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## ROAD ACCIDENT ANALYSIS: A CASE STUDY RAJKOT CITY

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### ABSTRACT

The main aim of this paper is analyze and study of road traffic accident data. In this paper traffic volume survey and spot speed survey are carried out. The road traffic accident analyzed according to types of injuries, drivers age group , gender wise distribution, months , day and night time, location wise and types of vehicles. The road accident data analysed in varies types of injuries like fatal , minore , not injured and serious. In fatal accident 2 wheelers are more involved than others. Accident data analyzed as per month, the most of accidents have been occurred in the month of January and June. Minimum or zero number of accident observed in the monsoon month in may and august. Also, accident data analyzed according time in this paper the maximum accident occurred in day time and less and minimum accident are reported in night time. Further, accident data analyzed according to location wise the number of more accidents have been happened at kankot patiyu and kataria chokdi so observed it as black spot location. As per analyzed the accident data the age group 18 to 30 are more involved than others age group and gender wise distribution the males faces are more involved than female faces.

**Keywords:** Road traffic accident , analysis , traffic volume study , spot speed study .

### 1. INTRODUCTION

“Road Accident : An accident which occurred on a road open to public traffic resulting in either injury or loss of life, or damage to property, in which at least one moving vehicle was involved. Road accidents is recognized as major problems in India . Its direct affect to the society , economy and progress of a country”.

It is necessary to identify the role of the underlying factors that causes the road traffic accident to design and implement policies for reducing road traffic accidents. Various factors such as driver behaviour , vehicle features, road traffic characteristics and environmental effects act as significant causes for road traffic accidents. There are many road accidents are occur every day. 1214 road crashes occur every day in India. 2-wheelers account for 25% of total road crash deaths. Total population of the rajkot is 1,28,6678 and children's 1,38,052. In population male faces are 6,74,355 and female faces are 6,12,323. The use of statistical techniques for analyzing road traffic accident data is well established.

## 1.1 NEED AND OBJECTIVE OF THE STUDY

- To identify black spot location.
- To identify varies types of road traffic accidents.
- To identify total number of road traffic accidents.

## 2. LITERATURE REVIEW

[1] **M. Bhagyaiah**, The main objectives of the paper are , To study the cause of road traffic accidents in Hyderabad city. To identify and analyze black spot location . To understand the nature of accident and type of injuries. The methodology is used from the secondary data collected which from various police station. The study is also depends on primary survey where data was collected through observation and survey methods.with the use of GIS done help to identify accident black spot location .The limitations of the police database, which is the legal source of information on fatalities resulting from road traffic crashes, indicate a need for strengthening the road traffic crash surveillance system so that reliable, accurate and adequate data on road traffic crashes and the resulting fatalities and injuries can be collected.

[2] **Noorliyana omar** , she mentioned the objective of the study is ,The aim of this study is to analyze the accident data to identify black spots along Federal Route 50.The methodology used for this study is identification of the study area, accident data collection from the police station and black spot identification. Accident data was collected from all police recorded accidents. The data included; number of fatalities, number of seriousness of the injuries and number of accidents that did not involve any injury.The accident point weightage formula

$$APW=X1(6.0)+ X2(3.0) + X3(0.8) + X4(0.2)$$

This study was designed to analyze accident data and identify accident black spot. The authorities and government should take this issue seriously and introduce precautionary steps to prevent more accidents from happening along this route.

[3] **Maya john** , In this study, they used data mining techniques to analyze the traffic accident data pertaining to Dubai for the year 2017. The data for analysis was officially collected from of United Arab Emirates.Studies are used to identify the major causes and reason associated with road accidents. It has been observed that majority of accidents occur due to traffic collision. Another finding was that young generation were involved in the majority of accidents. Apriori algorithm method are used for searching large databases.

$$\text{Support (X)} = \frac{\text{Count (X)}}{N}$$

The dataset is collected from the website <http://bayanat.ae>, the official open data portal of United Arab Emirates. The dataset consists of 1987 records pertaining to road accidents in Dubai for the year 2017. It was observed from the dataset that the major types of accidents were collision between vehicles and run over. The main causes of accidents include driving under alcohol influence and traffic vehicle collision.

## 3. METHODOLOGY

The methodology adopted in this study is based on secondary data which was collect from police station. the study is also based on the primary survey where data was collect by observation and survey method. There are two survey carried out for the primary survey.

1. traffic volume survey
2. Spot speed survey

The traffic data collected at two busy intersection point such as kataria automobile and metoda gidc gate 3 were analyzed to arrive at hourly flows and daily flow as per direction and class of vehicles. Traffic analysis was done with given study area and get the information of hourly variations compositions and peak hour flows. The spot speed data was analyzed to get the information of class of vehicles with speed.

## 4. DATA COLLECTION

There are two types of data collection carried out to study the paper .

