



# Exploratory Data Analysis

**Road Accident Analysis – Kolkata City [April 2020 to March 2021]**

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**DS Jan 2022 STS-I Project**

*“This highly confidential data presented in this report is only for research and analysis purpose and not be collected or shared by any means to avoid any kind of judicial activities.”*

## **EXECUTIVE SUMMARY**

A part of this commitment is enabling a data-driven approach to reduce fatalities in the city. These reports highlight the priority areas and low hanging fruits for improving safety of commuters on the city roads. This report discusses the findings of accidents investigated in the calendar year April'20 to March'21.

Across the study area, 1534 crashes were reported from 1st April 2020 until 31st March 2021. Out of the total crashes, 146 (9.5%) were fatal crashes, 391 (25.5%) were serious and 997 (65%) were minor injury crashes. Collision between motorcycle and pedestrian (192 by count) were the highest. Motorcyclists (41%) and pedestrians (28%) were the most affected road users. Pedestrians were the affected road users in 46% of all fatal crashes and motorized two wheelers (M2W) in 26% of all fatal crashes. National Highways and State Highways together recorded more than 18% of all crashes within the study area and 16% of fatal crashes. Accidents of City Roads, National Highways and State Highways were analysed in depth to understand the crash pattern of the particular road type.

## **ACKNOWLEDGEMENTS**

We express our sincere thanks to **Kolkata Police (Traffic Department) and Fatal Squad of Traffic Police** for giving us the opportunity to continue this study and analysis with full support and cooperation by providing us a mock data set which consists of all the crash data in Kolkata jurisdiction from April'20 to March'21.

Our sincere appreciation and gratitude to all the **researchers of J.P. Research India Pvt. Ltd (JPRI)** for their support and cooperation in sharing the data for analysis purpose.

We strongly believe in this pioneering attempt in India towards data-driven road safety strategies. Such efforts have been proven to be highly effective in mitigating fatalities, injuries and crashes around the world. We hope that the data collected and analysed from this study is useful to all the stake holders of the Kolkata city roads in helping make road travel safer.

*“This report is dedicated to  
all those whose lives have been affected,  
directly or indirectly, by road traffic crashes  
on Kolkata city roads.”*

## REPORT OBJECTIVE

During the period from 1st April 2020 to 31st March 2021, 1534 crashes distributed across Kolkata city were notified to accident research team. This report presents the analyses of all 1534 crashes to highlight crash distributions and identifying contributing factors to the crashes. The report presents the findings based on the crashes investigated, the potential contributing factors are also identified for the vulnerable stretches of the roads. General observations of road safety issues are presented along with graphs that depict the classification of accidents on various months of the year, collision partner and other many more information.

## STUDY AREA

The study area for the road accident study covers 400 kilometres of roads and includes only the urban areas that fall under KMC (Kolkata Municipal Corporation). The main North-South corridor, from Shyambazar to Tollygunge, of Kolkata includes Bhupendra Bose Avenue, Jatindra Mohan Avenue Road, Chittaranjan Avenue, Jawaharlal Nehru Road, Ashutosh Mukherjee Road, Shyama Prasad Mukherjee Road and Deshpriya Sashmal Road. The most important east-west corridor includes A.J.C. Bose Road and Park Circus Connector, connecting Vidyasagar Setu and Eastern Metropolitan Bypass. The Eastern Metropolitan Bypass (E.M. bypass) that runs from north to south along the east edge of the city.



**FIGURE 1: MAP SHOWING STUDY AREA IN KOLKATA CITY (COURTESY: GOOGLE MAPS)**

## **JOURNEY TOWARDS SAFER ROADS – KOLKATA**

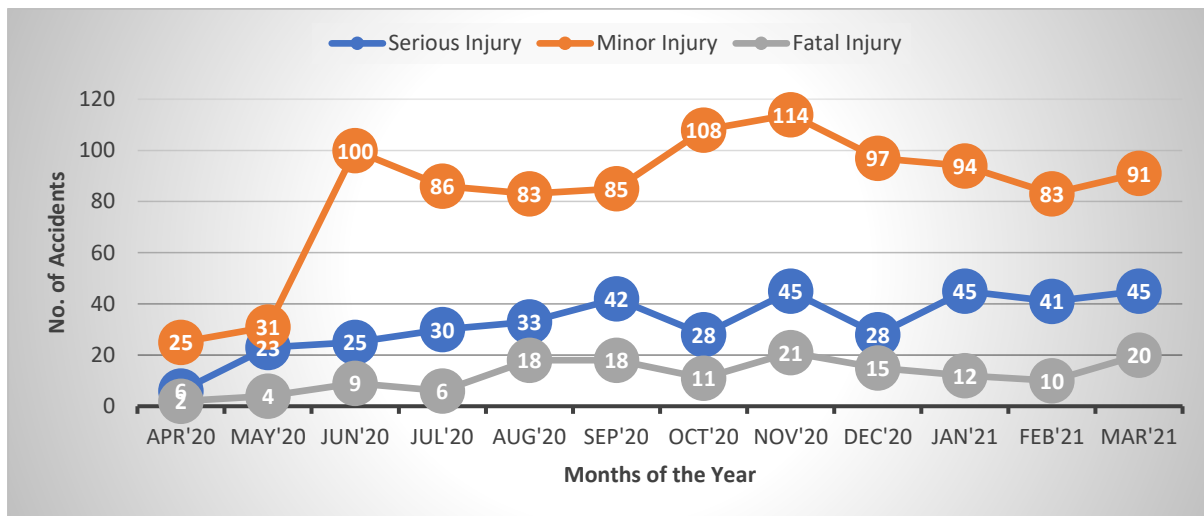
The following table shows the number of road traffic crash fatalities in Kolkata over the past 6 years and the percentage change year on year. As can be seen from the data, there has been a steady reduction in fatalities across the years.

