

A Project work on

ROAD SAFETY AUDIT ON STATE HIGHWAY 19 FROM MANNEGUDA TO SAGAR RING ROAD.

A PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF BACHELOR OF ENGINEERING IN CIVIL ENGINEERING.

By

S. Rakesh (160118732037)

G. Goutham Anand (160118732029)

K.V.B.S. Bharath Chandra (160117732023)

Under the guidance of

**Sri G. Viswanath**

**(Assistant Professor, CED)**



DEPARTMENT OF CIVIL ENGINEERING  
CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)  
Gandipet, Hyderabad-500075  
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DEPARTMENT OF CIVIL ENGINEERING

**CERTIFICATE**

This is to certify that the project work entitled, "**Road Safety Audit on State Highway 19 from Manneguda to Sagar ring road**" is a bonafide work carried out by

S. Rakesh (160118732037)

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In the partial fulfilment of the requirements for the award of BACHELOR OF ENGINEERING in CIVIL ENGINEERING by the OSMANIA UNIVERSITY during 2013-2017 session at the CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY is an authentic work carried out by them under my supervision and guidance. To the best of our knowledge, the matter embodied in the thesis has not been submitted to any other University/ Institute for the award of any Degree or Diploma

**Sri. G Vishwanath**

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Department of Civil Engineering

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## DECLARATION

We (**S. Rakesh, G. Goutham Anand, K. Bharath Chandra**) students of Bachelor of Engineering, final year, Civil Engineering department, Chaitanya Bharathi Institute of Technology(A), declare that the project entitled "**ROAD SAFETY AUDIT ON STATE HIGHWAY19 FROM MANNEGUDA TO SAGAR RING ROAD**" has been independently carried out under the esteemed guidance of (**Sri. G Viswanath**), Asst Professor, Department of Civil Engineering, CBIT(A). This work has been submitted in partial fulfilment of the requirement for the award of Bachelor of engineering in Civil Engineering by Osmania University during the academic year 2021-2022

Signature of candidates

1. S. Rakesh (160118732037)
2. G. Goutham Anand (160118732029)
3. K.V.B.S Bharath Chandra (160117732023)

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## **ABSTRACT**

According to MORTH, India has a road network of an estimated 3.3 million km which is continuously increasing carries nearly 65 percent of freight and 85 percent of passenger traffic. 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 percent per year.

A Road Safety Audit (RSA) qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. The Road Safety Audit consists of safety principles to the design of a new or a rehabilitated road section, to prevent frequent occurrence of accidents or to reduce their severity.

In this project, analysis of one of the major stretches of state highway 19 will be undertaken. The location of interest for the analysis is from Manneguda to Sagaringroad. The roadway carries considerable amount of traffic throughout the day and it has number of conflict points such as merging of traffic from flyover. A detailed analysis of stretch will be carried out from the point of view of safety and supplemental analysis regarding the traffic growth and accident analysis will also be performed.

From this project we have identified deficiencies and suggested mitigation strategies to improve the safety at intersections.

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# CHAPTER -1

## INTRODUCTION

Road fatality rates in India are probably among the highest and out of 1.25 million deaths worldwide every year, 8-10 per cent of all road deaths are in India. The road system and the traffic operations in India are deficient in safety management. One of the reasons for this situation is that there is very little opportunity to learn from the past mistakes. 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. This road safety management system is poor in India, with untrained police officers collecting only incomplete records of fatal accidents and always stating the road user's fault as the cause of the accident. In a road environment where the road designs, knowledge of traffic rules, traffic control and policing (enforcement) are responsible for the accident. In a deficient road and traffic environment, causes are related to poor road geometry and poor traffic control aggravated by poor traffic sense.

A **Road Safety Audit (RSA)** qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. The Road Safety Audit consists of safety principles to the design of a new or a rehabilitated road section, to prevent frequent occurrence of accidents or to reduce their severity.

Road safety audit is tool for the improvement of road safety and to recognize potentially dangerous spots on the roads which includes highways, includes on highway, and propose remedial measures. It is a systematic approach for evaluating of new and existing roads by an independent team at different stages of planning, design, construction, operation, and maintenance to achieve accident-free roads and to increase overall safety performance. JSRPRCD [2012]: defined road safety audit as formal procedure for assessing accident potential & safety performance in the provision of new road as well as maintenance, improvement, rehabilitation of existing roads. AUSTROADS [2002]: describes it is a formal examination of a future road or traffic project or an existing road, in which an independent, qualified team report on the projects crash potential and safety performance. ADB [2003]: defined RSA as systematic procedure for accessing the road safety of roads and road schemes.

### 1.1 Safety Problem in India

Growth in urbanization and in the number of vehicles in many developing countries has led to increased traffic congestion in urban centres and increase in traffic accidents on road networks, which were never designed for the volumes and types of traffic, which they are now required to carry. In addition, unplanned urban growth has led to incompatible land uses, with high levels of pedestrian-vehicle conflicts. The drift from rural areas to urban centres often results in large number of new urban residents unused to such high traffic levels. As a result, there has often been a severe deterioration in driving conditions and a significant increase in the hazards and competition between different classes of road users. In addition, the inherent dangers have

often been made worse by poor road maintenance badly designed intersections and inadequate provision for pedestrians. All of these have contributed to the serious road safety problems in developing countries like India. It has been estimated that over 3 lakh persons die and 10 to 15 million persons are injured every single year in road accidents throughout the world. Road accidents in developing countries are a cause for growing concern and road accidents cost around one percent of Annual Gross National Product (GNP) resources of developing Countries, which they can ill afford to lose.