1. Primary data
2. Secondary data

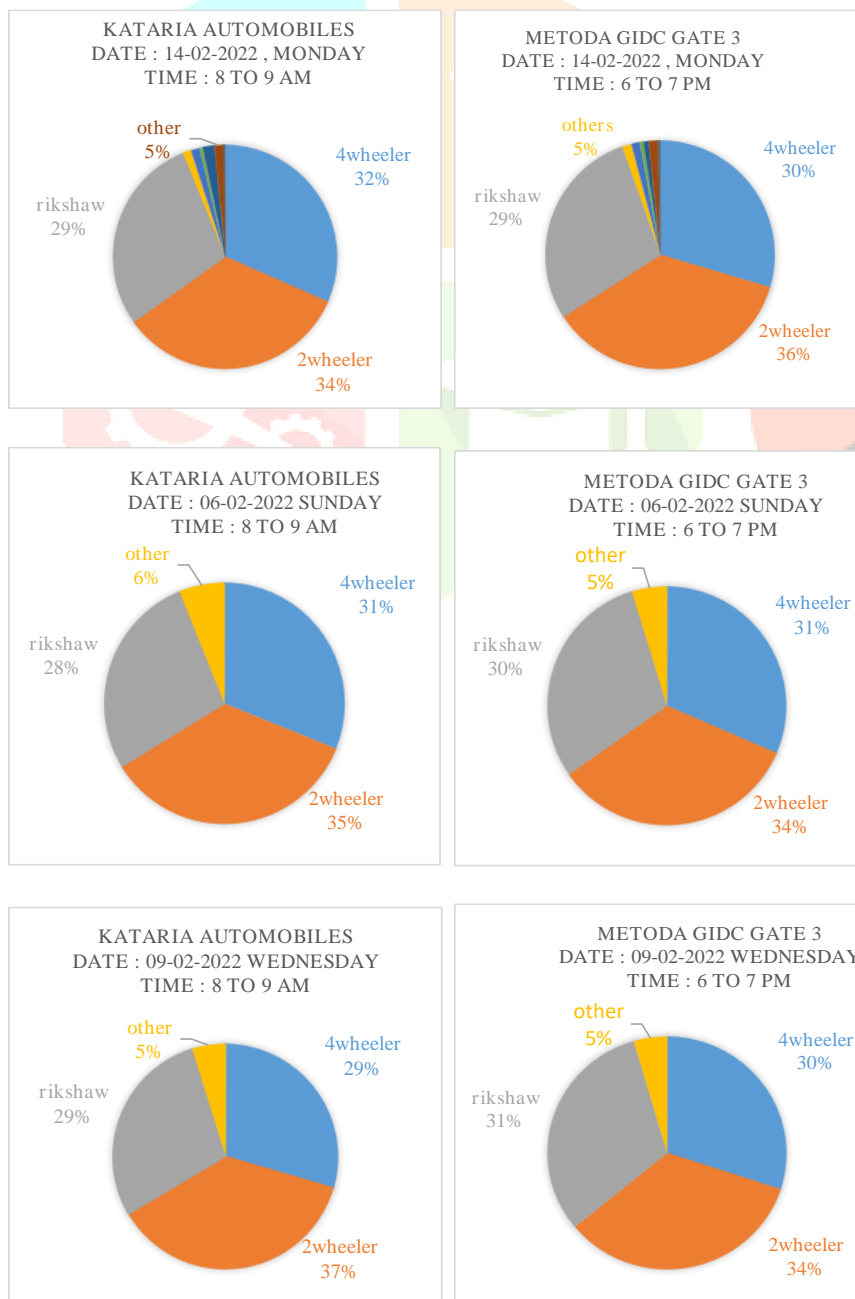
First primary data are collected by following two survey.

- 1.1 traffic volume survey
- 1.2 Spot speed survey

And secondary data such as road accident data are collected from police station. survey and data collection is taken between kataria showroom to metoda gidc gate 3, rajkot. data was collected with various traffic conditions from 7:00 a.m. to 10:00 a.m. (including morning peak hour) and from 05:00 p.m. to 08 :00 p.m. (including evening peak hour).

