

## “Road Safety Audit: A Case Study for Beed Bypass, Aurangabad.”

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### **Abstract**

Road safety audit is formal procedure for assessing accident potential and safety performance in the provision of new road schemes, improvement and rehabilitation of existing road & in maintenance of roads. The primary role of audit team is to identify the potential problems of a highway project by conducting the site inspection & collecting data from various agencies. The role of auditor is to provide independent advice in the form of written recommendations. Road Safety Audit (RSA) recognizes & provides possibilities for improvement in safety for all road users. RSA prevents instance of accidents or to reduce it.[1]

The motive of the study is to determine the accidents prone areas on the road, to study the road stretch & know relation between accident rates & reasons of accidents. In this project, analysis of one of the major national highway of Aurangabad city will be considered. The location of interest is of Beed By-pass road from Mahanubhav Ashram (T- point of Paithan road) to ZaltaPhata which is a stretch of 13.150 km.

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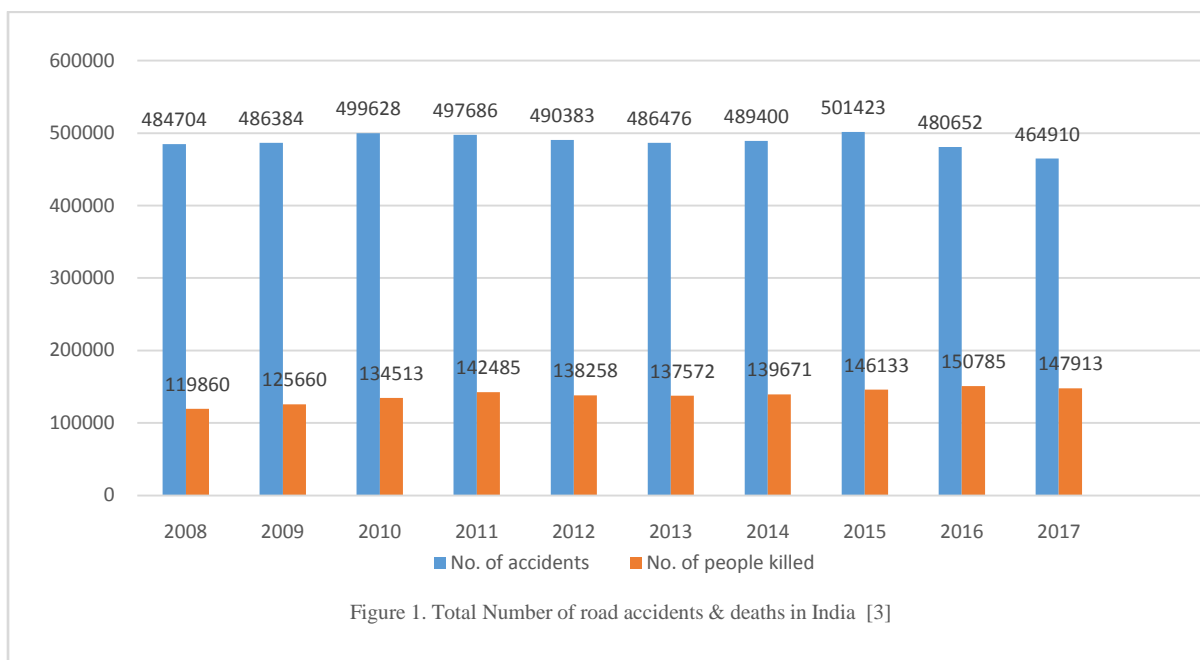
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### **I. Introduction**

The road network of India is one of the largest in the world, spanning over 5.5 million km. 64.5% of all goods in the country is transported via this roads and 90% of the country's total passenger traffic uses road network.[2]The road traffic is estimated to be growing at an annual rate of 7-10 per cent, while the vehicle population is growing at a rate of 12 per cent per year. The road transportation increases year by year, but the rate of road crashes also increases with it. India is one of the developing countries, where the rate of road crashes is more than the critical limit. Road traffic injuries continue to be one of the leading causes of death, disabilities and hospitalization in the country. The accident records are supposed to provide the clue about deficiency in the road, vehicle and user systems to explain the causes of accidents and to develop remedial measures.