## **1.2 Accident Scenario in India**

Road accident Studies have indicated that accident rate in developing countries are high compared with those in developed countries. The spectacular growth in the Road Transportation Sector in India has been a key element in the economic development. In the country, more than 80-90 thousand people die and nearly 4.5 lakhs persons are injured in road accidents every year. India's motor vehicle population is just 1.5% of the worlds, but her share of world road traffic accidents is 6%. Even though it can be observed that the accident rate has been steadily increasing over the past 25 years, the accident rate is still very high compared to the developed nations. In India, according to UNESCO 1,37,423 accidents have been occurred where 16 children die on Indian roads daily and one death occurs every minute. Totally 1214 road crashes occur every day in and two wheelers account for 25% of total road crash deaths. to be known 377 people die every day which is equivalent to a jumbo jet crashing every day. Two people die every hour in road accidents.

## **1.3 Road Condition and Traffic Safety**

The effect of road conditions in road safety to date is still underestimated. On the basis of widespread scientific research involving analysis of road accidents and a study of how vehicles are driven under different road conditions, it will be probable for the highway engineer to establish the effect of road conditions on accidents. The main road conditions that contribute to accidents are:

1. Road Width
2. Width and state of shoulders
3. Width of the median
4. Grades
5. Deficiency in sight distance.

## OBJECTIVES

### The Objectives of Study are:

- To study road safety characteristics of selected stretch from Manneguda (0+000Km) to Sagar ring road (15+000Km) part of state highway19.
- To study about the impact of roadway geometrics and traffic conditions on the highway.
- Identify design imperfections and recommend improvements.
- Identification of accident-prone regions on the highway.

### Site Selection for Study Area:

- Portion of SH 19 - FROM CHAINAGE 0+000 TO 15+000 km from MANNEGUDA to SAGAR RINGROAD.
- The current stretch has been selected since this stretch will be a part of Memorandum of Understanding (MoU) between CBIT and NHAI(National Highways Authority of India).

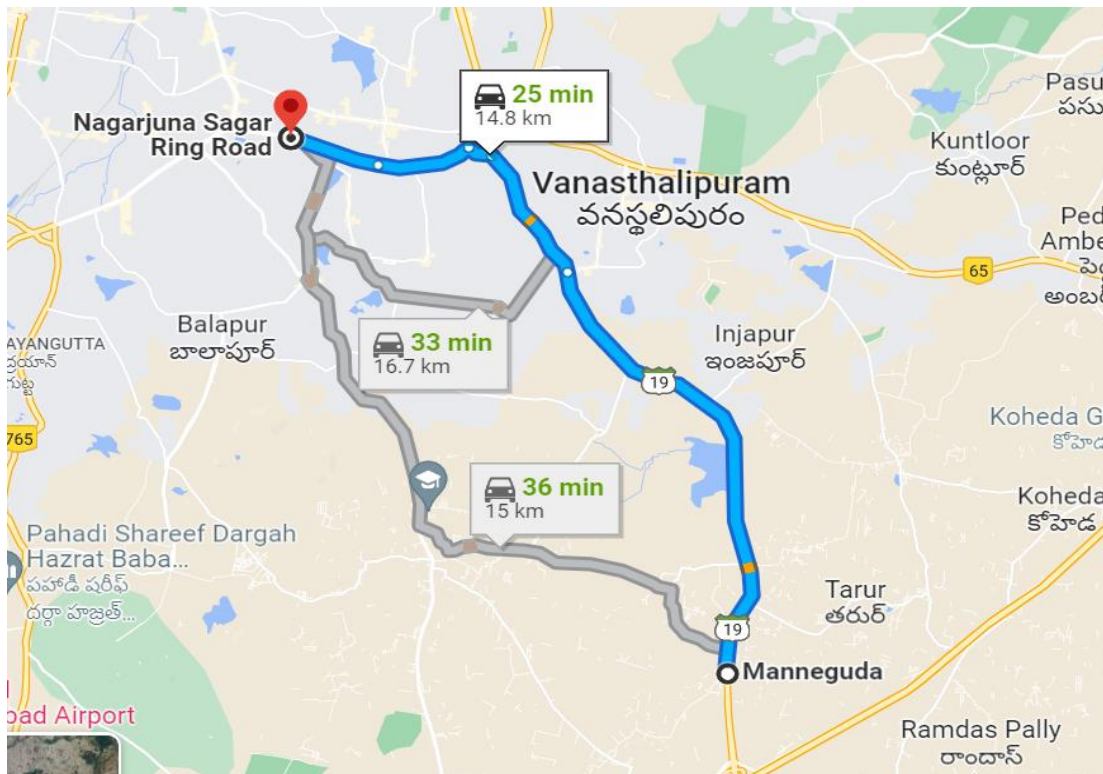


Fig.1: Location Map of Study Area

## **CHAPTER -2**

### **LITERATURE REVIEW**

#### **2.1 General**

A literature review is a type of review article. A literature review is a scholarly paper that presents the current knowledge including substantive findings as well as theoretical and methodological contributions to a particular topic. Literature reviews are a basis for research in nearly every academic field.

The literature reviews of some journals regarding the present topic of road safety audit on a selected stretch of highway are presented below.

#### **2.2 Review of Literature**

##### **“Road Safety Audit: A Case Study for Wardha Road in Nagpur City”**

**Manish. D. Katiyari, Prof. S. D. Ghodmare** had done road safety audit on Wardha road to ensure increased safety for the users. By performing various tasks like collecting traffic and road inventory of Wardha Road and collecting Accident Data and performing accident data analysis, they have made some conclusions by examining the data. They have aimed to Minimise the risk of accidents occurring in the future because of planning decisions on new transport infrastructure schemes, Reduce the risk of accidents occurring in the future because of unintended effects of the design of road schemes. Reduce the long-term costs associated with a planning decision or a road scheme.

