

# IMPACT OF VEHICLE PEDESTRIAN INTERACTION ON TRAFFIC FLOW: MID- BLOCK SECTION & INTERSECTION IN AKOLA CITY

Dipali S Pattebahadur<sup>1</sup>, Dr. A.P. Dange<sup>2</sup>

<sup>1</sup>PG Student, Department of Civil Engineering, G.H. Rasoni University Amravati,

<sup>2</sup>Professor, Department of Civil Engineering, G.H. Rasoni University Amravati, INDIA.

\*\*\*

**Abstract** - In this paper some studies are there to understand the pedestrian movement in Akola city. As we know that pedestrian is one of the important component in the urban transportation system and additionally vulnerable at un-protected mid-block locations under mixed traffic conditions. The papers describe various pedestrian movements. And similarly we know that crossing by pedestrians on midblock sections of urban roads is extremely common in developing countries such as India. The locations where the pedestrians cross the road are always specified with no pedestrian cross marks. Due to the saturation of population within the city area the population growth in these areas has been more rapid in recently, and it is related in large-scale industrial development in the outermost areas. Therefore it is necessary to give attention related transportation and study the need for street lighting, better geometric design, signals, roadway marking, capacity, etc.

To do this, different places are chosen from Akola city i.e., road intersection in Sindhi camp towards the Post office road between station points facing the large amount of traffic problems. In this paper the study would be mainly divided into two parts with initial section focusing a lot of on a mid-block section and also the later phase on intersection mentioned higher than.

**Key Words:** Pedestrian, sidewalk, mid-block, crossing behavior, signalized intersection, mix traffic, vehicular characteristic.

## 1. INTRODUCTION

Now a day's walking is a primary means of human motion. And that's why we are considered the pedestrians are the basic elements of transportation. Proper facility may helpful for pedestrian. In ancient ages there was a huge pedestrian walking takes place thus walking is the only way for transportation. As we know pedestrian walk is a useful mode of transportation for short trips and walking is a huge mode of transportation in Indian cities as well. So provision of best design

spaces for human motion like at movement for travelling the hill station and travelling to tour, travelling the work aspect, etc. For that, the study of vehicular motion is most important in all aspects and it is carried away by using two levels i.e. (macroscopic level and microscopic level). In a macroscopic level a study of basic flow parameters like density of vehicular motion and speed. At macroscopic level one may trace the paths followed by individual vehicular while moving respectively. From above study it is cleared that the vehicular may frame their own path in their journey. After that now coming to the vehicular crossing behavior there are various cross road like intersection, it is provide to assist the vehicular to move from one side to the other side of road, and it play a exceptional role in the mobility and safety mode of signalized intersections. But in some other places like the busy traffic takes place, vehicular choose the midblock to cross the road. However there is no safety as compared to signalized intersection. Even many vehicular cross roads are taking place in this midblock section. It is totally depend upon the vehicular travel motion need road width is specify. There are some manuals are published about the road width but they didn't provide clear specification for the required road width.

Vehicular flow consists of two types i.e. unidirectional and bidirectional. In a unidirectional flow, the flow of vehicular motion is only in one direction whereas in the bidirectional, the flow of vehicular travels from the both direction and interact with each other. A vehicular road safety is one of the important features of transportation engineering in urban areas. The prohibited crossing behavior of the vehicular is an major issue in the road safety. The research paper is focused on developing vehicular motion which can describe the vehicular interaction at the cross section. For that vehicle flow interaction at various intersections was collected from Akola city these experimental studies will be discuss here.

## AIM AND OBJECTIVES

**AIM:** To provide mid block section and road intersection at junction of Sindhi camp road, Akola to control the traffic volume and its problem by traffic design.

### OBJECTIVE:

- 1) To study the traffic volume of the mid block section and intersection.
- 2) To study the road conditions.
- 3) To study the existing drainage condition of the mid- block section road sites.
- 4) To study the existing condition of residence living near the site of study area who can have the problem with the work.
- 5) To perform record search, site investigation and data collection to identify existing utilities in the area.

### SCOPE:

- 1) Reduces intersection crash types.
- 2) Healthy and safe communities.
- 3) Transportation system effectiveness.
- 4) Facilitates complex and risky traffic movements at 'X' and 'T' intersections.
- 5) Improved traffic flow by avoiding collisions and blocking congestion delays.
- 6) Reduces disturbing noise produce by vehicle horns and automatic warning devices.