In 2015 number of road accidents were highest, then it decreased gradually up to 2017 but still there is need to minimize the number of road accidents in India.

In this analysis of one of the major arterial street of Aurabgababad city will be undertaken. The location of interest for the analysis is Beed By-Pass Road from Mahanubhav Ashram (T- point of Paithan road) to ZaltaPhata.



## II. Problem statement



Figure 2. Google map image of Beed Bypass.

Beed bypass road from Mahanubhav Ashram (T- point of Paithan road) to ZaltaPhata a stretch of 13.150 km. This road is a part of NH-52 (NH-211). Beed bypass was constructed in 2003 to allow the vehicles cross the Aurangabad city without entering the city but with the course of time various residential areas and institutes are developed along this road due to which local traffic is also added to the traffic flow which led to increase in number of road accidents. In the 14 years since this bypass was constructed, 102 people have died.

## III. Scope of work

The scope of the study is to reduce accidents on road network, reducing severity of accidents and the need for costly remedial work is reduced. The accident analysis will be done from previous year's data. The aim of this project is to collect and analyze the data, identifying the black spots and proposing some remedial measures to reduce the possible accidents.

## IV. Objective of study

The first object of carrying Road Safety Audit on Beed pass road is to increase safety for the users. Each accident calls for systematic study in a scientific manner and detailed investigation of the accident spot. This type of investigation will help to identify some of the causative factors responsible for accidents and to give relative importance. The results of the study could be employed advantageously to take up preventive measures to reduce the accidents.

The objectives of the present study are:

- 1) To collect the traffic intensity and description of Beed by pass road from Mahanubhav Ashram (T- point of Paithan road) to ZaltaPhata.
- 2) Identification of accident prone areas on the Beed Bypass road from First Investigation Report.
- 3) To identify defects and conflict points on the road network which cause accident.
- 4) To identify safety influencing parameter in reducing accidents rate.
- 5) To study the effect of roadway geometrics and traffic conditions on this road stretch.
- 6) To study the causes of accidents and suggest corrective measures at potential location.

#### **V. Checklist for safety audit at junctions [1]**

- 1) Is the general layout of junction caters safely for all road users including disabled road users? (Check whether there are other junctions too close to it. Check whether approaching drivers will get a clear view of it. Check with respect to pedestrians, cyclists and two wheelers etc.).
- 2) The type of junction (T-type, staggered, signal controlled, roundabout) suitable for the function of the two or more roads, the traffic volume, the traffic movements (pedestrians and vehicular) and the site constraints? Is it safest alternative?
- 3) Is the layout of the junction adequate for all permitted vehicular movements and for all types of vehicles?
- 4) Does the layout encourage slow controlled speeds at and on the approach to stop/ give way lines and other critical decision points? (Check for Y and skew junctions, which can be a problem. Also roundabout with inadequate deflection?)
- 5) Is there adequate provision for channelizing the different streams of traffic? (Check the provision for right turn lanes, deceleration lanes and acceleration lanes?)
- 6) Is adequate provision made for pedestrians and non-motorized vehicles?
- 7) Is the provision of night-time lighting adequate, if not what are the deficiencies?
- 8) Are junction(s) at that stretch having proper markings, signs and studs to avoid accidents?