##### **Road safety audit: a case study on NH-65**

**Tummala Bharat Kumar, Chukkapalli Jeswanth Chowdary** had done a case study on the four lane National Highway-65, and they have drawn some conclusions by analysing data. The conclusions are road markings, condition of shoulder, condition of carriageway and median opening are the factors for causing accidents on the NH-65.

It also observed that the moderately moving vehicular traffic is generating traffic problems for the fast-moving vehicular traffic as it generally occupies innermost lane of national highway. Along this four-lane national highway, service roads need to be provided to isolate slow moving vehicular traffic from fast moving vehicular traffic. All the unauthorized gap-in-median should be closed and necessary provisions like foot-over bridges to be provided for the local neighbourhood to cross the national highway on the priority basis. All undeveloped minor and major crossings should be developed with necessary lighting provisions such that the accident rate can be decreased along the surveyed areas. Footpath for the pedestrian need to be developed near the habitant areas, industries, educational institutions and to be properly maintained wherever it is there, and the guard rail need to be provided along the entire length of the footpath. Facilities for the differently abled people at bus stops need to be developed on **the NH-65.**

## **Accident Analysis of Anandapuram to Anakapalli Stretch via SH-38**

**S. Naveen Kumar, CH. Deepika** had done road safety audit on SH-38 from Anandapuram to Anakapalli. From the Accident Analysis, they have concluded that the accidents are occurring almost uniformly during day as well as night hours, but severity index is very high wheelers and trucks in the night hours. This may also be attributed to poor illumination and absence of warning measures such as delineation and retro-reflective material. From the analysis that two contribute to majority of accidents. This is mainly because of the discontinuous service road leading to wrong side movement of traffic in order to avoid long detours. Poorly designed access roads from the adjacent areas of the highway are also leading to frequent conflicts between local traffic (mostly two wheelers) and through traffic (goods vehicles).

## **Road Safety Audit & Remedial Measures-A Case Study of SH-55**

**Patel Savankumar, et al.** had done a case study on SH-55. They collected traffic volume, Accident data from various sources and drawn some conclusions from the data. Some of the conclusions are, Delay is noted specially in congested areas while as in straight roads in rural area the delay reduces and speed increases, which may pose a threat to life in mishaps. The drivers are having the tendency to move closely to the front vehicle without realizing that to avoid accidents minimum 3 seconds time for reaction is needed i.e., distance required depends on speed if it is 60 kmph then minimum distance required for safe stopping sight distance is 80 m but the fact is that drivers are tailgating which even more contributes to honking horn too. Also, the dire need of overtaking is also observed for which the drivers require minimum 300 metres for safe overtaking but still the violations are noted. The local authority should lay police enforcement at such places also no overtaking signs should be provided where risk factor is very high.

## **Road Safety Audit for Four Lane National Highways**

**Dr. S. S. Jain, et al.** developed a methodology for Road Safety Audit for four lane National Highways. They had examined safety features adopted in the selected section of four lane National Highway-58 and find out deficiencies in the road network which led to accident and safety hazards to road users. Based on the study of road safety audit for 4 lane national highways the following conclusions they had drawn are, due to newly upgraded four lane National Highway-58 between Km 75.000 to Km 130.00, the road standards have been raised suddenly. But other related factors are not brought to this level such as road user behaviour, surrounding prevailing conditions etc. The road standards there are permitting high speeds, but prevailing traffic conditions are not conducive to such speeds. Earlier the average speed of vehicles was 30-40 Kmph and now 60-70 Kmph whereas design speed is 100 Kmph which is very high. From data simulation, they found that Road Markings, Condition of Shoulder, Traffic Volume, Spot Speed, Median Opening and Carriageway condition were main

parameters for causing accidents. It was also seen that slow moving traffics were creating traffic hazards for fast moving traffic as it always occupied the innermost lane of highway. Therefore, service roads should be provided for the entire length of four lane roads to separate slow moving traffic from fast moving traffic. All unauthorized median openings should close and adequate provisions for crossing local people be made on priority. All undeveloped major and minor intersections must be developed with adequate lighting provisions as quickly as possible since maximum accidents were observed on these locations. Pedestrian guardrail should be provided all along the footpath of service road and at bus stops.

## **Road Safety Performance Audit for National Highway-44**

**Preethi S, et al.** studied about audit on National Highway-44. Based on road inventory survey which is aggregation of data about the status and situation of the road system, they have made conclusions which are as follows. From the classification of accidents according to fatal and non-fatal, it is witnessed that a larger number of accidents have happened among male road users. Streets lamps were provided along the whole stretch but most of them doesn't work which could be a cause of night accidents. Control devices such as traffic signs and road markings are not maintained properly. Lighting at main junction along the stretch were not provided, resulting in difficulty at night driving. Barricades were dismantled and destroyed and no repairing for the roadside facilities were not seen. Along the stretch of road, even though pedestrian count was more, no facilities for pedestrians to cross are provided except zebra crossings at few locations. Traffic island at Rani Junction is a must to be provided as the junction connects to road on all four directions. Lighting at Devanahalli Junction and Chikballapur Junction which is the main junction along the stretch were not provided.

### **“Road Safety Audit”**

**Arun S Bagi, Dheeraj N kumar** are the authors for the audit on Bannerhatta road and collected data for four years and by analysing the data, they have made some findings regarding accidents, spot speed studies.

More number of accidents have occurred during 2011. No definite trend is observed with month wise distribution, the accidents have occurred all through the year. Majority of accidents have occurred during 8am to 12pm and 4pm to 6pm of the day and it is difficult to explain the particular trend. Analysing kilo meter wise accident occurrence has shown that KMS 0 to 1 and 2 to 3 have shown higher accidents.

The study stretch has very low pedestrian safety. The accident reasons for low pedestrian safety are Sight distance problem, driving vehicles on footpath, People standing on the road near bus stand. Improper footpaths, trees on the median.

