International Journal of Advanced Technology in Engineering and Science
Vol. No.3, Special Issue No. 01, September 2015
www.ijates.com
ijates
ISSN 2348 - 7550

STUDY OF ROAD TRAFFIC PROBLEMS WITH REFERENCE TO GUWAHATI CITY

Navanita Das[1], Yudhajit Dey[2], Imtaj Haque Choudhury[3]

[1, 2]*Assistant Professor, Department of Civil Engineering, Royal Group of Institutions, (India)*

[3]*U.G student, Royal Group of Institutions, (India)*

ABSTRACT

Guwahati is the largest city in Assam and one of the fastest developing cities in India. With the rapid growth of population in the city, the road traffic problems are also increasing at an alarming rate. The development of a city or town leads to the growth of the number of vehicles which is directly linked to increased traffic congestion and a growing number of accidents and fatalities. Road traffic problems like congestion, unpredictable travel-time delays and road accidents are taking a serious shape in the city. Thiscalls for the vital need of Intelligent Transportation Systems (ITS) which make use of communication technology to alleviate traffic problems. In this paper, an attempt has been made to understand the causes behind the traffic congestion in some of the busiest junctions in the city. Rapid visual screening has been performed and interaction with the traffic police and local people has been carried out. An attempt has been made to determine the peak hourly volume of traffic. Based on these observations, important conclusions have been drawn and remedial measures have been suggested.

Keywords: Accidents, Congestion, Rapid Visual Screening, Traffic, Technology.

I. INTRODUCTION

1.1 General

Road traffic problems are one of the most important problems prevailing in the urban cities. The development of a city or town leads to the growth of traffic which is directly linked with increased number of accidents and fatalities and traffic congestion. Spending hours in traffic jam has become part and parcel of metropolitan lifestyle leading to health and environmental hazards.

There could be two approaches to solve these problems, first and the most common solution is to come up with infrastructure involving wider roads, flyovers bypasses, expressways etc. Second approach is to manage traffic with existing safe infrastructure with the use of technology and by involving computers in the process.

1.2 Introduction of Region - Guwahati

The city Guwahati which was known as Pragjyotispura in ancient times is the largest city in Assam and one of the fastest developing cities in India. The city lies between the banks of Brahmaputra River and the foothills of Shillong Plateau as shown in fig 1.1. The Guwahati Municipal Corporation(GMC),the city's local government, administers an area of 216 sq.km (83 sq. m), while the Guwahati Metropolitan Development Authority, the planning and development body administers an area of 254 sq.km (98 sq. m). Guwahati is a major commercial and educational hub not only of Assam but alsoof the entire northeastern region of India.

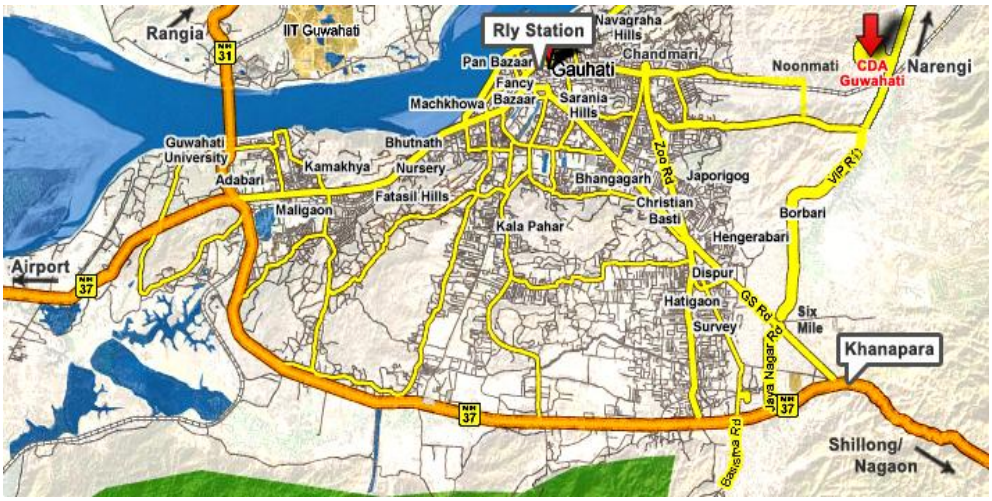

Fig 1.1 Map of Guwahati

II. SITE OBSERVATIONS

For the purpose of the study, a Rapid Visual Screening was carried out in which a selected number of traffic junction points in the city were visited. A number of qualitative as well as quantitative assessments were made based on the observations. The ten sites visited are enlisted below:

