IJARESM
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN ENGINEERING, SCIENCE & MANAGEMENT

TRAFFIC VOLUME ANALYSIS FOR JAHANGIRPURA-OLPAD CORRIDOR, SURAT CITY

Bhavik Jayeshkumar Icecreamwala[1], Himanshu J. Padhya[2]
P.G. Student, Town & Country Planning, Sarvajanik College of Engg & Tech, Surat, Gujarat[1]
Asso. Prof., Faculty of Civil Engg, Sarvajanik College of Engg and Tech, Surat, Gujarat[2]

Abstract: ***Surat is one of the fastest growing cities with growth rate of 55.29 % in 2011. So in Surat city, due to increase in population use of private vehicles is increase and also increase industries in the city which result in people more travel for the jobs. To overcome this behavior of traffic problem and to see the planned development, the present study aims to traffic volume survey of Jahangirpu-Olpad Corridor which is one of the entry-exit road for Surat City. So, improve transit planning and improve traffic for conduct Traffic volume survey. From the traffic volume survey find out the PCU per hour.***

Keywords: **Transportation planning, Traffic volume survey, Traffic volume analysis, Passenger Car Unit**

I. INTRODUCTION

India has a tremendous system of streets, both metaled and undetailed. Be that as it may, this methods for transport and correspondence are as yet insufficient for our requirements. The vehicles that are essentially utilized on town streets are motor buses, trucks, and bullock trucks. Prior to the approach of railroads, streets were the main methods for correspondence for the exportation of surplus deliver. With the expansion of the railroad framework, it has turned out to be increasingly important to develop streets to bolster the rail lines. At present, the financial misfortune brought on by the detachment of numerous farming locale in the blustery season is extremely incredible. In sandy, uneven, and timberland canvassed tracts and in different parts of the nation, where railroads have not entered, street transport still holds a vital share of long-separation movement. The opening of railroads has made an interest for street development, which must be met by the nearby and common bodies. The topic of building up the streets is additionally of key significance. We can't expect any critical advance in our provincial economy unless there are great street associations amongst towns and towns. Over four decades of automobile oriented planning the world over has necessitated the need to search for a new growth management model that is able to respond to the challenges of the 21th century cities.

Transport plays a significant role in the overall economic development. Transportation results into growth of infrastructure, industrialization and massive production.

II. LITERATURE

Indian cities are increasingly faced with the twin challenges of providing adequate road space for future use and improving the poor condition of existing roads due to the neglect of maintenance over the years. Current road designs do not adequately provide for facilities such as footpaths and cycle tracks. The available road space gets encroached by commercial establishments, street vendors, and on-street parking due to poor enforcement of the existing regulations. The variety of vehicles on the roads moving at different speeds without any demarcated lanes also adds to the challenges of urban transport.

The highly inadequate and poor quality of the public transport system in Indian cities not only poses a major challenge to realizing the growth potential of the economy but also has adverse impact on the health and wellbeing of the people. Long hours spent on road journeys, lives lost in road accidents, and air pollution are only some of the effects of the acute problem of transportation facilities in and around cities.

As per CRRI repot Surat, traffic problem create by the inadequate road width, on-street parking, mixed traffic condition various types of transportation mode, inconsistent carriage widths, absence of pedestrian facilities. Transportation management plan is needs to study about intersection, parking and terminal, pedestrian and bicycle, screen point, speed and delay.

As per IRC Guideline, Standard lane width of highway is 3.5m. Shoulder width on the outer side built up area 2.0m. The width of road is depend upon the width of carriageway, shoulders and the median. Passenger Car unit (PCU) though find out the how much lane is provide to particular road.