## **Traffic Safety and City Public Transport System: Case Study of Bengaluru, India**

P. S. Kharola, Geetam Tiwari, and Dinesh Mohan had done a case study of Bengaluru and collected data and by analysing the data, some findings have been drawn regarding road traffic crashes. The conclusions are, In this paper through a micro-analysis of fatal crashes, has attempted to find patterns in the crashes involving public buses. While some of the findings fortify the existing understanding of

the causes of crashes, the study has, nonetheless, provided empirical evidence for it. The analysis has provided a very useful input to policy makers who could take corrective steps and consequently reduce the number of such fatal crashes. The paper establishes that change in bus design with low floors, automatically-closing doors, safer bus fronts, and segregated infrastructure for bicycles and pedestrians would go a long way in reducing the number of fatal crashes on city roads involving public buses.

### **Road Safety Analysis : A case study of Patna city**

Sanjay kumar singh, Ashish Misra had done a case study on patna city by collecting data regarding traffic data ,accident data ,black spots regions in the city and some conclusions have drawn from the data .They are as one would expect ,patna is suffering from deaths and injuries on its roads.The total fatal accidents as well as related fatality in the city is increasing over the years. Persons killed per 100 accidents are alarmingly high, as high as during the year 2000. Although the fatality rate is very low in patna city, fatality risk is higher than Indian average. Pedestrian deaths as a percentage of all road fatalities are extremely high in the city. During the recent years, they constitute more than 90% of all road fatalities. Since both adult age working group and pedestrian constitute a large portion of road accident fatalities, it is believed that the vast pedestrian casualties occur to the economically active cohort (18 to 60 years).As far as vehicle accident rates are concerned ,buses are most risky .On an Average, they are causing 16 accidents per thousand buses per annum. In general, trucks and three-wheeler vehicles are the second and third risky vehicles, respectively. Furthermore, the city traffic police have identified few accident prone location on the basis of severity and frequency of accidents. From the year 2000 onwards, new bypass road on national highway-38 is considered to be most accident prone location where around 15% of the all accidents occur during recent years.

### **ROAD SAFETY AND ROAD SAFETY AUDIT IN INDIA: A REVIEW**

Abdul Rahoof, Bipin Kumar Singh had done an audit about road safety in India. Audit on based on the existing roads in India in major cities. Security Audit can be connected to new roads, Existing or built Roads. Road safety review is an essential means for giving careful consideration to road safety amid the configuration of road plans. This unequivocal consideration ought to help everybody required in settling on choices with respect to changes to road base to survey the safety ramifications of the numerous decisions that emerge amid the outline procedure, and accordingly build the road safety familiarity with base organizers, fashioners and powers.

### **Road Accident Analysis: A Case Study of Vidisha City**

Chitra Yadav, Ankita Tiwari had done a case study of Vidisha city. Collection of data regarding road accidents is taken and distribution of accident data in to accidental deaths, accident severity index ,fatality distribution by age has made. The conclusion from this case study is the road traffic accidents are a major but undervalued global problem. Transportation facilities in India are incompetent and degrading year by year. Problem of providing medical aids instantly or inadequacy of medical facilities increases the number of death rates in the country. It has been observed that death rates per thousand vehicles have decreased slightly from 1.4 in 2009 to 0.9 in 2013, as the vehicles in India is increased by 78.0% and the amount of road accident has increased by 51% during the same period. The existing transportation system of Vidisha is

mixed type system. Transportation system in Vidisha is majorly constituted by local minor streets and roads heavily congested.

### **Accident Study to Analysis the Traffic Conflict Areas of Jaipur City.**

Mr Teekam Singh, et al had done a case study on Jaipur city by collecting accident data registered in police station. Based on the data collected some conclusions follows, the Problem of deaths and injuries as a result of road accidents in Jaipur city is serious enough to demand attention respective administrative authorities. Apart from the humanitarian aspects of reducing road deaths and injuries, A strong case can be made of reducing road crash deaths or economic rounds Alone. It is estimated 60% of all registered accidents occurred between 06:00 To 17:59 hrs (Daylight Hours) And 54% of all registered accidents involved minor injury accidents. The most involved road users in an accident are M2Ws (34%) followed by Cars (33%). The most affected road users in an accident are M2Ws(52%) followed by pedestrians (33%). From the data of recent year, the rate of accident in Jaipur has been increased.

### **2.3 Conclusion of literature review:**

From the above literature review it can be concluded that road safety audit is an important part of pavement management and maintenance. In this regard this study has been taken in order to fulfil the requirement of SH19 starting from manneguda to sagar ring road.



## **CHAPTER -3**

### **METHODOLOGY**

In this project, A stretch of 15km of state highway19 has taken. The selected stretch is from Manneguda to Sagar ring road having considerable amount of traffic. Initially accident data was collected from various police stations along the study area stretch from Manneguda junction CH 00.00 km (SH-19) to Sagar ring road junction CH 15.00 km (SH-19). The data obtained for the stretch under study is obtained from 2 different police stations falling in the jurisdiction of study stretch. The road inventory survey data is carried out which gives the details of the existing road facilities on the selected stretch on SH-19. The SH-19 stretch from Manneguda Junction (CH: 00.00Km) to Sagar ring road Junction (CH: 15.00Km) and is having residential and commercial land uses along the road sides. In Road inventory survey was various parameter taken into consider of road geometry like existing roadway width, sign, signal, marking, and shoulders width, bridges, etc. Data has been collected by visiting the stretch in four-wheeler vehicle during weekend day. Detailed analysis for every 1 Km regarding geometric aspects has done and images indicating the deficiencies along the stretch are collected.