**TABLE 1: FATALITIES AND YEAR ON YEAR CHANGES**

Year	2015	2016	2017	2018	2019	2020
Fatalities	422	407	329	294	267	201
Percentage Reduction		3.6%	19.2%	10.6%	9.2%	24.7%

Real time in-depth scientific data is collected during the investigation process to identify the factors (Human/Vehicle/Infrastructure) that contribute to traffic crashes. Key factors such as vehicle speed, avoidance maneuver, road infrastructure deficiencies and human error are identified and recorded in an organized structure which is used to develop suitable interventions to reduce crashes. Immediate implementation of counter measures as per the crash investigation findings, data led enforcement, government commitment, are some of the key factors which possibly have played a part in reducing fatalities in Kolkata.

Kolkata Traffic police continuously monitors the road safety situation in Kolkata using the police reported accident data. This helps in understanding the effectiveness of counter measures and identifying which counter measures are providing positive reductions in fatalities and crashes.



This graph shows the count of injuries with respect to the no. of accidents in the given time period.

### **Fatal injury:**

Accidents resulting in serious injuries causing on spot death or death in less than 30 days. Fatal does not account for death due to natural causes or suicides.

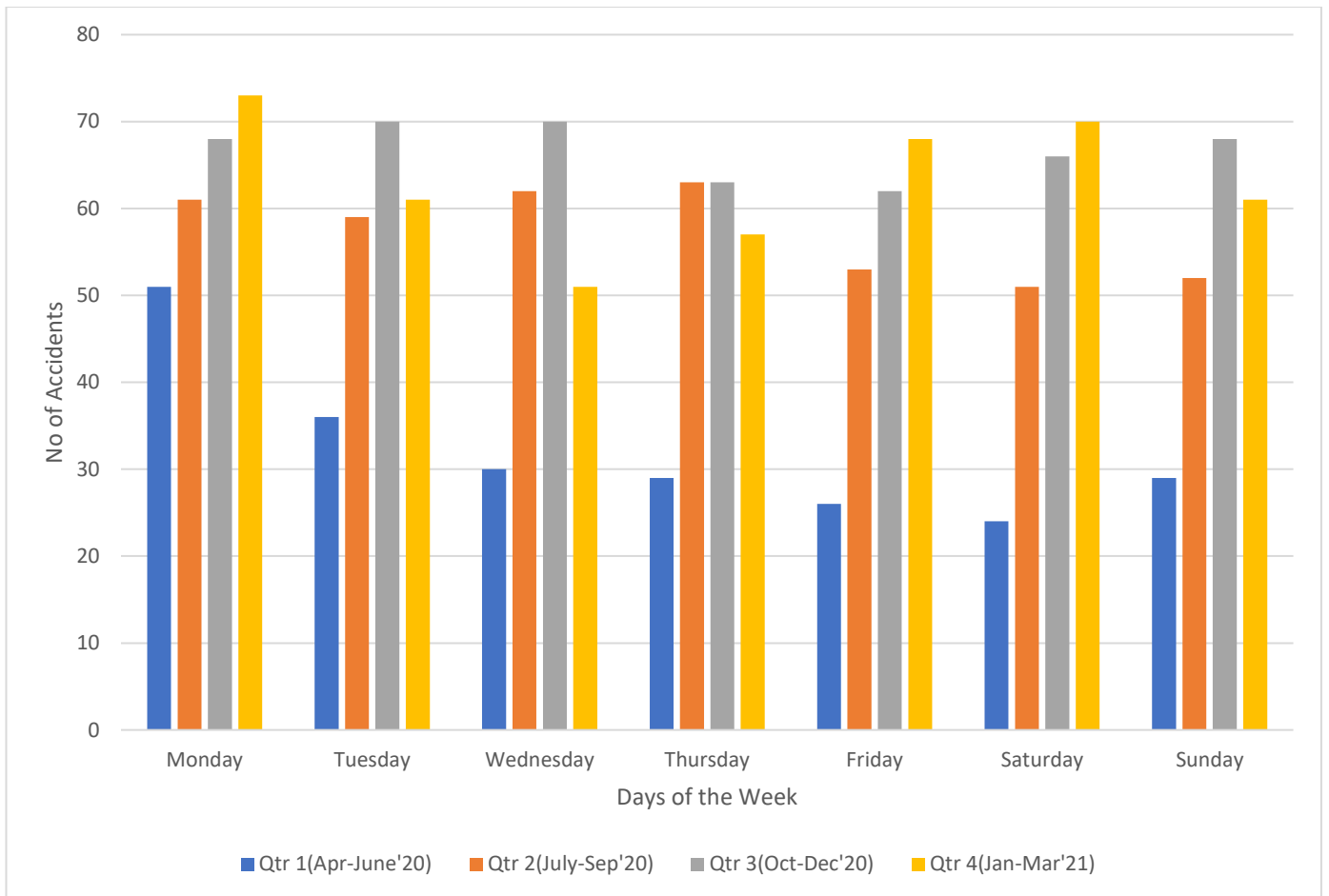
### **Serious injury:**

Accidents resulting in serious injuries which requires hospitalization (In-patient treatment) for more than 24 hours or Death after 30 days of hospitalization.

