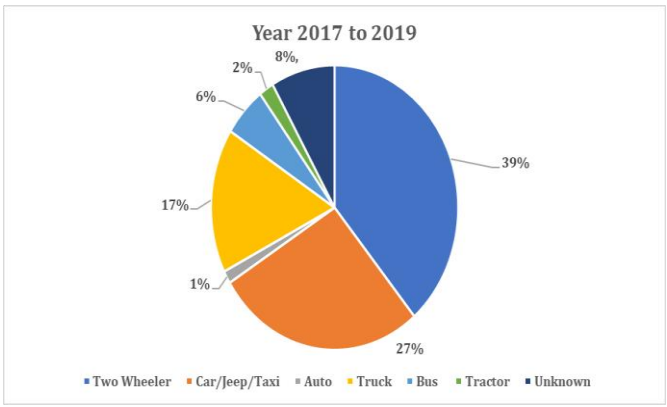



**Figure 3: Vehicle percentage wise distribution of the accidental data**

## 2. Action Plan

| Sr. No. | Activity | Measures | |
|---|---|---|---|
| | | Short Term | Long Term |
| 1 | Curves with geometric Deficiency (59 No with radius less than 250m.) | | |
| 1) | Improvement with requisite sight distance, radius of curve, Super elevation, Camber and improvement to pavement by strengthening. | | √ |
| 2) | Providing extra widening at Non-Visibility sections. | | √ |
| 3) | Improvement by providing sign boards, marking, cat eyes and speed breakers etc. and protection by providing crash barriers. | √ | |
| 4) | The structures located at curves shall be painted, delineated and provided with hazard markers. | √ | |
| 2 | Intersections with geometric and Safety Deficiency | | |
| 2.1 | Major Junctions (4 no) | | |
| 1) | Improvement of junctions geometrically (sight distance, turning radius and right turning lane) and by strengthening of pavement. | | √ |
| 2) | Improvement with pedestrian crossings, Road marking, speed breakers, cat eyes etc. and transverse bar marking. | √ | |
| 3) | Improvement by providing footpath with guard rail | | √ |
| 4) | Provision of Islands, Median with median markers, kerb and drainage facility at junction. | | √ |
| 2.2 | Minor Junctions (39 no) | | |
| 1) | Providing pedestrian crossings, sign boards, cat eyes, speed breaker with strictly STOP sign on approach road. | √ | |
| 2) | Provision of minor improvement to shoulders and potholes and damaged road surface. | √ | |
| 3) | Improvement by geometric correction to sight distance, turning radius and matching the grade of connecting road with project road. (Improvement of Y type junctions to T type) | | √ |
| 2.3 | Railway Level Crossings (2 no) | | |
| 1) | Providing pedestrian crossings, sign boards, cat eyes, speed breaker with strictly STOP sign. | √ | |
| 2) | Provision of minor improvement to shoulders and potholes and damaged road surface. | √ | |
| 3) | Improvement by geometric correction to sight distance, turning radius and matching the grade of connecting road with project road. (Improvement of Y type junctions to T type) and improvement as per IRC: 39:1986 guidelines. | | √ |
| 3 | Cross Section and Road Damages (Total length Project Stretch) | | |
| 1) | Minor improvement to road damage by pothole filling, shoulder improvement with murrum etc. | √ | |
| 2) | Geometric improvement to road and strengthening of pavement by providing widening, paved shoulders, parking lane, right turning lane, stable side slope etc. | | √ |
| 4 | Road Side Hazards | | |
| 4.1 | Road Side Trees/ Electric Poles and Transformer etc. | | |
| 1) | Remove the road side hazards and providing clear shoulder. | | √ |
| 2) | Provision of hazard markers, reflector markers and shielded with protection devices. | √ | |
| 4.2 | Water Bodies 11 No) | | |
| 1) | Improvement with widening of road with retaining/ toe wall at pond or water bodies location. | | √ |
| 2) | Temporary guarding with locally available materials and alerting the road users by hazard sign boards. | √ | |
| 5 | Road side protection work/furniture | | |
| 5.1 | Structures (Bridge 2 No and Many Culverts locations) | | |
| 1) | The narrow structures shall be protected by metal beam crash barriers, road marking, Object hazard markers, sign boards, delineation, marking, cat eyes and painting on railing of structures. | √ | |
| 2) | Improvement by widening and | | √ |

| Sr. No. | Activity | Measures | |
|---|---|---|---|
| | | Short Term | Long Term |
| | reconstruction by correcting sharp bend and steep gradients at approaches of structures with all safety provisions. | | |
| 6 | Drainage and Cross Drainage Work | | |
| 1) | Improvement with providing built-up drains in builtups areas and surface / open drain/ earthen drain in rural or open areas. | | √ |
| 7 | Signs, pavement markings and delineation | | |
| 1) | The pavement marking, signs and delineation work on total project stretch. | √ | |
| 8 | Vulnerable road users (pedestrians, bicyclists, two wheelers and three wheelers, and animal drawn carts) | | |
| 8.1 | Built-up and Village Locations (52 no. of Major & Minor Villages) | | |
| 1) | Provision of facilities for vulnerable road users, raised pedestrian crossings (Special treatment), rumble strips making, pavement marking, speed restriction and sign boards. | √ | |
| 2) | Provision of Bus shelter with ramps, bus bays, truck lay bay, builup drains and pedestrian marking (special treatment), speed hump. | | √ |
| 8.2 | School/Colleges, Hospital, Govt. Offices and Temple Locations (39 No. of School & 2 no. of Hospitals) | | |
| 1) | Provisions of sign boards (speed restriction sign, information sign and warning sign), pedestrian marking (special treatment at vulnerable reach), guard rail. | √ | |
| 2) | Improvement by widening of road with paved shoulder, speed hum, raised pedestrian marking and speed restriction sign boards, marking and guard rail. | | √ |
| 9 | Access to property and developments (Many locations along total project stretch) | | |
| 1) | Improvement to eliminate the too many direct accesses by providing common access by connecting it to nearby minor or major junctions. | | √ |
| 2) | Alerting the road users by providing road marking, sign boards, speed humps etc. | √ | |
| 10 | Lighting and night time issues | | |
| 1) | Providing lighting facility for vulnerable road users at major junctions, builtup area, bus shelter and pedestrian crossing for vulnerable users. | | √ |
| 11 | General road safety considerations | | |
| 1) | Provision of road marking and No parking sign boards. | √ | |
| 2) | Improvement of road by widening with provision of parking lane and strengthening of pavement. | | √ |

## 3. CONCLUSIONS

The major and minor junctions need to be improved geometrically by providing suggested recommendations in this report with appropriate marking and sign boards as per IRC guidelines. The sharp horizontal curve with geometric deficiencies needs to be improved by improving the sharp horizontal curves. The road stretch does not contain any established black spot location, but have blind curves which can be treated as black spot location and that need to be rectified by improving it geometrically and as an immediate measures sign boards with pavement marking are recommended.

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