1. BeltolaTiniali
2. MaligaonChariali
3. AdabariTiniali
4. Chandmari
5. HatigaonChariali
6. Ganeshguri
7. Jalukbari
8. Zoo Road Tiniali
9. Guwahati Club
10. Paltanbazar

One such data sheet and its details are shown below:

LOCATION 1: **BELTOLA TINIALI**

2.1 General Observations

1. Number of roads meeting at the junction point and their names.

Answer: There are four number of roads meeting at the junction point. They are named as: -

i. (towards) Ganeshguri Road
ii. (towards) Khanapara Road
iii. (towards) BasisthaChariali Road

2. Number of lanes in each of the above mentioned road.

Answer: In *Ganeshguri Road* there are two numbers of lanes, in *Khanapara Road* there are two numbers of lanes, in *BasisthaChariali Road* there are two numbers of lanes.

3. Width of the Roads.

Answer: The width of the *Ganeshguri Road* is 4.5meter and the width of the *KhanaparaRoad* is 5.85meter, width of the *BasisthaChariali Road* is 5.85meter.

4. Road condition: presence of proper camber, kerb, super elevation, wear and tear ?

Answer: The road condition of that area is good as observed with no wear and tear with proper camber, kerb and super elevation.

5. Presence of footpath and its utility.

Answer: In *Ganeshguri Road* there is footpath with necessary utility on both sides of road; in *KhanaparaRoad* footpath is available on both sides of road as well; in *BasisthaChariali Road* footpath is available on both sides of road.

6. Is Drainage system is available with proper drain size, presence of manhole and other sewer Oppurtenances)?

Answer: The Drainage condition of the area is good with the presence of manholes and sewer appurtenances and they are well maintained.

7. Number of Lamp posts (Street Lights) and their conditions.

Answer: There are overall nine lamp posts, three in *Ganeshguri Road*, three in *Khanapara Road*, in *Basistha Chariali Road* there are three lamp posts available.

8. Number of traffic police in duty.

Answer: There are two numbers of traffic policemen on duty according to our observation.

9. Is there any facility for pedestrians or cyclists?

Answer: Yes there are facilities for pedestrians too as footpath are available for them available on both sides of the roads and zebra crossing is also available but there are no facilities available for cyclists.

10. Other conditions such as road clearance, divider condition?

Answer: If we discuss about the road clearance of roads then the road clearance of *Ganeshguri Road* is 3.25meter and divider is 0.65meter, *Khanapara Road* is 3.25meter and divider is 0.65meter, *BasisthaChariali Road* is 3.25meter and divider is 0.65meter.

The divider conditions of the roads are average.

11. What is the type of rotary present?

Answer: There is a rotary available and its triangular in shape.

12. What is the type of area is it commercial, residential, market place etc.

Answer: The area that we surveyed comes under Market Place and Commercial.

2.2 Interaction with The Traffic Police

13. Types of instrument used by traffic police.

Answer: The instruments used by traffic police are Whistle, Wireless Radio (walkie talkie), LED bars.

14. What are the causes for which accidents occurs?

Answer: The causes of accidents are: -

i. Violation of traffic rules and regulations
ii. Over speed
iii. Over crowd

15. Type of vehicles undergoing maximum number of accidents.

Answer: There are 4 to 5 numbers of accidents in maximum if we observe most of them are two wheelers (bikes) and some cars too.

16. What are the damages caused by the accidents?

Answer: The damages caused by the accidents are property damage, physical injuries of people, vehicle damage and pavement damage.

17. What is the speed limit of the area?

Answer: The speed limit of the area is 30 km/hr to 40 km/hr.

18. Number of road safety violation registered in a day.

Answer: The number of road safety violation registered in a day is ten to twenty maximum.