Table. 1 PCU factor for various types of Vehicle

Vehicle type	Equivalent PCU factors	
	5%	10% and above
Two wheeler , Motor cycle or Scooter etc.	0.5	0.75
Passenger car, Pick-up Van	1	1
Auto rickshaw	1.2	2.0
Light Commercial Vehicle	1.4	2.0
Truck or Bus	2.2	3.7
Agriculture Tracker trailer	4.0	5.0
Bicycle	0.4	0.5

(Source: IRC code 106)

Table. 2 Design Service Volume (PCU PER HOUR)

S.r No.	Type of Carriageway	Total Design Service Volumes		
		Arterial	Sub-arterial	Collector
1	2-lane (One-way)	2400	1900	1400
2	2-lane (Two-way)	1550	1200	900
3	3-lane (one-way)	3600	2900	2200
4	4-lane Undivided(Two-way)	3000	2400	1800
5	4-lane Divided(Two-way)	3600	2900	-
6	6-lane Undivided (Two-way)	4800	3800	-
7.	6-lane Divided (Two-way)	5400	4300	-

(Source: IRC Code 106)

III. DATA COLLECTION

There are various types of surveys that are carried out to assess main components of planning. The first is known through the inventory search and the second is through the field survey.

Field Survey

To get accurate data and actual condition of study area field survey is required. The facts and figures will be getting by it. It is carried out through observation, sketching, measurement etc.

1) Traffic Volume Survey

Traffic Volume is the number of vehicles crossing a section of road per unit time at any selected period. Traffic volume is used as a quantity measure of flow; the commonly used units are vehicles per day and vehicles per hour.

The traffic volume survey was carried out from two different places of study area. One is Saroli and the other one is Intercity near Olpad. The survey was carried out for 6 Hour/day for 1 weak. The survey timing was 9:00a.m to 12:00a.m. And in evening 6:00p.m to 9:00p.m. In this period Manually Count was done from both places vehicles have been counted.

IV. DATA ANALYSIS

The surveys like traffic volume survey; vehicle occupancy survey was carried out on the main corridor of study area from Saroli to Olpad. This chapter deals with data analysis based on the data collection using field survey data like Travel pattern was collected and following analysis is carried out.

A. Location: Saroli

Saroli is a part of the Chowk to Olpad Road and this road is develop as a major entry-exit of the surat city. So, Saroli to need develop the road. The traffic coming towards city from Olpad is called as Olpad to Saroli side volume and going from city towards Olpad on GJ SH 06 is called as Saroli to Olpad side volume.

Average Morning Peak Hour Volume Analysis

a. Saroli to Olpad

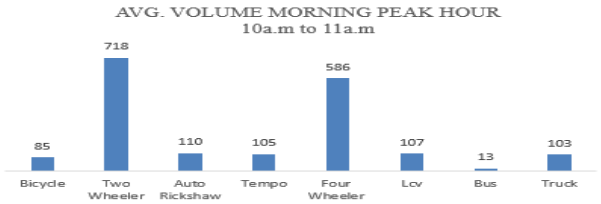

Fig 1 Avg. Hourly Volume of Morning Peak Hour at Saroli of Olpad Direction

In Avg. morning peak hour during 10:00a.m. to 11:00a.m vehicle volume is maximum and it is 1827 vehicles/hour. In which 2wheelers are maximum 39% of total hourly volume and 2nd highest is four wheeler 586 which was almost 32% of total hourly volume. Only 1% is busses are there which indicates the lacking of public transport and influence of private vehicles.

b. Olpad to Saroli

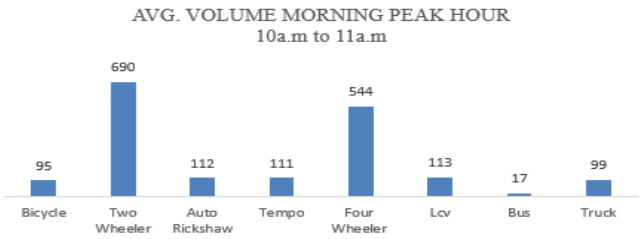

Fig 2 Avg. Hourly Volume of Morning Peak Hour at Saroli of Saroli Direction

The traffic on this side of road is almost same in comparison of other side of road. Avg. hourly volume is 1781. In which 39% are two wheelers which are 690 Avg. per hour but it is almost same of the number of two wheelers on other side of road. The four wheeler are 544 which is 31% of Avg. hourly volume.