#### **Signal-Controlled Junction**

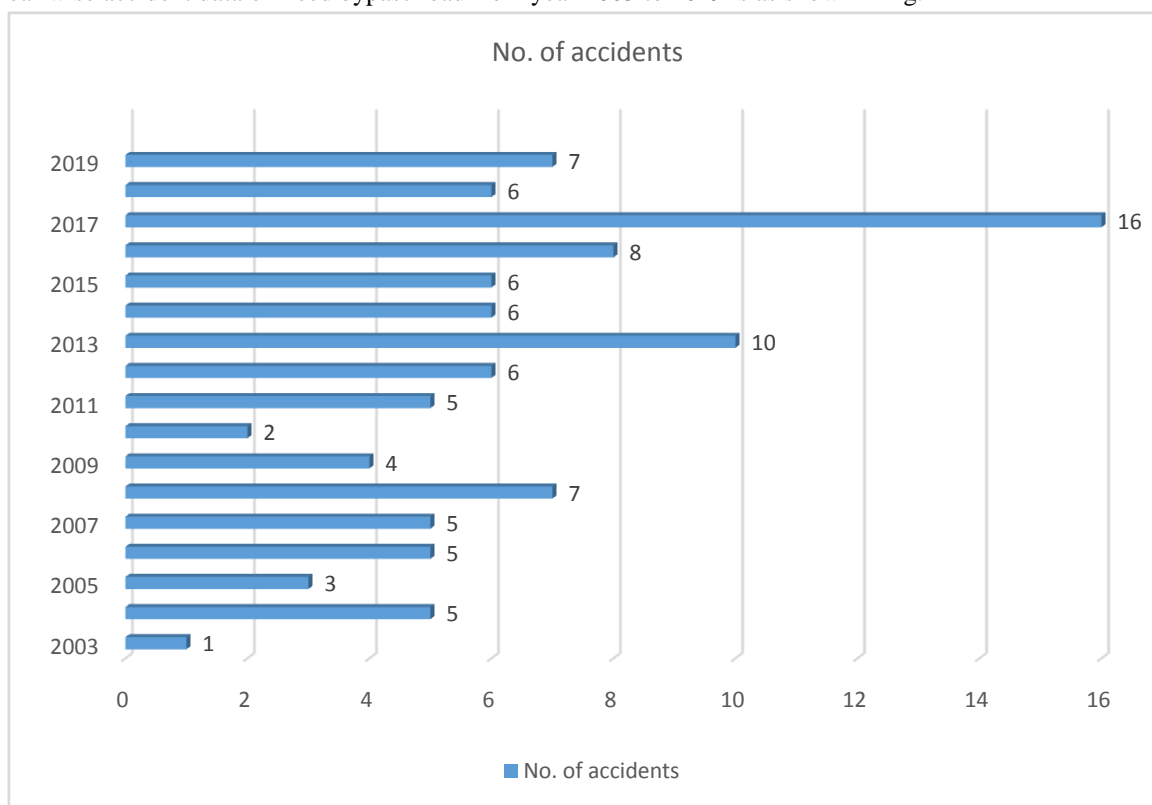
- 1) Does the signal sequence confirm to the requirements of the regulations and standards?
- 2) Do the signals clearly indicate which movements are allowed at any one time? Are the timings of various phases of signal cycle adequate?
- 3) Are the signal heads positioned so that drivers can see them easily, and in time to react (stop or go)?
- 4) Are all right turning movements protected as far as possible?
- 5) Does the signing; marking and channelization make it clear to drivers what path they should take through the junction?
- 6) Are the pedestrian signals positioned so those pedestrians can see them?

#### **Vegetation and Plantation**

- 1) Is there clear space for vision of drivers?
- 2) Is the vegetation/plantation at the corners of the junction retracted for enough back from the edge of the shoulders to afford clear view of approaching traffic to the driver?
- 3) Are there no branches of trees projecting over the road berks/pavement at a height less than 7 m?

**VI. Data collection**

Year wise accident data of Beed bypass road from year 2003 to 2019 is as shown in fig.