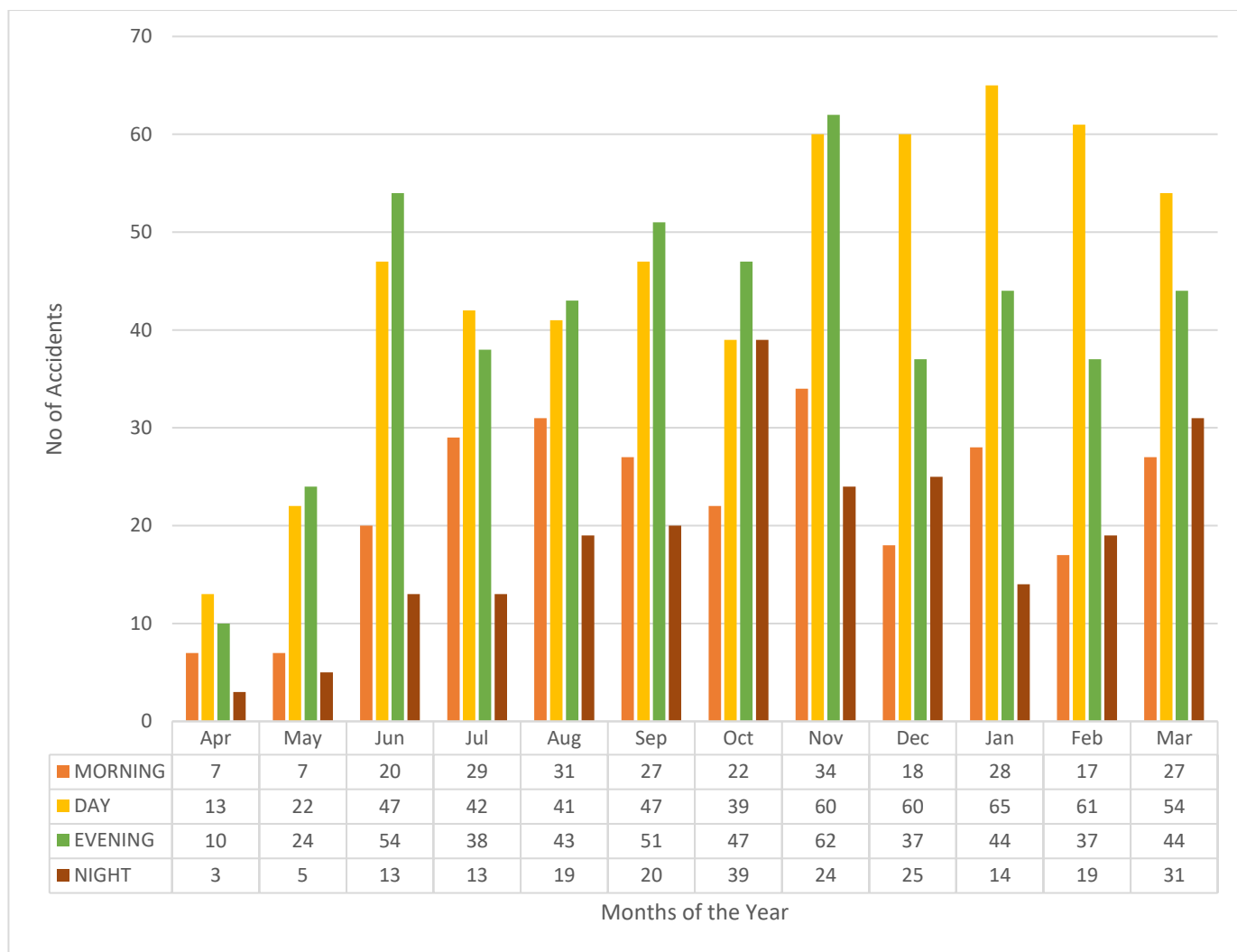
### **Minor injury:**

Accidents resulting in injuries which does not require hospitalization more than 24 hours or only outdoor treatment (Out-patient treatment) or first aid or self-treatment.

- Due to lockdown during covid, April witnessed the lowest no of accidents in the year.
- November witnessed the highest no of accidents due to the trail of the festive season were yet to go and people became more reluctant and reckless on roads.