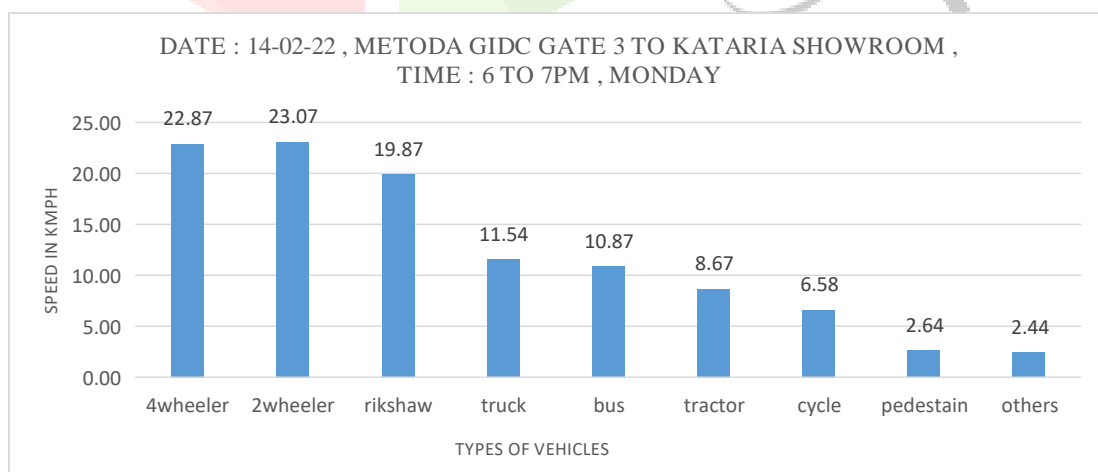
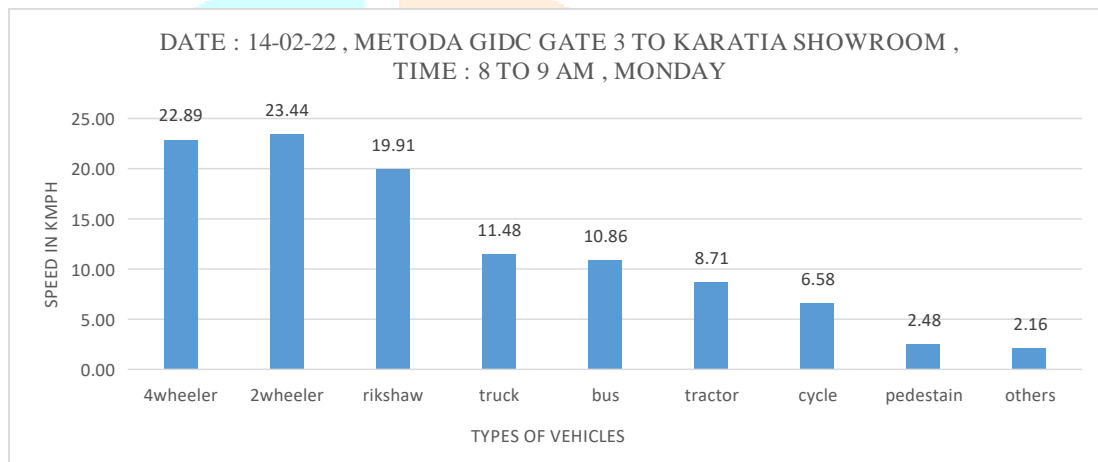
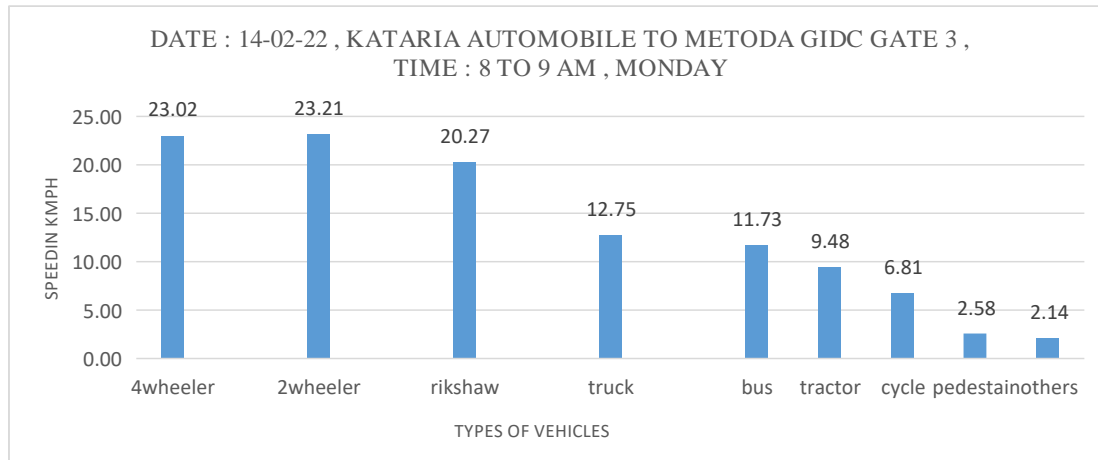
### 4.1 TRAFFIC VOLUME SURVEY