### **3.1 Salient Features of the Study Segment**

The width of main carriageway is of 7.00m with 1.50m earthen shoulder on both left and right carriage way of the highway. The width median is 1.5m and raised type in general. Road infrastructures details are as under:

<b>Sr. No</b>	<b>Salient Features</b>	<b>In Total Number</b>
1	Major Junctions	10
2	Signalized Junctions	4
3	Unsignalized Junctions	6
4	Major Bridges	1

**Table 1. Salient Features of Study Area**

## DETAILS OF ROAD ACCIDENTS IN TELANGANA

YEAR	January - December		
	No.of Accidents	No.of fatalities	No.of Injuries
2014	20078	6906	21636
2015	21252	7110	22948
Grow Rate	<b>5.8</b>	<b>3.0</b>	<b>6.1</b>
2016	22,811	7,219	24,217
2017	22,475	6,595	24,017
Grow Rate	<b>-1.5</b>	<b>-8.6</b>	<b>-0.8</b>
2018	22,230	6,603	23,613
2019	21,588	6,800	22,265
Growth Rate	<b>-3%</b>	<b>3%</b>	<b>-5.70%</b>
2020	19,164	6,668	18,745
Growth Rate	<b>-11.23</b>	<b>-1.94</b>	<b>-15.81</b>

Table 2 : Road Accidents Data in Telangana

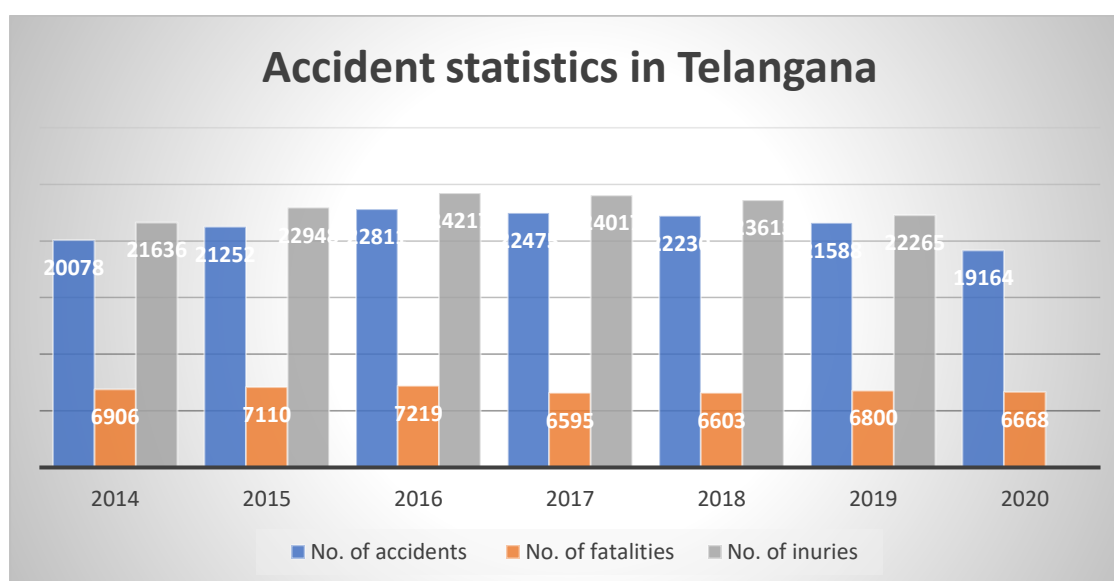


Fig.2: Accident statistics in Telangana

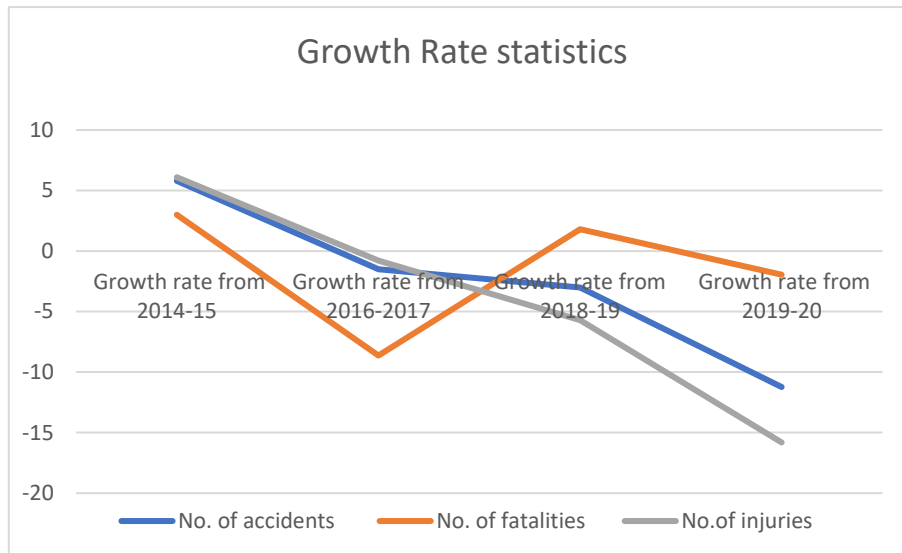


Fig.3: Growth Rate statistics

## ACCIDENT SCENARIO IN THE STUDY STRECH

To assess the accident scenario, it is very much necessary to collect the accident data. In this regard, accident data was collected for the year 2020-21 from the concerned police stations, who are responsible for recording and maintaining of accident data.

The accidents distribution during different hours in a day evident that the number of accidents are slightly more in the day because of heavy traffic conditions. The severity index (ratio of number of people killed to the total number of accidents) is high in night hours when compared to the day hours. From the accident analysis, it indicates that the accidents are occurring almost uniformly during day as well as night hours but severity index is very high in the night hours. The accidents are very less compared to the previous years because of impact of covid-19 on traffic. Most of the data that we have collected regarding accidents are non-fatal accidents .