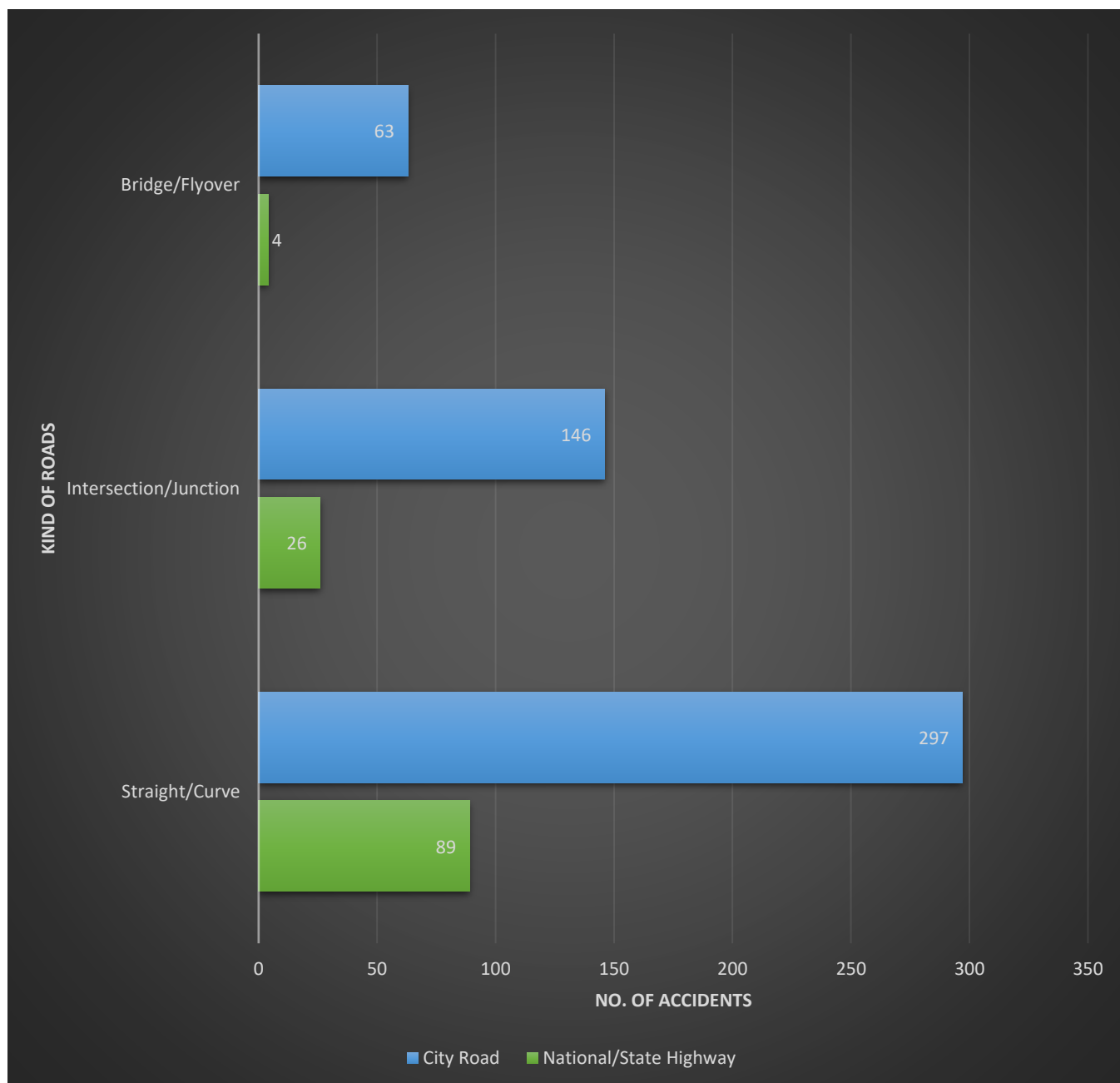


- Most of the accidents happened on Monday since all people remain in a hurry to join work after a holiday and become careless while driving and the count increases gradually per quarter as the lockdown constraints becomes less stringent day by day.

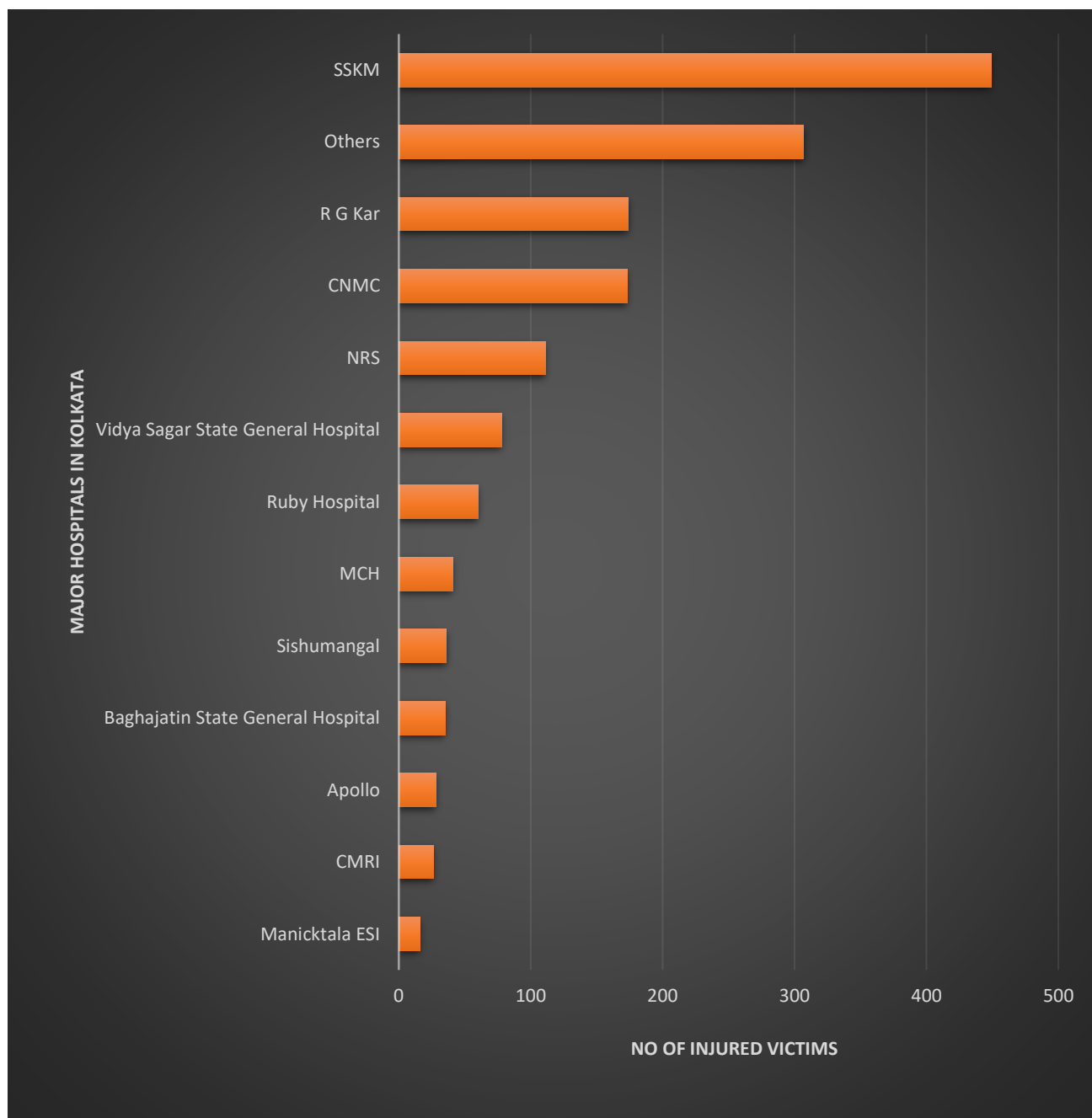


- Due to the onset of lockdown in April, the no of accidents is the lowest in that month and then the number started increasing.
- Most accidents occurred in the month of November due to the reckless driving in the festive season.
- Most accidents occurred at night (10pm to 4 am) during October for the onset of Durga puja and other following festivals, when people become more inattentive and careless during driving.