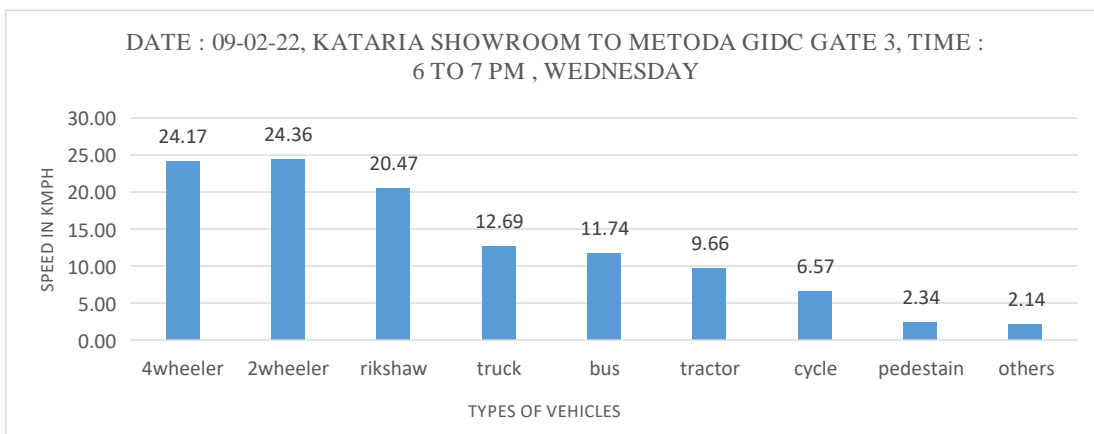
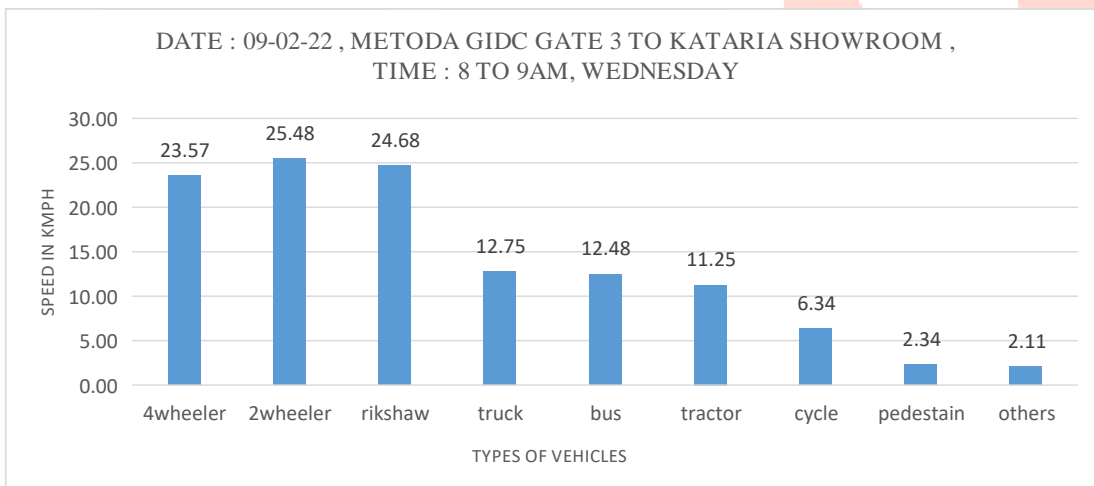
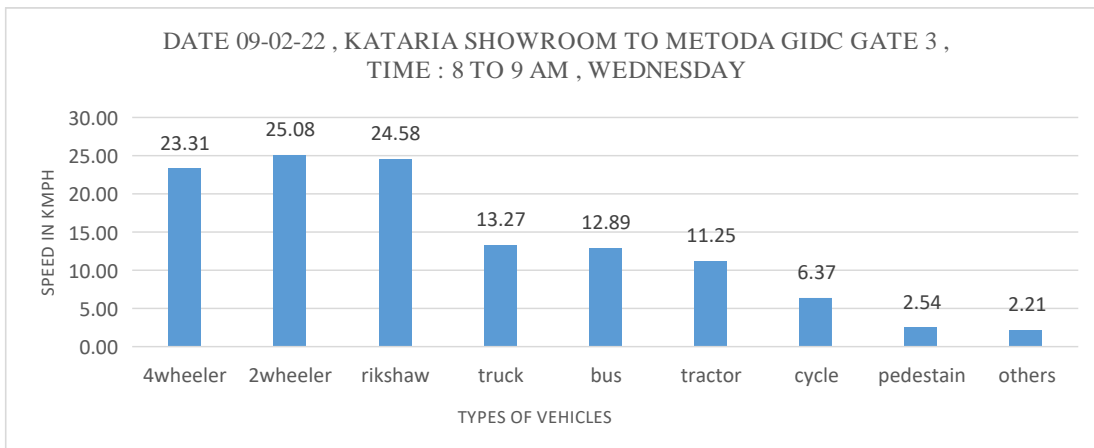
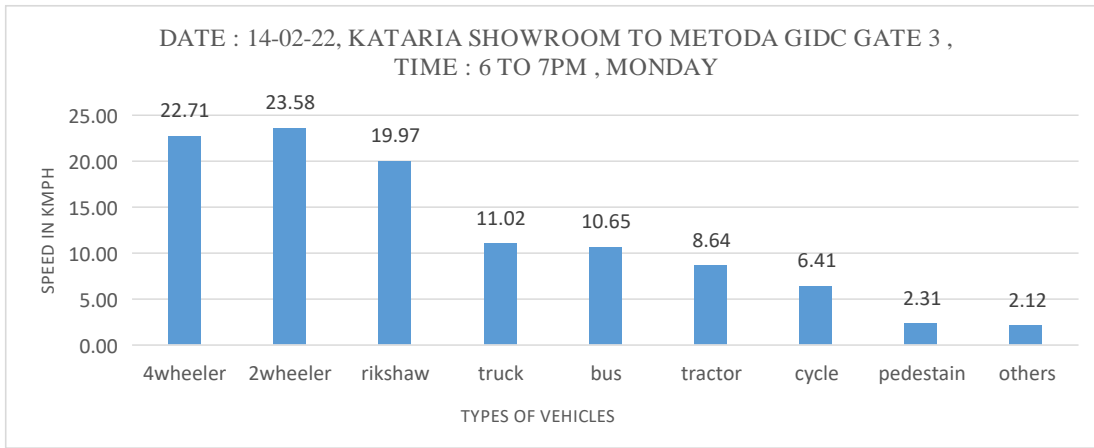
“The term traffic volume study can be termed as traffic flow survey or simply the traffic survey. It is defined as the procedure to determine mainly volume of traffic moving on the roads at a particular section during a particular time”.