**Figure 3.**Number of accidents on Beed Bypass

**Table 1.** Accident classified according to nature of accident.[5]

Sr. no	NATURE AND ACCIDENT	FATAL	GRIEVIOS INJURY	MINOR INJURY	NO INJURY	TOTAL
1	Hit and run	4	9	1	0	14
2	Pedestrian	1	6	0	1	8
3	Hit from back	7	8	5	7	27
4	Hit from side	2	2	1	1	6
5	Run off road	0	0	0	2	2
6	With animal	1	0	0	0	1
7	Fixed object	0	0	0	0	0
8	With Parked vehicle	0	0	0	0	0
9	Vehicle overturn	0	0	0	0	0
10	Head on collision	0	0	0	0	0
11	other	0	0	0	0	0
<b>Total</b>		15	25	7	11	58

**Table 2.** Accident classified to type and traffic violation.[5]

Sr. no	Type of traffic violation	Fatal	Grievous injury	Minor injury	No injury	Total
1	Over speeding	10	17	4	9	40
2	Drunken driving	0	2	0	0	2
3	Driving on wrong side	3	5	3	2	13
4	Jumping red light	0	0	0	0	0
5	Use of mobile phone	0	0	0	0	0
6	No violation	0	0	0	0	0
7	Not known	2	1	0	0	3
<b>Total</b>		15	25	7	11	58

### VII. Traffic Count

Traffic volume was collected manually by counting the number of vehicles passing, on a pre-determined location.