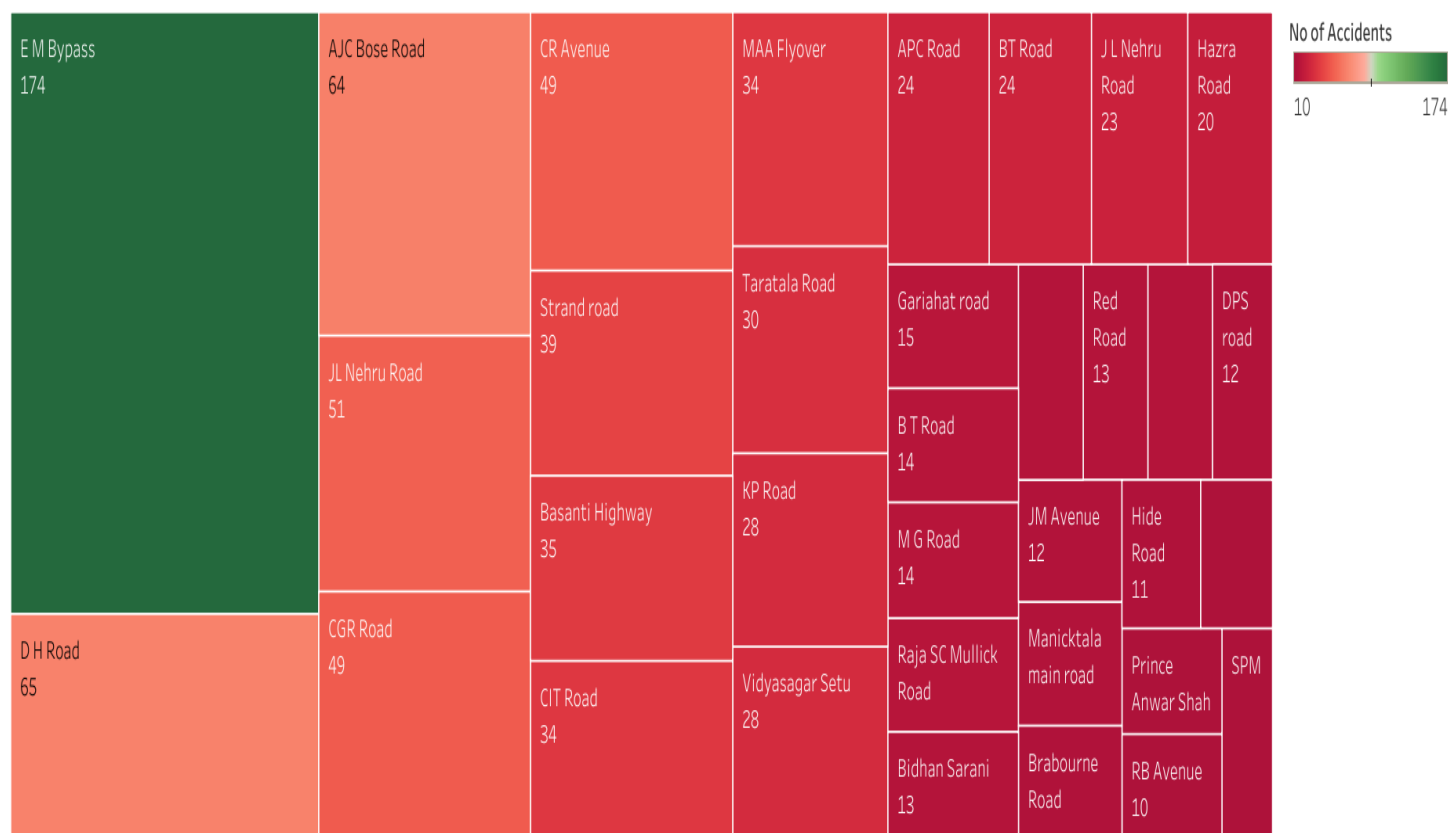


- Most of the people take city roads as granted. Mostly, they tend not to follow traffic rules in their known terrain which resulted in more accidents.