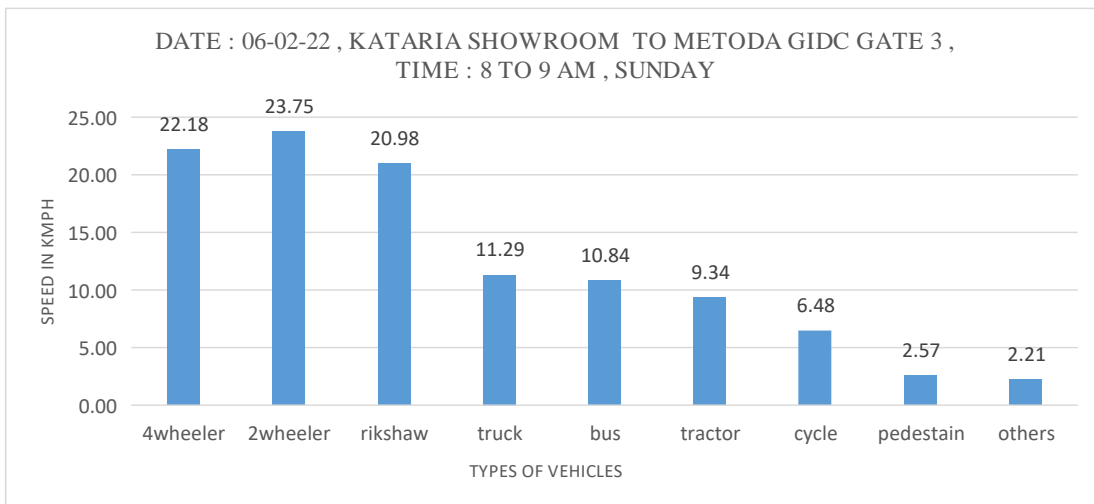
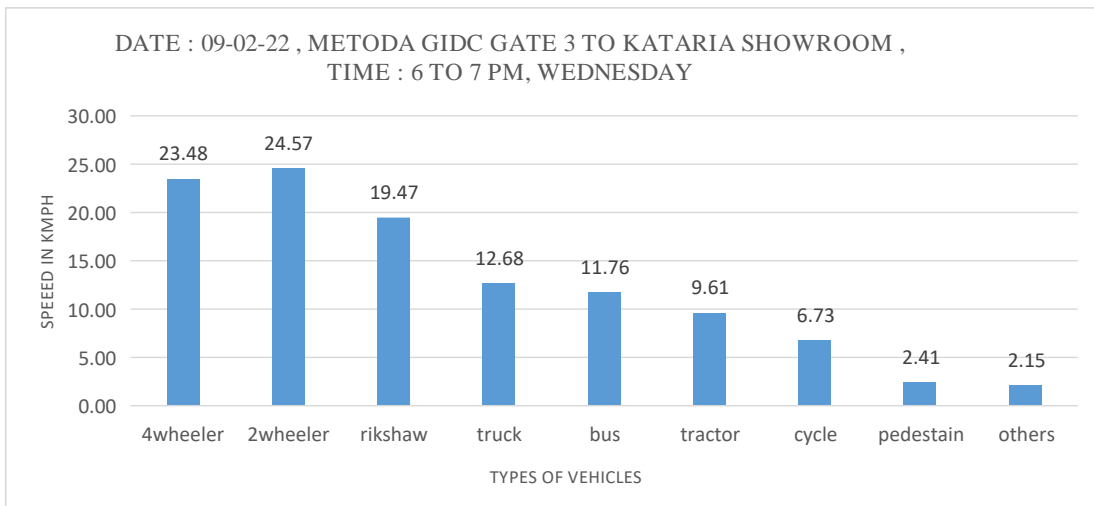