### LIMITATION OF STUDY:

- 1) To analyze the mid-block road condition of the site.
- 2) Prepare geotechnical report based on in-situ testing as necessary to support the track design.
- 3) Study of microscopic traffic flow characteristics like headway, clearance etc.
- 4) Estimating and costing of overall project.

### PROBLEM SPECIFICATION:

#### i) Problem caused at road crossing:

- 1) Huge traffic congestion due to intersection.
- 2) Traffic jam creates long queues of vehicles.
- 3) Increase travel time and fuel consumption.
- 4) Air pollution and noise pollution.

#### ii) Accident causes at road site:

- 1) Most crashes happen at intersections.

- 2) Accident cause due to some technical Problem of vehicles.

## 2. METHODOLOGY

To establish the effect of the pedestrian crossing on the speed and capacity of the urban road the data collected at Akola city in Maharashtra. To assess the effect of pedestrian crossing it is essential to conduct the survey at the section with and without the effect of the pedestrian crossing on the urban road. The mid-block section with the effect of the pedestrian crossing is termed as 'friction section' whereas the mid-block location where there is no any such influence observed is termed as 'base section'. A photographic survey was conducted at Akola city.



### i) DATA COLLECTION

1. The traffic volume at Sindhi camp, information is expand.
2. The traffic flow survey at intersection from time 9Am to 11Am and at evening 5Pm to 7Pm.
3. The traffic at junction mostly in early morning and in evening so here seems that most of the traffic issues of junction are occurred by pedestrian, animals, parking and significant vehicle. To sort out these issues of traffic the subway ought and bridge to be provided.

Traffic investigation methods. There are two methods for conduction of traffic volume counts; i.e. 1) Automatic count. 2) Manual count.

### AUTOMATIC COUNT METHOD

An automatic count method is completely based on automatic system. In automatic count method the data will be recorded by using video graphic images and sensors on the zebra crossing which is record the number of vehicle passes away.

Manual counts are normally collect information for determination of auto classification, direction of travel, Pedestrian movement, turning movement or vehicle occupancy

An automatic count generally gives the information for determination of auto hourly patterns, daily or seasonal differences and growth trends, or annual traffic estimates. The choice of study strategy ought to be determine injury count amount and the count amount ought to be illustrative of the time of day, day of month, month of year for study space. For instance, count at a summer resort wouldn't take in January. The count amount ought to avoid special event and compromising atmospheric condition (Sharma 1994). A count period could vary from five minutes to one year. Usually count period are quarter-hour or a pair of hour for peak period, four hours for morning and afternoon peak, six hours for morning, mid day, and afternoon peak and twelve hours for daytime periods (Robertson 1994). Thus, for instance, if you were conducting a 2hour peak amount count, 8-15min count would be requiring.

### MANUAL COUNT METHOD

Most of utilization of manual count essential little samples of knowledge at any given location. Manual counts are usually used once the problem and expanse of machine-drive instrumentation are not even. Manual counts are important sometime instrumentation is not on the market. Manual count normally used for the period of daily basis. Normal intervals for a manual count are 5, 10 and quarter hour. At the day time of Monday and evening time of weekday show inconsistent high volume. Therefore, sometime count may conduct on Tuesday, Wednesday or Thursday.

### Manual counts recording methods

There are three methods i.e., .1) Tally sheets method, 2) Mechanical counting board 3) Electronic counting boards.