**Number of accidents registered on the SH-19 from Manneguda to Sagar Ringroad in the year 2018 are 20.**

*8-accidents were caused by the heavy vehicle.*

*5-accidents were caused by the cars.*

*4-accidents were caused by the two-wheelers.*

*3-accidents were caused by the three-wheelers.*

**Number of accidents registered on the SH-19 from Manneguda to Sagar Ringroad in the year 2019 are 23.**

*9- accidents were caused by the cars. In which*

- 3 cases of rash driving were registered in which one case is after they injured four people who were crossing a road near sagar ringroad.

*4- accidents caused by 2 wheelers.*

- The accident occurred when a bike crossed through gap in median and hit the pedestrian.

*9- accidents caused by heavy vehicles.*

*1- accidents caused by Auto-rickshaw.*

**Number of accidents registered on the SH-19 from Manneguda to Sagar Ringroad in the year 2020 are 17.**

*7- accidents were caused by the cars .In which*

- 1 was a hit and run case during the midnight because of poor lighting for pedestrains and no sign board for the speed limit indication.
- 2-accidents were reported at the sagar ringroad junction during the rush hours because of the heavy traffic ocuured at that time .
- 1-pedestrain got hit by a car at the Turkamjal junction while crossing the road .
- 2-pedestrains were hit by the car at the temple on a Sunday at the Injapur lake.As the temple was built beside the road ,lot of people gather there on Sunday as ritual .
- 1-car was ran in to the divider of Gurramguda junction as the driver was drunk and driving .

*8-accidents were caused by the heavy vehicle.In which*

- 5- accidents were caused by college buses which were located on the SH-19 ,because of the no-correct sign boards at some junctions and due to the over speeding and reckless driving.
- 3-RTC bus accidents have been registered because of the over crowded passengers in which one RTC bus has hit an bike.

*2 Auto-rickshaw accidents* have been occurred due to recklessness and rash driving in which public poverty has been destroyed.

**Number of accidents registered on the SH-19 from Manneguda to Sagar Ringroad in the year 2021 are 21 .**

4-accidents caused by the heavy vehicles. In which

- 2 were caused due to the overspeeding and they hit the divider.
- 1 was because of the loss of control over the vehicle by the driver because there is no fitness for vehicle .
- 1 was caused by the driver who was drunk at time of driving.

10- accidents were caused by the 2-wheeler motor cycles .In which the accidents have been occurred due to the rash driving ,over speeding at the sharp turnings ,minor's driving the 2-wheelers and because of drunk and drive also.

3-accidents were caused by 3-wheelers such as auto-rickshaws because of carrying too many passengers and carrying too much of load.

2-accidents bus accidents were caused due to the recklessness of the driver and because of the No-speed limit indicators.

2-car accidents happened due to the poor visibility of road during a rainy night and during the night time at the sharp turnings .

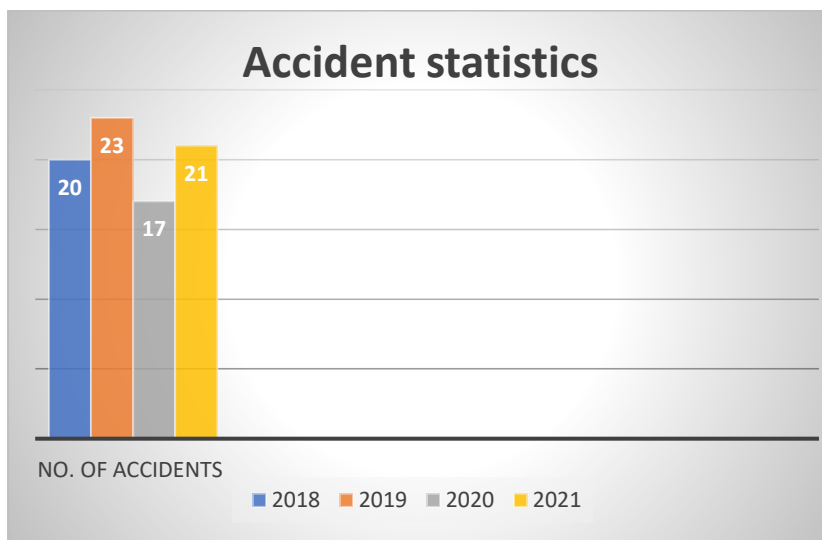


Fig.3: Accident statistics in the selected stretch

## CHAPTER -4

### 4.1 RESULTS AND FINDINGS ALONG THE STRETCH

In this chapter, data was collected and by analysing the data some conclusions have drawn for the factors causing the accidents and parameters for safety improvement of roads.

Selected stretch is lacking road markings completely. Various issues identified were as:

1. Markings in carriage way are not clearly visible.
2. Road information markings are completely absent at junctions

Recommendations:

1. Road marking shall be provided at roads according to rules of IRC: 35-1997;
2. Marking shows wear and tear at some sections so road markings shall be maintained in well condition and time-to-time checking of visibility of the same at night shall be checked;
3. Road information marking shall be provided at turning, bus stop.
4. Bus bay shall be marked with “BUS STOP”.

Identified such issues are captured and shown in Figure 9.

Various such locations are:

1. Vehicle Park at restricted area CH: 2.300 km;
2. Inadequate parking facility near Ice cream factory CH 3.900 km.

Recommendations:

IRC: SP: 12-1973 provide tentative recommendations on the provision of Parking Space for urban Areas. Moreover IRC: 67-2012 provide guideline and standards for signs necessary for on-street and parking lots. IRC: 35-1997 recommends various road markings to distinguish parking lot from service lane and park a vehicle is allotted space only.



Fig.4: At chainage 0.800km, footpath of 3km length and width 1.3m is provided for pedestrians.

According to IRC:103-2012, Footpaths in residential areas require a minimum clear width of 1.8 m.