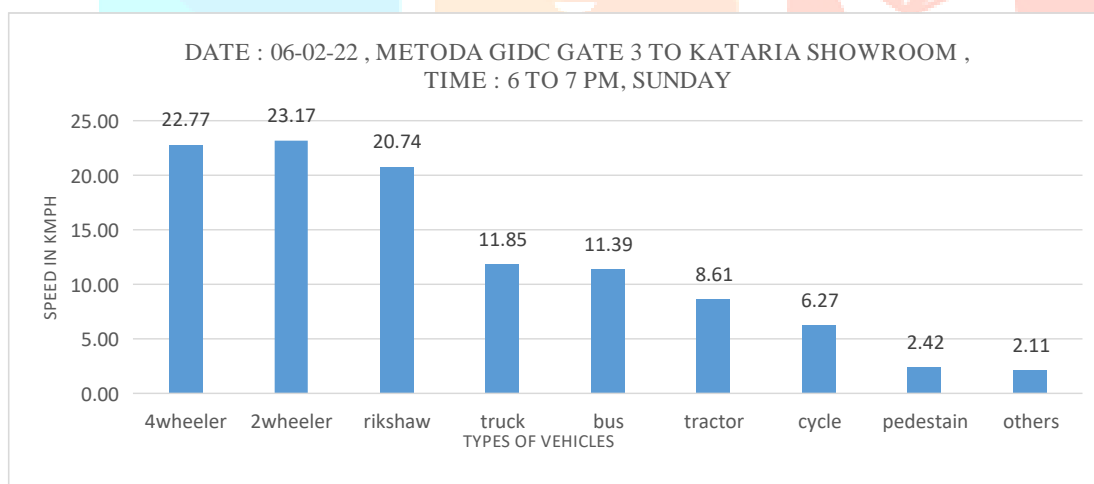
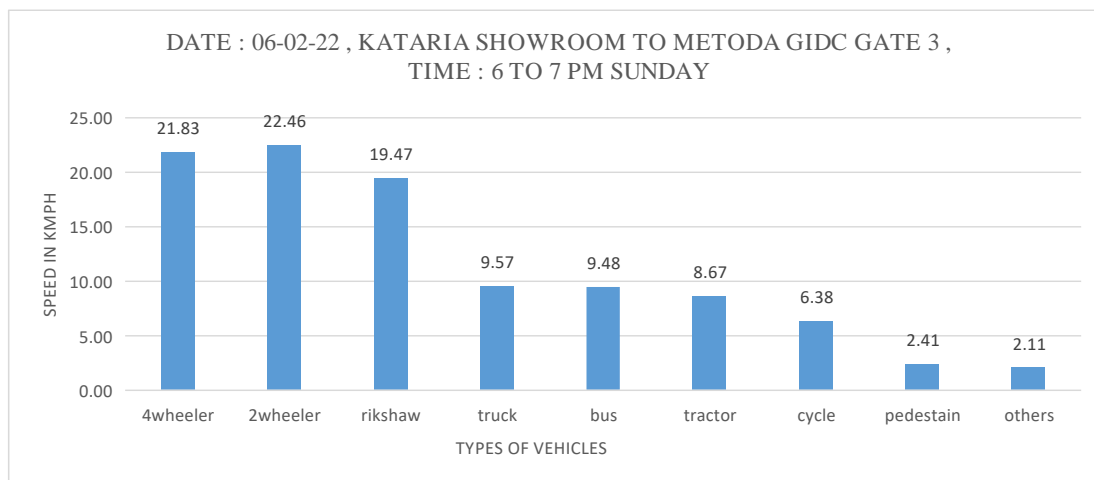
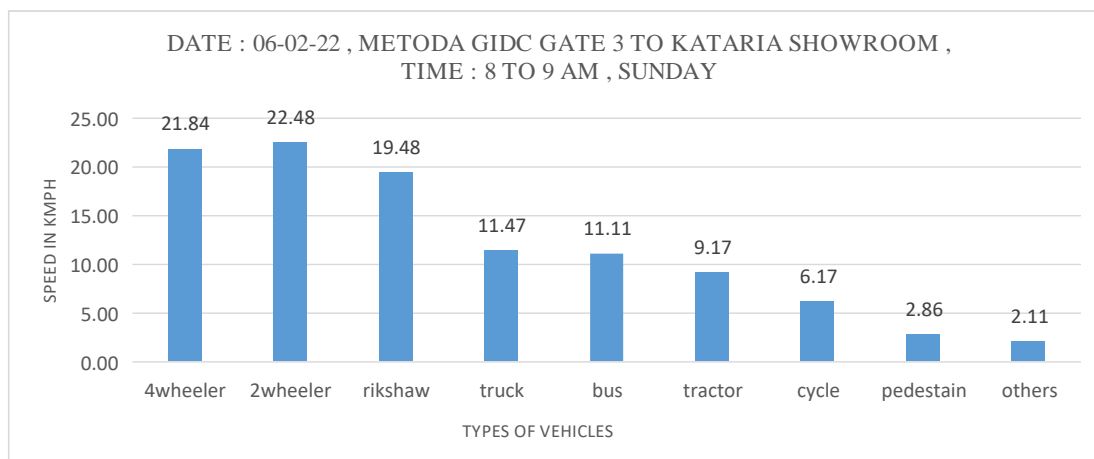
### 4.2 SPOT SPEED SURVEY