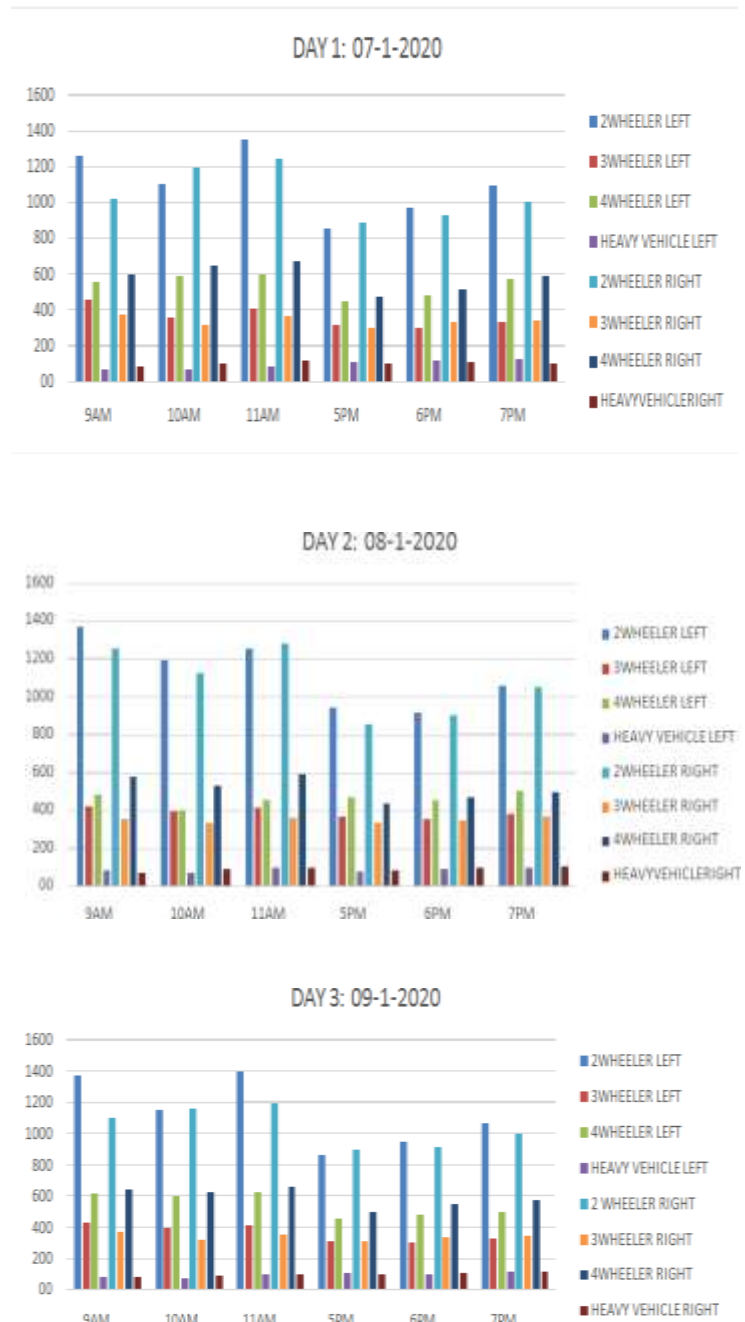
### Tally Sheets Method

In a manual count recording, tally sheet method is the simplest way for recording the information. And this information usually recorded with a tick mark on a pre- prepared field type. In this method a watch and timer is necessary to live the required count interval.

## 3. WORK PERFORMED

### Vehicles Counting

The various data collected in the form of vehicle counting which is shown in below the bar graph from Day 1 to Day 3 as follows:



In above graph shows time verses volume density in different day (i.e. Day1, Day2 and Day3) The vehicle counting peak hours in morning and evening different types of vehicle i.e. 2 Wheeler, 3 Wheeler, 4 Wheeler and heavy vehicle are

counting right and left sides.

#### 4. IMPLEMENTATION OF STUDY

Road controlling is given the authority to erect regulatory signs which includes GIVE WAY AND STOP sign. Associated road markings are required by the Traffic Regulations signs and marking must be present to have legal effect, except where the surface type of it impractical to provide markings, unsealed road. The required marking are detailed in guide to urban road marking. It should be noted that the current edition of the manual of traffic sign and marking shows 'STOP' or 'WAY' letters starting a maximum of 10m from the limit line. To make sure the Traffic Regulations are complied with the whole of the world of the word should be within 10m. Further instruction given in the sign manual.

Replication of sign may be desirable as outlined in these guidelines. This is specified in the definition of 'Intersection' in the interpretation clause of the Traffic Regulation of mid block section and intersection. They are important to ensure uniform national standards and to avoid confusion. Guidelines for use and construction of speed control hump are discussed in legal aspects of speed reduction devices. And guidelines for implementation of traffic control at cross road are discussed in new ministry publication and also discussed the procedures for the choice of traffic control at a particular uncontrolled crossroad. It provides a suitable reference to matter such as visibility distance, appropriate legal matters and practical aspects, approaching vehicle speed of road. In particular it contains new criteria for the installation of stop sign based on the safe approaching speed. Proper information can also be found in the manual of traffic signs and markings. It has been agreed that the section of manual dealing with give way and stop sign will be modify to give effect to this policy and be consistent with the guidelines. Still the implementation of the policy should be undertaken by road controlling authorities using their own staff or consultants.