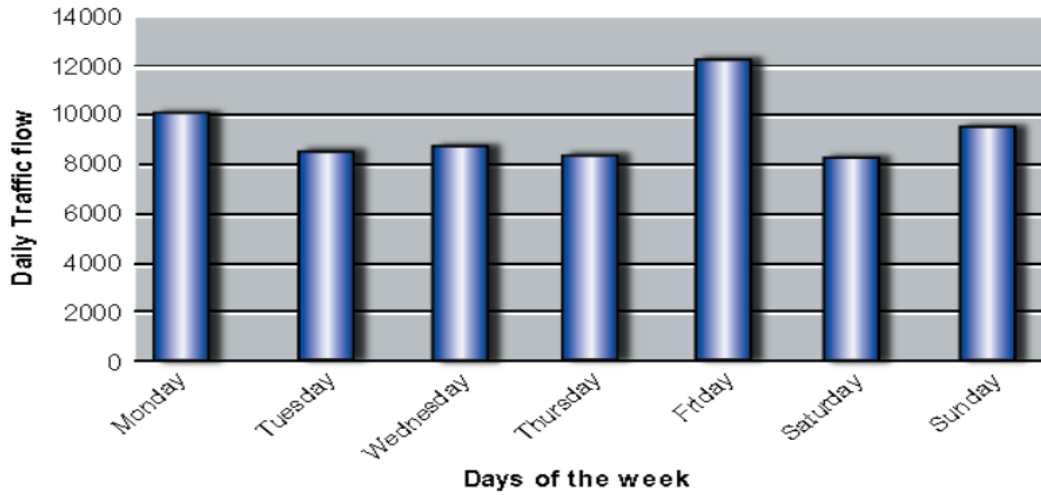


Figure 4. Bar chart: Daily traffic flow Beed bypass road

[1] MIT Chowk

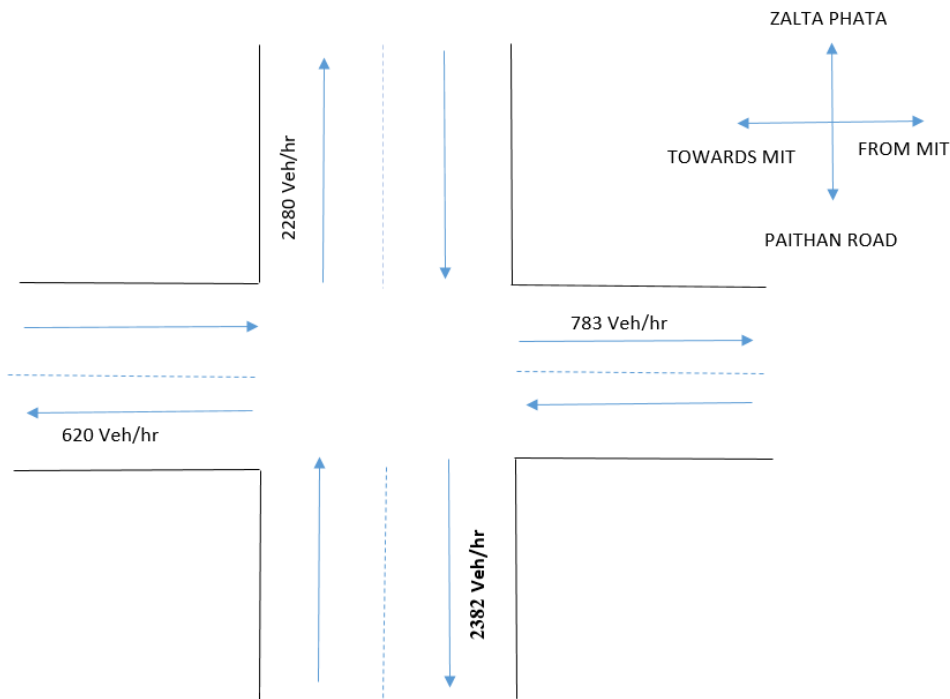


Figure 5. Traffic count at MIT Chowk

[2] Deolai Chowk

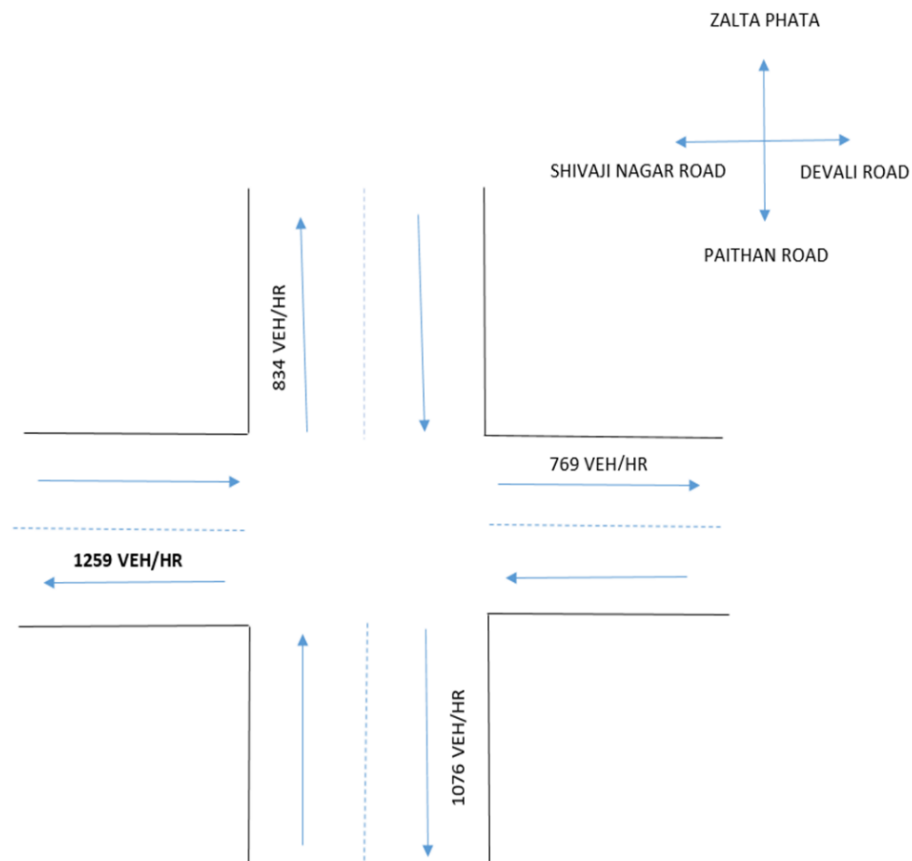


Figure 6. Traffic count at Deolaichowk

## VIII. IDENTIFICATION AND STUDY OF BLACKSPOT

### MIT Chowk

It is an institutional area, as a result there is presence of large number of students in day time. Also at that point there is gradient which eventually make the vehicle reach the junction at high speed. There is not enough set back distance available at the while turning from MIT college. All these factors lead to accidents.