19. Presence and utilization of bus bays.

Answer: There is no presence of bus bays in the area.

20. Is Traffic segregation is available?

Answer: There is no traffic segregation.

21. Is there adequacy of parking facilities?

Answer: Yes, there is parking facilities available in every road.

22. Peak traffic volume hour.

Answer: `Peak hourly volume as per observation is shown below:

	11am-12am	**8pm-9pm**
Buses	**300**	**182**
3 Wheelers	**360**	**114**
2 Wheelers	**2580**	**1420**
Cars	**1440**	**886**
TOTAL	**2950**	**1020**

2.3 Interaction WITH Public

23. Do you think traffic lights are necessary?

Answer: Yes they are necessary to maintain the flow of traffic in areas without causing traffic congestion.

24. Do you think traffic lights are helpful in preventing traffic jams?

Answer: Yes, traffic lights are helpful in preventing traffic jams.

25. How many road accidents occur in that particular area?

Answer: Three to four major road accidents were witnessed.

26. Site few reasons for which road accidents take place in this area?

Answer: The reasons are: -

ii. Over speed,
iii. Overcrowded,
iv. Irresponsible driving,
v. Violation of traffic rules.
vi. Road condition.

27. Do you think the local traffic police are doing their duty actively?

Answer: Yes, the police are doing their duty actively and nicely.

28. Are the drainage facilities in this area maintained properly?

Answer: Yes, the drainage facilities are maintained properly, we can say about their condition to be fair after observation.

29. Are the roads well lit at night?

Answer: Yes, the roads are well lit at night.

30. What is your opinion on local people following traffic rules?

Answer: Local people are the ones who break the laws frequently, they are mostly in a hurry to reach their destination and in that process they are least bothered about the overall road safety precautions.

III. FACTORS CONTRIBUTING TO TRAFFIC PROBLEMS

3.1 Factors Related to Drivers

3.1.1 Drowsiness

From our study it is clear that of the vehicles involved in accident, 70% fall in two categories, i.e., trucks and cars. Maximum number of accidents occurs between 9 am to 1 pm in the day time because of heavy traffic intensity (primarily cars) during this period. According to transporters, truck drivers do not operate much in the daytime due to fear of RTOs and Traffic Police. According to them, one of the reasons of night time accidents is over-speed driving to compensate the hours lost during the day and the stress of check that is carried over. From 10pm to 4am,trucks get involved in more accidents. As explained by traffic police officers, the above finding clearly explains the drowsiness hypotheses that the truck drivers feel sleepy afterdinner and around dawn and that leads to accidents. From a study of diurnal variation of number of accidents one can safely conclude that drowsiness and the vehicle intensity (especially cars) are the reasons of the accident pattern that is observed throughout the day.

3.1.2 Wrong Overtaking

From the interview with the drivers it was found that wrong overtaking by drivers, especially car drivers, leads to accidents. According to these drivers, when a car overtakes a vehicle and encroaches into the safe distance maintained between two vehicles; often the driver of heavy vehicles such as buses has to suddenly decelerate his vehicle. In the process the bus driver or the driver of the following vehicle sometime loses control and it often leads to an accident. The bus drivers play a very important role in causing traffic problems. They do not follow traffic rules and hence causes great disturbance in roads. In the light of Motor Vehicle Act in force, defaulters get penalty that is quite low. By paying paltry sum they get acquitted and it is not exemplary enough to keep them away from committing the same mistake.

3.1.3 Driving Under Alcohol

Use of alcohol by drivers while driving the vehicle is one of the root causes of accident. It has been observed in the survey that maximum percent of the drivers of heavy vehicles, while on long trip, consume alcohol and consequently drive in a reckless manner. About 35% of the drivers were observed not to be hesitant in admitting that they are regular users of alcohol. Some of them were of the opinion that it was very difficult for them to drive without taking alcohol. Majority of the drivers were of the view that after taking alcohol they do not feel

tired. While driving in a drunken state is liable to punishment, drivers do not take it seriously as they know that police hardly take any stern step against this fault.