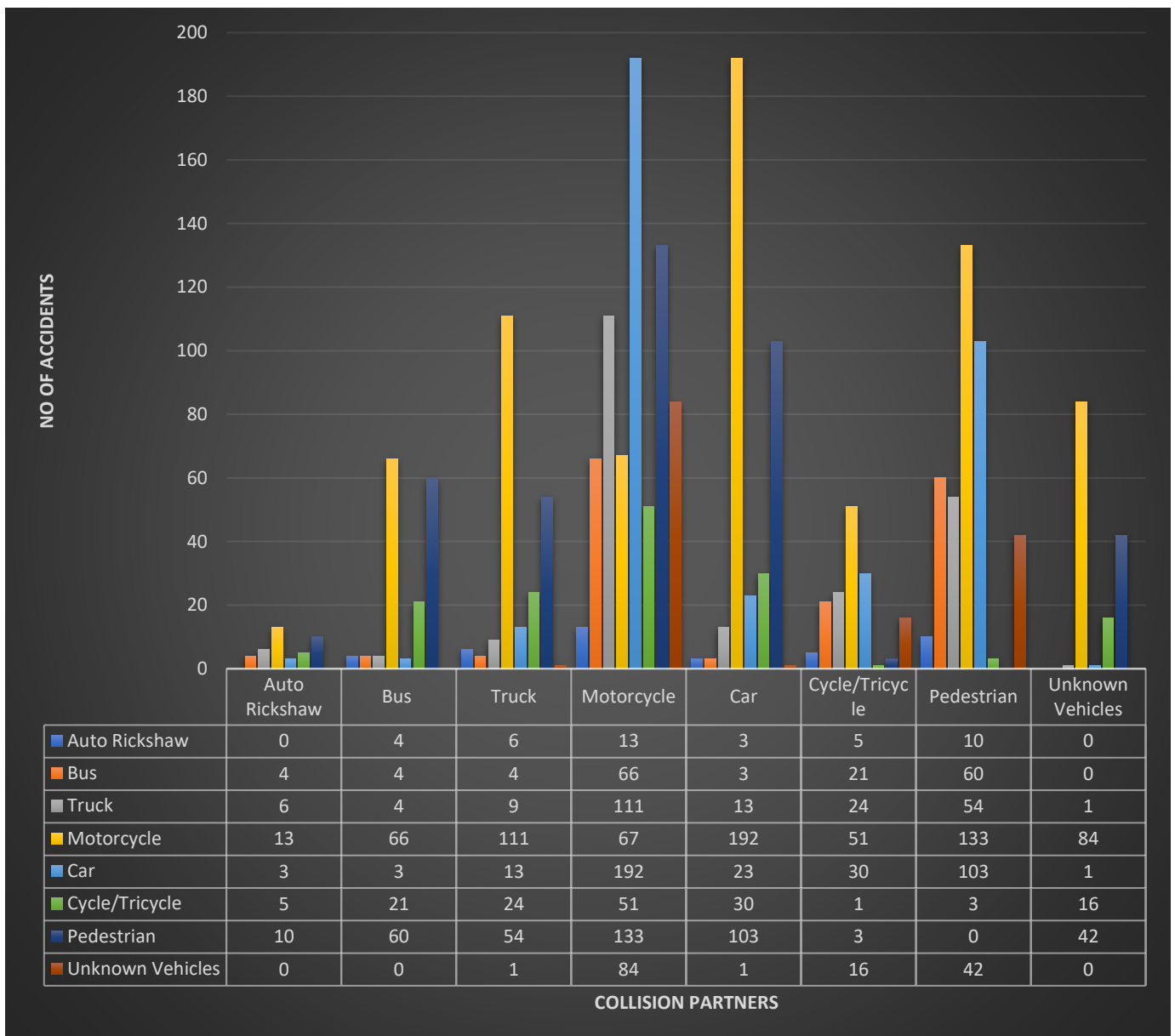
- SSKM hospital mostly treats the accident victims amongst other hospitals. Being a renowned health care centre in the government segment, it serves its best at crisis.
- Being centrally located, SSKM is ideally placed as a centre for treating accident victims, for whom time is of the essence.