“A spot speed is made by measuring the individual speeds of a sample of the vehicle passing a given spot on a street or highway. Spot speed studies are used to determine the speed distribution of a traffic stream at a specific location”.









### 4.3 ACCIDENT DATA ANALYSIS AND PREDICTION

“The increasing number of road and traffic accidents is a challenging issue to the transportation systems. It not only concern with health issues but also associated with economic burden on the society. Therefore, it is an important task for the safety analysis to carry out a comparative study of road accidents to identify the factors that causes an accident to happen, so that preventive actions can be taken to overcome the accident rate and severity of accidents consequences”.

#### 4.3.1 The accident data analyze as per types of injuries

The total road traffic accident within study area year from 2017 to 2021 are shows in table 3.3.1. The road traffic accidents are classified in fatal , serious , minore and not injured in types of accident.

During these 5 year the population raised but the number of total accidents and fatal accidents has remained approximately constant. Accidents classified according to year from 2017 to 2021.

No of accident as per types of injuries				
YEAR	FATAL	SERIOUS	MINORE	NO INJURED
2017	4	3	2	2
2018	5	3	4	1
2019	1	3	3	1
2020	3	4	1	0
2021	2	4	1	1
Total	15	17	11	5

Table 3.3.1.1

### 4.3.2 The accident data analyze as per months

Accident analyze as per months year from 2017 - 2021. Month wise accident data collected and compiled in table 3.3.2.1.

It shows monthly spectrum of accidents for year from 2017 to 2021 .This showing that the maximum number of total accident is reported in months of January and June. It is also seen that there is no variation are considerable.

Maximum number of fatal accidents occur in the month of june , because in these months due to foggy weather and poor visibility. Minimum or zero number of accident as observed in the monsoon month in may and august.

No. of Accident as per months						
Months	2017	2018	2019	2020	2021	
JANUARY	0	0	2	1	2	5
FEBRUARY	1	1	1	0	1	4
MARTH	0	2	0	2	0	4
APRIL	1	2	0	0	2	5
MAY	0	0	1	0	0	1
JUNE	2	3	3	1	3	12
JULY	3	2	0	0	0	5
AUGUST	1	2	0	1	0	4
SEPTMBER	0	0	1	0	1	2
OCTOMBER	0	0	0	0	0	0
NOVEMBER	2	1	0	2	0	5
DESEMBER	0	0	0	0	0	0
Total	10	13	8	7	9	47

Table 3.3.2.1

### 4.3.3 The accident data analyze as per time

Accident analyze as per times year from 2017 to 2021. when we considered the time in accident analysis, the most of accident are occur in day time. Table 3.3.3.1 shows hourly accident occur details from year 2017 to 2021.

Total number of accident is highest during 10 to 12 in morning and 5 to 8 in evening. It is clear that during peak the chances of accident are extremely high. during the peak hour volume of traffic will be high and it affects on the chances of road traffic accident.

The evening time is more phone to fatal accident especially from 6 to 7 because of poor visibility. In the accident analysis as per time the number of accident are high in day time as compare to night time.



No. of accidents as per time										
Time	2017		2018		2019		2020		2021	
	Fatal	TA	Fatal	TA	Fatal	TA	Fatal	TA	Fatal	TA
6 am to 11:59am	2	4	2	4	1	2	1	3	1	4
12 pm to 5:59pm	1	3	2	3	0	1	1	0	0	2
6 pm to 11:59pm	0	2	1	4	0	3	0	2	0	1
12 am to 5:59 am	1	1	0	2	0	2	1	2	1	2
Total	4	10	5	13	1	8	3	7	2	9

Table 3.3.3.1

#### 4.3.4 The accident data analyze as per location wise

The location wise analysis of road traffic accident is shows in Table 3.3.4.1 as per year .The accident data classification as per location within study area.

The collision of two or more vehicles takes place at such as junctions. Over speeding by the driver and Pedestrain behaviour also play good role in occur of road traffic accident.

We can easily identify black spot location by help of Table 4.9.6 . our black spot location is kankot patiyu and katariya chokdi.