3.1.4 Fatigue and Physical Fitness

About 80% of truck drivers admitted that they drive on an average about 16 hours in a day when going on long trip. Such long hours of drive make them susceptible for accident especially in difficult weather conditions. Poor health, especially poor eyesight, is one of the most serious reasons behind the drivers committing fault. Most of the drivers admitted that they do not go through a thorough check of their medical fitness (heart disease, deafness, lunacy and night blindness) primarily because of financial reasons, although they understand its utility for their own safety. According to the study done by the Traffic Police 80% of the drivers have some health problem and about 60% have serious eyesight problems. By issuing driving license for period of 20 years, which is too long, and without any regular health checkup the possibility of accident on the road increases.

3.1.5 Untrained Drivers

Drivers are often illiterate or have very low level of education. They are improperly trained. Majority of the drivers had an educational status up to primary level. Truck drivers generally travel across the states. They often face the problem of language as they just have some knowledge of their mother tongue and most of the instructions on national highway are in local language and English. Driving is not learned in a formal school. Most of them learn while being a helper to the driver. According to them getting a permanent driving license is not difficult even for the inadequately trained ones. Based on the observation of state transport officials, trained drivers not only save fuel but also drive more miles without accidents.

3.2 Factors Related to Vehicles

Vehicle condition influences the probability of accident to a great extent. A new and well-maintained vehicle has a low probability of accidents. The vehicles of age more than 4-5 years not only pose a threat to the smooth flow of traffic on highways, but also to the environment through their highly polluting nature. A common policy on this aspect to stop old vehicles on National Highway is very much needed. Vehicles having defects in the breaks, gears, tyres, lights, etc., due to poor maintenance also add to the risk of accident on roads. As regards the headlamp glare and non-use of dipper at night, all the drivers of other vehicles in the sample were unanimous in blaming the owners of vehicles particularly luxury buses and new models of cars for using high intensity lights (mercury vapour lamps or halogen gas filament lamps). There should be uniformity in the system of lighting in vehicles and the drivers found responsible for violating that system should be punished heavily.

3.3 Factors Related to Road

Road condition is one of the important factors that influence the occurrence of the traffic problems. Some of the issues on road condition for smooth traffic flow are given below.

3.3.1 Sudden appearance of sharp curve

Sudden appearance of sharp curve on roads leads to accident. Thus, warning through road signs from a comfortable distance needs to be provided.

3.3.2 Segregation of slow moving and fast moving traffic and keeping the stray animals out of the roads

It is a common knowledge that segregating of slow moving and fast moving vehicles will improve traffic flow and reduce the possibility of accidents. There should be separate lanes for slow moving and fast moving traffic.

Provision of cycle track on roads is absolutely necessary to reduce the number of accidents. Presence of stray animals on the roads sometimes leads to accidents and hinders traffic speed. Some of the drivers consider it a very serious problem in smooth running of traffic.

3.3.3 Maintenance of road surface

Damaged road surface (e.g. pot-holes, etc.) specifically after rain, leads to vehicle breakdowns and accidents. These need maintenance. According to traffic police, overloading of heavy vehicles such as buses and trucks leads to road damage, vehicle breakdowns and hindrances to free flow of traffic. Strict checking and stern action against the defaulters appears to be the only way to stop this practice.

3.3.4 Road width and paving

Where the road is not sufficiently wide, side lanes are used continuously for over-taking. On some parts of the city side lanes are narrow in width. They are dangerous in normal condition and accident-prone during rainy seasons. Uniform width and proper markings of side lanes are needed in the whole section of the city.

IV. ROAD TRAFFIC CONTROL: SUGGESTED MEASURES

Road traffic control involves directing vehicular and pedestrian traffic around a construction zone, accident or other road disruption, thus ensuring the safety of emergency response teams, construction workers and the general public. Traffic control also includes the use of CCTV and other means of monitoring traffic by local or State roadways authorities to manage traffic flows and providing advice concerning traffic congestion.

4.1Types of Road Traffic Control Device

1. Traffic signs: These are signs which use symbols and/or words to convey information to road users. These devices are made with retro reflective materials that reflect light from headlights back towards the driver's eyes. This is to achieve maximum visibility especially at night.