## Road vs No. of Accidents

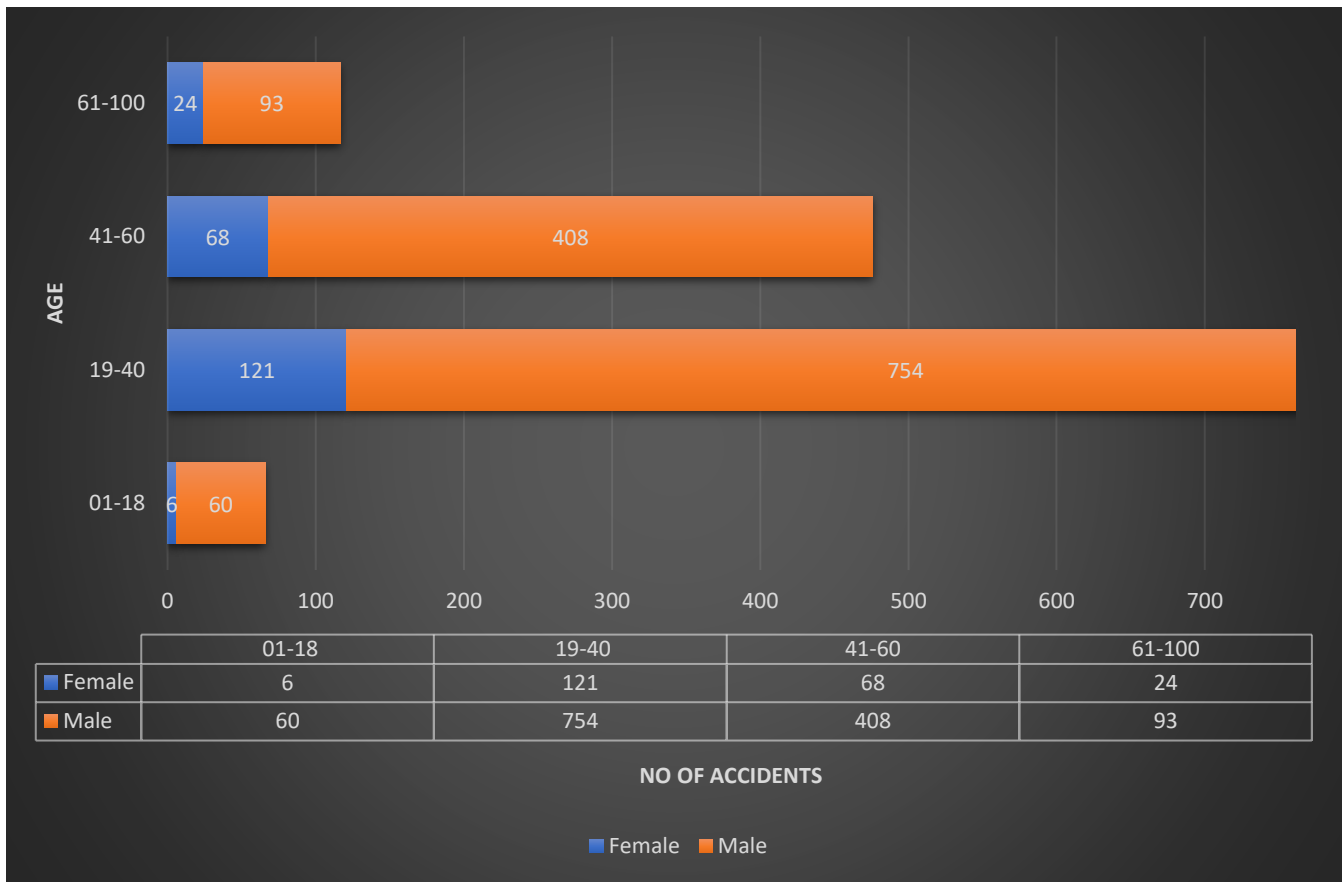


Road Name and sum of No of Accidents. Color shows sum of No of Accidents. Size shows sum of No of Accidents. The marks are labeled by Road Name and sum of No of Accidents.

- Eastern Metropolitan Bypass witnesses most of the accidents in the year followed by Diamond Harbour Road and others.



- Car and Motorcycles collide more often than any other body type followed by Motorcycles and pedestrians (road users). We can see the reckless attitude of the motorcycle riders.



- Most victims of the collision fall in the age group below 40 years during the most active phase of their life.

# ANALYSIS ON BLACKSPOT AREA OF KOLKATA

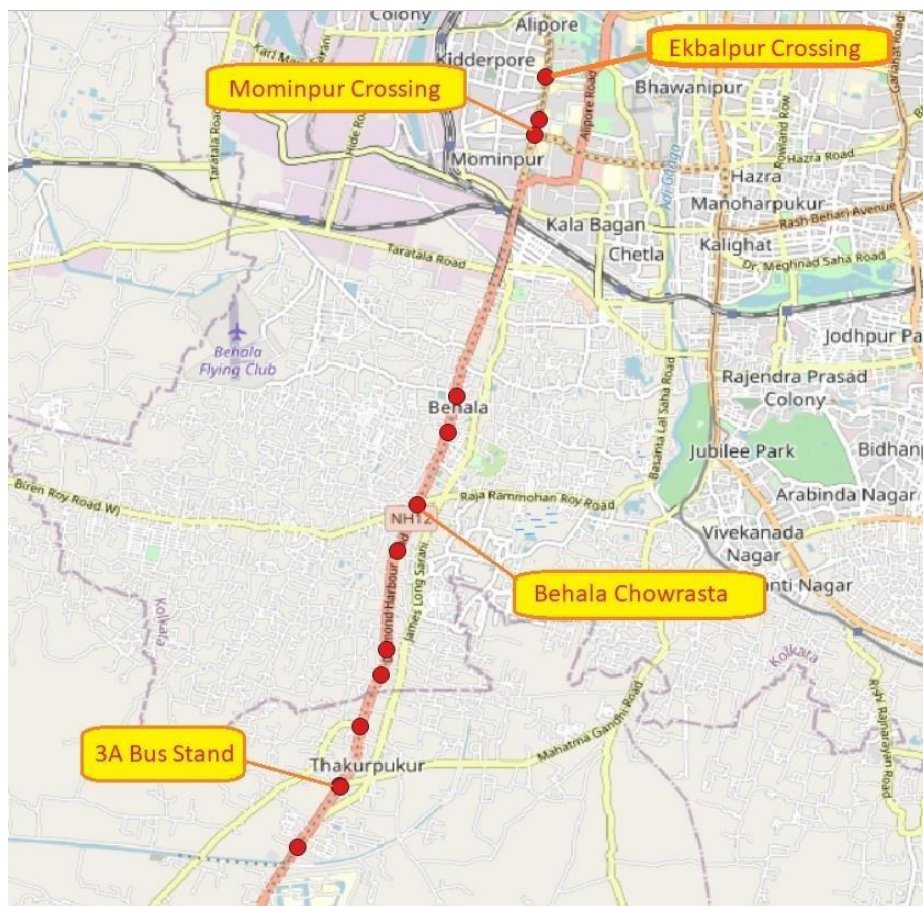
**Blackspot-** Definition of Road Accident Black Spot-on National Highways: Road Accident Black spot is a stretch of National Highway of about 500m in length in which either 5 road accidents in all three years put together involving fatalities/grievous injuries) took place during the last 3 calendar years or 10 fatalities in all.

In Kolkata some roads are considered into this category.

1. NH-117 Diamond Harbour Road
2. NH-12 Eastern Metropolitan Bypass

## NH-117: Spatial distribution of fatal crashes

These crashes occurred on the 11 km stretch of NH 117 starting from Khidderpore Crossing in the north to the Joka Metro Station in the south which falls under the study area.