Fig.5: At chainage 1.400Km, Accident prone Area sign board: A sign board indicating the area as accident spot and advising the vehicles to travel with low speed on a specified road. But road markings are not present.



Fig.6: At chainage 1.300Km, Median is damaged as shown in figure.



Fig.7: At chainage 1.600Km, Due to construction of a water pipeline, bottle neck condition is formed causing traffic.



Fig.8: At chainage 1.900 km, Roundabout ahead sign is blocked by vegetation beside the road. And poor visibility signs at CH:3.600 km, 6.800 km, 9.000 km.

IRC: 67-2012 shall be referred as code of practice for road signs and should be erected not less than 60 cm away from the edge of kerb in the case of kerbed road and at a distance of 2-3 m from the carriageway edge in case of un kerbed roads and all signs shall be inspected at least twice a year.



Fig.9: At chainage 2.300Km, there is no shoulder for car parking. The vehicles are parked on side of a road. Adequate enforcement shall be applied to restrict parking in no-parking zones.





**Fig.10: Unsignalized Intersection:**

At chainage 2.500Km, there is an unsignalized Intersection at which many two-wheeler vehicles are taking U Turn in wrong direction. Adequate enforcement shall be applied to restrict passenger movement in wrong direction.



**Fig.11: At chainage 2.600 Km, Barricades provided are damaged. Need to be replaced.**



**Fig.12: At chainage 3.000 Km, Unauthorised opening in the median for illegal movement of two wheelers leading to unsafety.**



Fig.13: At chainage 3.900Km, Accident might happen due to parking of cars on the roadside. (Ice cream factory named as ... Employment generator or trip attraction centre. However inadequate parking for the customers forcing them to park vehicles on the SH.



Fig.14: At chainage 4.700Km, no sign board indicating temple on side of a road which causes traffic. The irregular movement of people in front of temple causes discomfort for vehicles traveling.



Fig.15: At chainage 5.700 Km, Unauthorized gap in median is made by people traveling towards petrol bunk.



Fig.16: At chainage 5,900 Km, Bus Bay Junction Lane was separated from normal traffic.



Fig.17: At chainage of 6.300 Km, Street vendors occupying space beside the road.



Fig.18: At chainage 6.600 Km, no sign board is maintained indicating left turn which increases the risk for vehicles.



Fig.19: At chainage 7.100 Km, in this picture barricades are provided to slow the traffic and to provide bus transportation for passengers at the stop.



Fig.20: At chainage 7.400 Km, Unauthorized parking by group of vehicles along the road.



**Signalized Intersection No.1**

Fig.21: Chainage 8.800 Km, this is first signalized traffic intersection in a stretch of 15.000Km

Which is handling a moderate amount of traffic.



**Signalized Intersection No.2**

Fig.22: Chainage 9.800 Km, second traffic signal with high amount of traffic.



Fig.23: Chainage 11.500 Km, Signalized Intersection.



Fig.24: At chainage 13.800 Km, Temple located on side of road having less width.



Fig.25: Chainage 14.700 Km, have a Junction without working traffic signal. Junction with considerable amount of traffic without a working traffic signal is a major spot for accidents.



Fig.26: **Chainage (15.000 Km) Sagar Ring Road junction** which is at the end of Stretch, major junction without proper functioning of traffic signals. The traffic from flyover converging in to Junction without a traffic signal is a major spot for accidents happening over there.

## 4.2 IDENTIFICATION OF BLACKSPOTS IN STUDY STRETCH

The entire section of study between Manneguda to Sagar ringroad is unsafe from safety point of view. The main reason is local traffic has direct access to the State Highway, which results in congestion and accidents. Analysis of accident data within the study area showed that about 38 accidents occurred on the study stretch in the year 2020-21. Maximum accidents were occurred at (Manneguda Junction, Sagar ring road Junction, Injapur lake, turkayamjal x road, Gurranguda). The identified black spots were investigated in detail to assess the cause of accidents and suggest the remedial measures to minimize the accidents.