- Regulatory signs
- Warning signs
- Guide signs

2. Variable Message Signs or VMS are trafficcontrol devices which can exhibit differenttraffic messages according to the needs of aspecific road.

3. High-level warning devices are trafficcontrol devices that are high enough to see over other vehicles, such as but not limited tovehicle top, poles and other places not lowerthan 8 feet.

4. Channeling devices are used to warndrivers and pedestrians and to guide themthrough a work zone. Common channelizingdevices are traffic cones and drums.

5. Road surface markings are traffic controldevices that are applied directly to the roadsurfaces. They are used to guide and channeltraffic by designating lanes and indicatingstopping points at intersections

6. Traffic lights are traffic control devicesused for alternately assign right-of-way totraffic moving in conflicting directions at anintersection.

4.2 Technologies Around the World

Numerous ITS applications have been developed by various organizations and institutions around the globe and tailored to offer transportation solution to meet their specific needs. In developed countries, road operators have become dependent on ITS for not only congestion and demand management, but also for road safety and improved infrastructure. ITS employ modern communication, computer and sensor technology directly.

Some implementations of ITS around the world are described in the following sections.

1. JAPAN:
   - Advances in Navigation Systems.
   - Assistance for Safe Driving.
2. EUROPE:
   - Congestion Assistance.
   - Detection and Interpretation of the Driving Environment.
3. UNITED KINGDOM:
   - Cameras.
   - Managed Motorways.
4. INDIA:
   - Electronic Toll Collection (ETC).
   - Advanced Parking Management.
   - Advanced Public Transportation System (APTS)
   - Automatic Traffic Control(ATC)

Such scientific implementations can be exercised in our city as well which would help a great deal in improving the traffic scenario.

V. CONCLUSION

In urban areas congestion mostly occurs at the junctions. Junctions are the intersection of roads, where the flow of the vehicles is controlled by traffic police or traffic lights.When the flow of vehicles increases at the junctions, it causes traffic jams and stream of vehicles incur longer waiting time. When there is a crossing at a junction, a stream of vehicles has to wait for others. Design of an uninterrupted traffic flow system at the traffic junctions without having to wait for others will lead to minimize severe traffic congestion.

Congestion of traffic is a solemn experience faced by the traffic users who travel on the roads of Guwahati city. Due to traffic congestion, traffic commuters spoil valuable time, fuel and money. However, congestion on urban roads can be mitigated by creating additional infrastructure. In cases when it is not feasible or possible to create additional infrastructure due to several reasons, such as unavailability of required fund, unbreakable permanent structure and so on, the existing infrastructure may be slightly modified to minimize the congestion on urban roads. As for an example, creation of a bypass over a city may decrease the number of vehicles entered in the city, and thus minimizing traffic loads on urban roads. Congestion sometimes occurs due to unorganized flow of vehicles on urban roads and an organized traffic flow may lead to minimization of congestion. Random distribution of traffics at different paths of an urban traffic may cause traffic breakdown at the peak hours.

Therefore, an optimized allocation of paths is necessary to mitigate the traffic breakdown. With proper planning and public consciousness, the traffic related problems in our city can be efficiently minimized.

VI. ACKNOWLEDGEMENT

The authors acknowledge the contribution of Kumar Sunny, Hiraj Kumar Nath, HiranmoyDey and Ashim Jyoti Talukdar, students of Royal Group of Institutions, who were very helpful in collecting the data required for formulation of this paper.

REFERENCES

[1] Singha, Ranjan, M., Kalita, B., Uninterrupted Traffic Flow at Junctions with special reference to Guwahati city, International Journal of Innovative Technology and Exploring Engineering, February 2014.

[2] Sen, R., Sevani, V., Sharma, P., Koradia, Z., Raman, B., Challenges in Communication assisted Road Transportation Systems for Developing Regions, NDSR, 2009.

[3] Carsten, O.M.J., Tight, M.R., Southwell, M.T., Plows, B., Urban Accidents: Why do they happen? 1989.

[4] Uddin, Azeem, Traffic Congestion in Indian cities: Challenges of a rising power, Naples, March 2009.