Accident analysis as per location wise year from 2017 to 2021											
Location	2017		2018		2019		2020		2021		
	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta	
HARIPAR PATIYU PAL	0	2	1	2	0	1	0	1	0	1	
KANKOT PATIYU	2	4	3	6	1	1	2	3	1	2	
KATARIYA CHOKDI	2	3	1	2	0	4	1	2	1	4	
COSMOPLEX	0	0	0	1	0	2	0	1	0	1	
ESCONE TEMPLE	0	1	0	2	0	0	0	0	0	1	
Total	4	10	5	13	1	8	3	7	2	9	

Table 3.3.4.1

#### 4.3.5 The accident data analyze as per types of vehicle use

Table 3.3.5.1 is give the compiled vehicle wise distribution of accidents from the year 2017 to 2021. The maximum number of fatal accident is caused by 2 wheelers.

Some the reason for road accident by these modes of transportation may be attributed to extremely speed , rush driving , over loading of passengers or goods and poor service or maintenance of vehicles.

Accident analysis as per vehicle type from year 2017 to 2021										
Types of Vehicles	2017		2018		2019		2020		2021	
	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta
2 wheeler	2	5	3	6	1	4	2	3	2	4
3 wheeler	1	1	0	2	0	0	0	1	0	2
4 whleers	1	3	1	4	0	2	1	2	0	2
bus & truck	0	1	1	1	0	2	0	1	0	1
etc	0	0	0	0	0	0	0	0	0	0
Total	4	10	5	13	1	8	3	7	2	9

Table 3.3.5.1

#### 4.3.6 The accident data analyze as per drivers age

The road traffic accident analysis as per drivers age distribution shows in Table 3.3.6.1. It is indicated that maximum number of driver involved in fatal accident are age between 18 to 30 .

This is happened may be due to more of study and work strips. Males faces are involved higher than female faces.

Accident analysis as per driver age										
Age	2017		2018		2019		2020		2021	
	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta	Fatal	Ta
18-30	3	5	3	5	1	3	2	4	2	4
30-40	0	1	1	2	0	0	0	1	0	0
40-50	1	2	0	2	0	2	0	0	0	2
50-60	0	2	1	3	0	2	1	2	0	3
>60	0	0	0	1	0	1	0	0	0	0
Total	4	10	5	13	1	8	3	7	2	9

Table 3.3.6.1

#### 4.3.7 The accident data analyze as per driver sex wise distribution

It is clear from Figure 3.3.7.2 and Table 3.3.7.1 that males are more involved than female in road traffic accident. The total 87% male faces and 13% female faces are involved in year 2017 to 2021. male faces higher then female faces year from 2017 to 2021.

Accident analysis as per driver sex wise distribution from year 2017 to 2021										
year	2017		2018		2019		2020		2021	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	8	2	12	1	7	1	6	1	8	1
Total	10		13		8		7		9	

Table 3.3.7.1

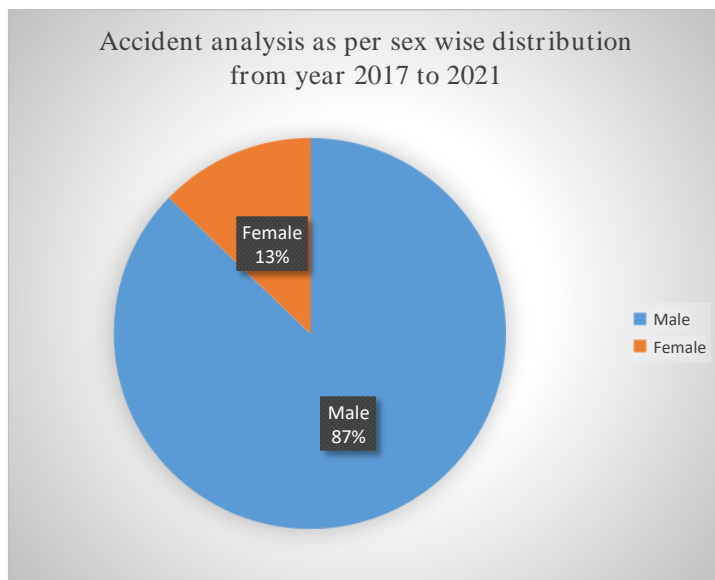


Figure 3.3.7.2

## 5. CONCLUSION

A total 47 causes of road traffic incidents were recorded in the police database for year 2017 to 2021 within study area. In which 14 people were killed and 27 injured. The majority of those who died due to these accidents were male faces.

The accident data analyzed according the month , most of accident are occur in January and June , and less accident are occur in may and august.

The accident data analyzed as per time , the more accident are occur in day time and less accident are occur in night time.

The accident data analyzed according location wise , most of accident are happened at kankot patiyu and kataria chokdi.

The data analyzed as per driver age the 18 to 30 age group are more involved than others age group.

By accident data analyzed as according to sex wise distribution, the males faces are more involved then female faces.

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