### Deolai Chowk

Deolaichowk is one of the most crowded junction in the Aurangabad city. It is famous for road accidents as many accidents occur at this chowk. These accidents generally occur between Heavy vehicles like Trucks and Motor Cycles. The road going towards Shivaji Nagar has a railway crossing and whenever the this road is closed for the crossing of train then the traffic on this road jams up to the Deolaichowk making it more congested for the other traffic at the chowk.

## IX. REMEDIAL MEASURES

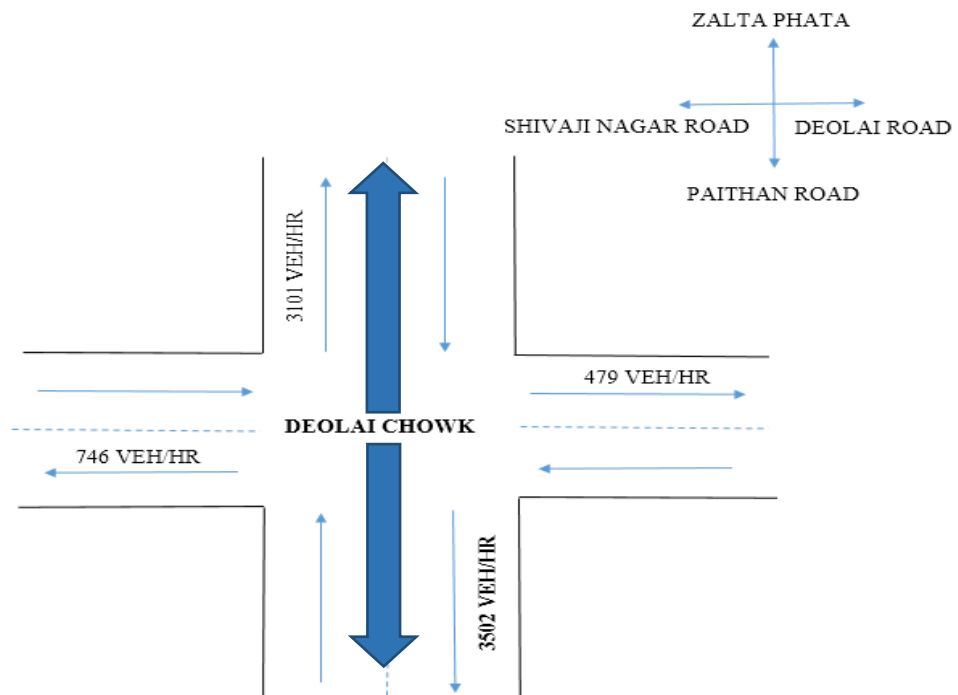
### Immediate measures to be taken:

1. Hazard marker to be provided.
2. Shrubs in shoulders to be removed.
3. Repairs of railing on culverts to be carried out.
4. Pavement marking is to be provided.
5. Median gap to be closed.
6. Hazard marker shall be provided at the parapet ends of the CD works.
7. Near MIT college speed breakers to be provided across full width of pavement.
8. Pavement marking at the junction including pedestrian marking.
9. Hazardous marking at central pole.
10. Speed breaker shall be extended to full width of the pavement and shall be marked.
11. No. of electric poles close to the road need to be shifted.

## LONG TERM MEASURES

### 1) Deolai Chowk

Provide flyover on the given direction.