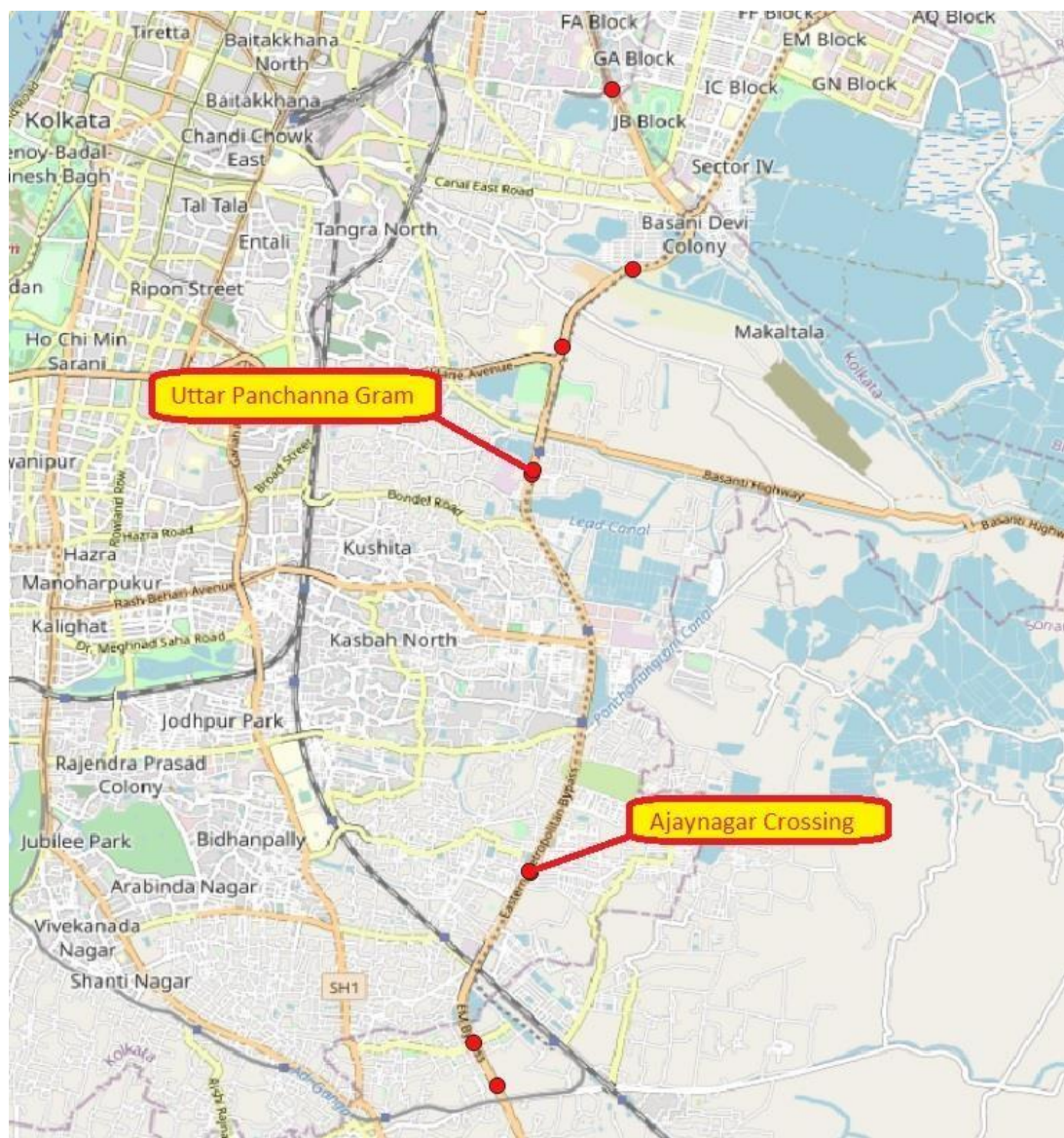


## **NH-117: Infrastructural Recommendations for reducing accidents**

- Provide pedestrian signal for both directions and ensure maintenance.
- . Provide walking space for pedestrians of minimum 1.8 m width by placing metal barricades on the left side of the road.
- Provide refuge island at median and increase pedestrian waiting space on footpath.
- Provide pedestrian signal and ensure maintenance.

## **NH-12: Spatial distribution of fatal crashes**

These crashes occurred on the 11.4 km stretch of NH 12 starting from Chingrighata More in the north to Dhalai Bridge, Garia in the south which falls under the study area.



## **NH-12: Infrastructural Recommendations for reducing accidents**

1. Trim the overgrown branches of vegetation up to suitable height.
2. Provide pedestrian signals and ensure maintenance.
3. Provide road markings to guide road users.
4. Provide pedestrian crossing with pedestrian signal.
5. Reduce the intersection area by making the design more compact with proper channelization



## CONCLUSION

1. In conclusion, following the road rules, avoiding excessive speeds and improved general awareness like wearing helmets and wearing seatbelts and road infrastructure like appropriate headlights, road lightings can significantly reduce the risk of a traffic accident.
2. Regularly checking vehicle health and maintenance of parts also eliminates any potential risks.
3. The Government has approved a National Road Safety Policy. This Policy outlines various policy measures such as promoting awareness, establishing road safety information data base, encouraging safer road infrastructure including application of intelligent transport, enforcement of safety laws etc.
4. Around the world, road traffic injuries cause 1.25 million deaths and up to 50 million injuries each year. These injuries can lead to lifelong disability including brain and spinal cord injury. Road traffic injuries are the leading cause of death among young people aged 15-29.

### 5. Road Safety Rules

- Keep to the left. Keep to the left while driving and allow vehicles from the opposite direction to pass.
- Slow down on bends and turn.
- Move cautiously and slowly during congestion on roads.
- Remain within the speed limit.
- Maintain the right distance.
- Understand and follow the road signs.
- Never Drink & Drive.
- Always Wear Seat Belt.
- Keep a Safe Distance from the vehicle ahead.
- Always Avoid Distractions.
- Never Break Red Signal.
- Always Drive Within Speed Limit.
- Avoid the Drowsiness While Driving.
- Watch Out for Drivers on the Road