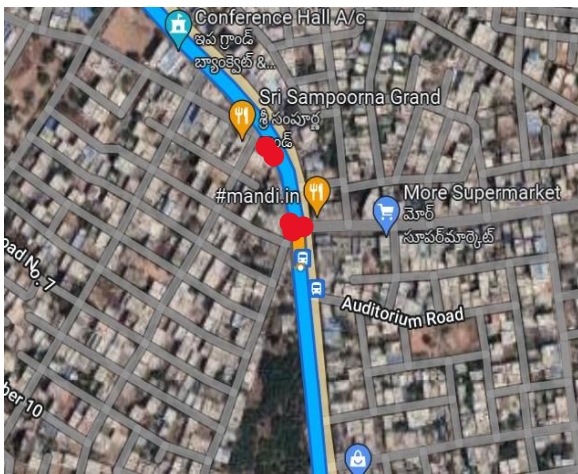


Fig.27: Vanasthalipuram x road

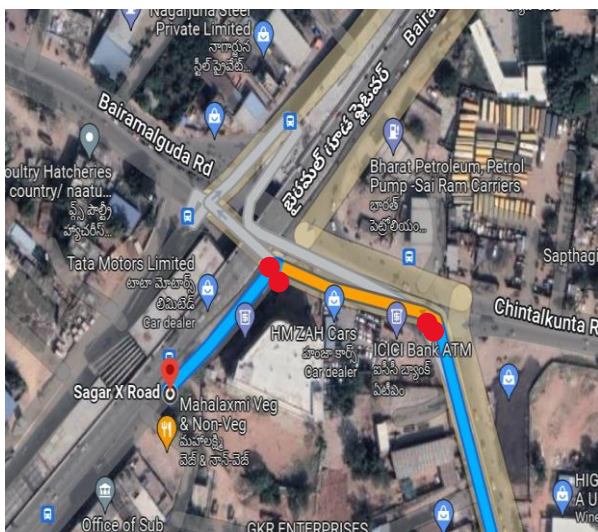


Fig.28: Sagar Ring Road Junction

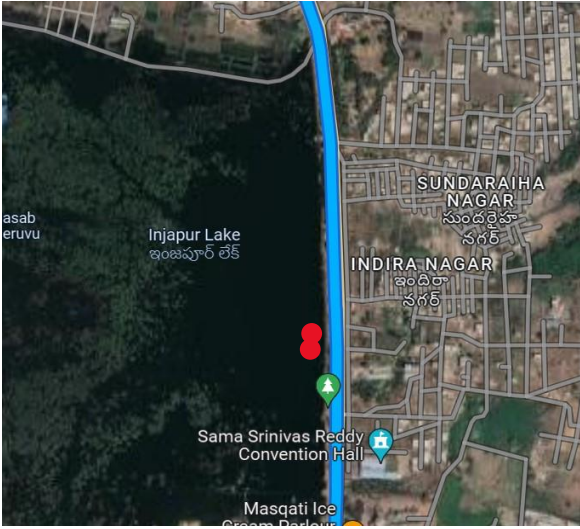


Fig.29: Injapur lake

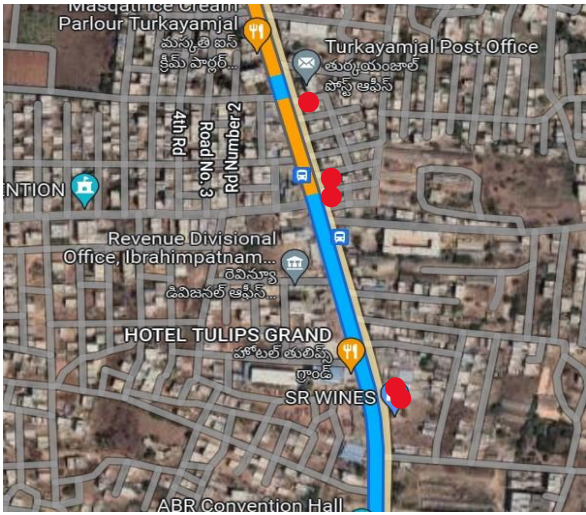


Fig.30: Turkayamjal x road

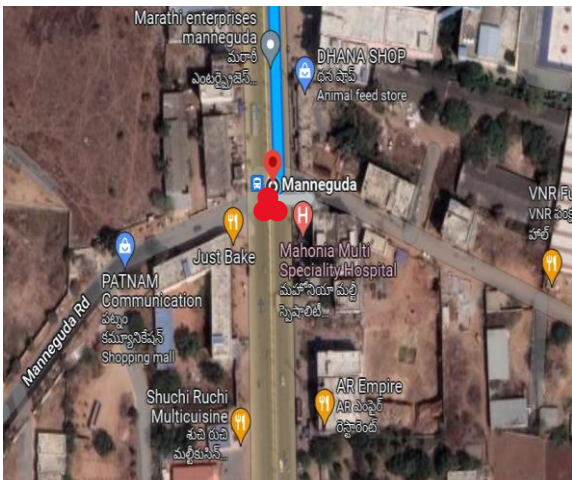


Fig.31: Manneguda Junction



## CONCLUSIONS

Some major conclusions have drawn are:

1. By analysing the information it is found that road markings, condition of shoulder, condition of carriageway and median opening are the factors for causing accidents on the state highway.
2. It also observed that the moderately moving vehicular traffic is generating traffic problems for the fastmoving vehicular traffic.
3. All the unauthorized gap-in-median should be closed.
4. Footpath for the pedestrian need to be developed near the habitant areas, industries, educational institutions and to be properly maintained wherever it is there.
5. Traffic Signals need to be properly maintained at the major intersection.
6. Sign boards, road markings are not properly there at required spots.
7. Many restricted places on side of a road are being occupied for business works.
8. Sign boards for accident prone regions are properly maintained.
9. Speed limit indication boards need to be provided.
10. Barricades were dismantled and destroyed and no repairing for the roadside facilities were not seen.
11. Most of the accidents are caused due to over speeding of vehicles and recklessness of the driver.
12. 2-wheeler vehicles are more contributing to the accidents than the heavy vehicles.

## REFERENCES

1. "CODE OF PRACTICE FOR ROAD MARKINGS", IRC-SP-035-2015
2. "MANUAL ON ROAD SAFETY AUDIT", IRC-SP- O88-2010.
3. "MORTH SPECIFICATIONS 5th revised edition".
4. IRC: SP: 88-2010. "Manual on Road Safety Audit". Indian Road Congress, New Delhi, India.
5. "Road safety audit", Arun S Bagi Department of Civil Engineering, Dayananda Sagar College of Engineering, Bengaluru, Dheeraj N Kumar; Visvesvaraya Technological University, Belgaum, India.
6. Transportation Engineering by Khanna & Justo.
7. Road Safety Performance Audit for National Highway-44, Preethi S, Manjunatha M, Ranjitha B Tangadagi, A Bharath, N Sunil.
8. Road Safety Audit & Remedial Measures-A Case Study of SH-55, Patel Savankumar, Prof. C.B. Mishra, Prof. N.F. Umrigar.
9. Safety Audit" Arun S Bagi , Dheeraj N kumar.
10. "Road safety audit: a case study for wardha road in nagpur city";Manish.D. Katiyari, Prof.S.D. Ghodmare, M-Tech (Trans Eng,Research Scholar).
11. "Road safety audit for four lane national highways", Dr. S. S.Jain, P.K. Singh, Dr. M. Parida.
12. Transportation Engineering by Khanna & Justo.