### Advantages of flyover

- 1) No obstruction to heavy vehicles.
- 2) During railway gate signal the vehicle travelling on Shivaji road occupy almost all portion of lane, causing obstruction to vehicles travelling from Paithan to Zalta can be solved.
- 3) Easy accessibility for local people and vehicles.
- 4) Minimized the conflicts points.
- 5) Ultimately reducing accidents at that points.

### 2) MIT Chowk

Provide vision triangle at the sharp edges of turnings.

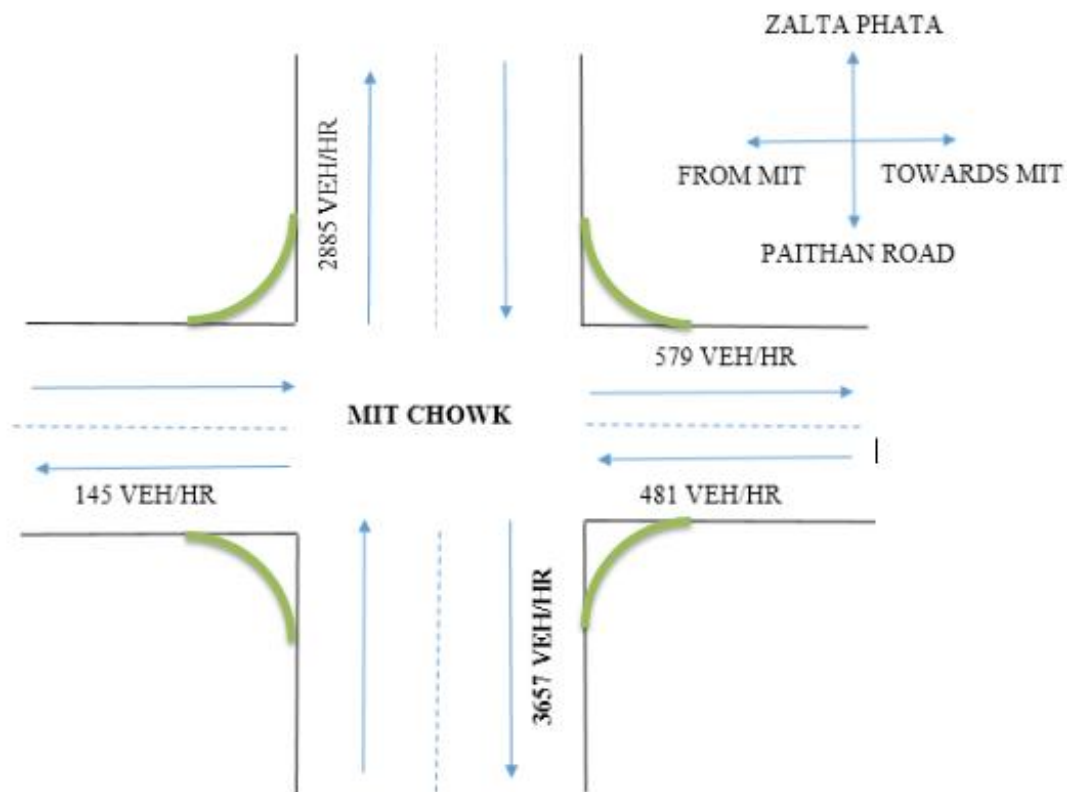


Figure 8. Provision of Vision Triangle

#### Advantages of Vision triangle

- 1) The vehicles going from Zalta to Paithan can see the incoming vehicles from MIT college easily which can help to avoid accidents.
- 2) Sufficient stopping sight distance will be available for the vehicles.
- 3) Accidents at merging and diverging conflicts point will be reduced.

#### X. CONCLUSION:

This report presented a road safety audit that highlighted issues in safety management. It examines the defects in the road safety in relation to motorized traffic. It suggested the various recommendations which are easy to do and are economical. The audit is applied to the risks outside the framework of standards and codes.

The accident data, traffic volume and field observations shows the risk involved while travelling on the road. Also it gives the information about causes of accidents and vulnerable road users.

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