**Road Width:** Traffic controls are reducing for implementation of road width for improper road and side of parking facilities provide.

**Signal:** Traffic signals are provided at road intersection this are control device which could alternatively direct to stop and proceed. Traffic signals are worked from the automatic and

manually. Sometime the signals are not work properly so the traffic are produce to the signal the maintenance and special control room are provide for better work of traffic control reduce and some small place of road intersection the battery of signal provide to maintained the traffic flow.

**Sign:** Road sign are provide for road side corner to inform the road user of certain laws, and regulation. This sign are inform the road user for proper guidance so the vehicular are proper way so the traffic is reduced.

**Marking:** The road marking to reduce the traffic control for improper parking of vehicles the marking sign of road side provider of yellow colour of line parking to provide the vehicle are park and Marking sign implementation of road marking of redline are provide to implement the road at night vision of road clearly show.

**Island:** The road intersections of island are providing for bigger size so the traffic is reduced.

**Traffic signal:** Traffic signals are electrically operated traffic control devices which alternately direct traffic to stop and to proceed. This discussion tells what factors enter into traffic engineer's decisions to install traffic signals. Because there is a common belief that signals are the answer to all traffic problems at intersections, this is offered in the interest of developing broader public understanding about what signal will do and what they won't do. A number of definitions and notation need to be understood in signal design. They are discussed below:

- **Interval:** Accordingly it indicates the change from one stage to another stage. In this there are two types of interval i.e. i) change interval and ii) clearance interval.  
A change interval may also called yellow time indicates the interval between the green and red signal indication for an approach.  
Now clearance interval may also called all red is included after each yellow interval indicating a period during which all signal faces sow red and it is used for clearing off the vehicles in the intersection.
- **Green Interval:** It is denoted as GI and it is the green indication for particular movement or set of movement. This is the actual duration the green light of a traffic signal is turns on.
- **Red Interval:** It is denoted as RI and it is red



indication for particular movement or set of movement. This is the actual duration the red light of a traffic signal is turned on.

- **Phase:** A phase is a green interval plus the change and clearance interval that follow it. So that during green interval, no conflicting movement are allot into each phase.
- **Lost Time:** It indicate the time during which the intersection is not usefully for any movement. For example, when the signal for an approach turns from red to green ,the driver of the vehicle which is in the front of the queue will take some time to sense the signal it is usually called as reaction time and sometime will be lost here before they moves.

A complete series of stages during which all traffic movements are served in turn is known as a cycle. The cycle time is the sum of each of the stage times.

## 5. CONCLUSION

On a junction the three phase signal is provided and the signal cycle time is 40 second. As this mid-block section is on the route of the Sindhi camp most of the traffic going towards the Nehru Park, Post office road and Washim bypass or some other school have to cross the road so the design criteria of this signal should be as per guidelines.

To provide zebra crossing near traffic end of the radius for people can safely crossing the road among three phases.

A signal with traffic police should be provided.

As per requirement Traffic marking and islands should be provided.

## 6. REFERENCES

1. Chattaraj, U., Seyfried, A. and Chakroborty, P. (2009). Comparison of Pedestrian Fundamental Diagram across Cultures. *Advance in Complex system*, 12 (3), pp. 393-405.
2. Highway capacity manual, Washington , DC: Transportation Research Board, 2010.
3. U Chattaraj, Chakroborty, P. And Seyfried, A. (2010). Empirical Studies on Pedestrian Motion through Corridors of Different Geometries. In *Proceedings of the 89<sup>th</sup> Annual Meeting of the Transportation*

Research Board, Washington, D.C, USA

4. Chattaraj, U. (2011). *Understanding Pedestrian Motion: Experiments and Modelling*. Ph.D. Thesis. IIT Kanpur, India.
5. Jodie Y.S Lee, William H.K. Lam et al.(2006). *The Variation of Walking Speeds on a Unidirectional Walkway and on a Bi-directional Stairway*. The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong.
6. Rastogi, R., Ilango, T.And Chandra, S. (2011). *Design Implication of Walking Speed for Pedestrian Facilities*, *Journal of Transportation Engineering*, ASCE, 137(10), pp. 687-696.
7. Chattaraj, U., Seyfried, A., Chakroborty, P. and Biswal, M.K.(2013). *Modeling Single file pedestrian motion across cultures*. Elsevier, 104(2013), pp. 698-707.