Average Evening Peak Hour Volume Analysis

a. Saroli to Olpad

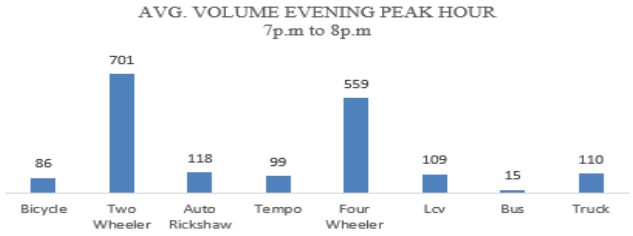

Fig 3 Avg. Hourly Volume of Evening Peak Hour at Saroli of Olpad Direction

The traffic is average on lane of Saroli to Olpad in the evening peak hours. Two wheelers and four wheelers are more in numbers which shows the number of private vehicles and auto are also more which indicates the lacking of public transport.

b. Olpad to Saroli

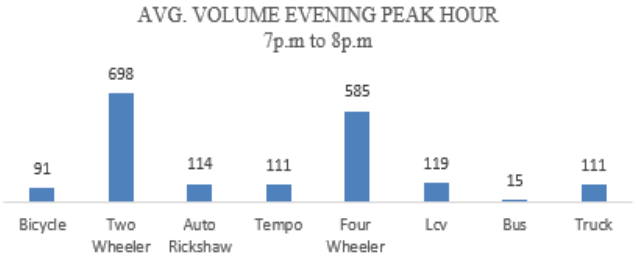

Fig 4 Avg. Hourly Volume of Evening Peak Hour at Saroli of Saroli Direction

The traffic is very heavy on the lane of Olpad to Saroli of this corridor. It is 1844 vehicles/hour. The percentage of two wheelers is 38% of total volume, which is 698 vehicle/hour. The percentage of auto is near about 6% of total volume which is 114 vehicle/hour. The percentage of car is 31% of total volume, which is 585 vehicle/hour. The percentage of bicycle is 1%.

B. Location: Olpad

Second survey location is near to the olpad town entry. It is placed on this main arterial road named GJ SH 06. This arterial road is one of the main entrances of city and this location is best for volume count of this arterial road.

Average Morning Peak Hour Analysis

a. Saroli to Olpad

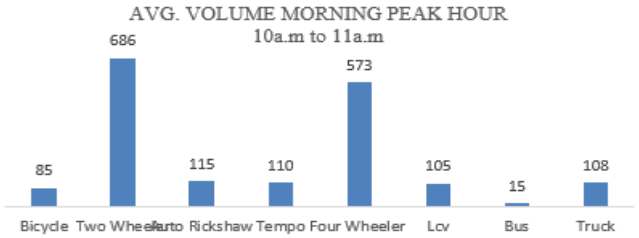

Fig 5 Avg. Hourly Volume of Morning Peak Hour at Olpad of Olpad Direction

In morning peak hour during 10:00a.m. to 11:00a.m vehicle volume is maximum and it is 1797 vehicles/hour. In which 2wheelers are over 686 per hour which is 38% of total Avg. hourly volume and 2nd highest is four wheeler 573 which was almost 32% of total Avg. hourly volume. Only 1% is busses are there which indicates the lacking of public transport and influence of private vehicles. 6% auto and 5% bus are avg. hourly volume percentage on their road.

b. Olpad to Saroli

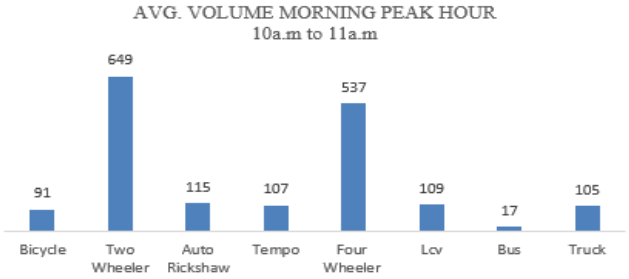

Fig 6 Avg. Hourly Volume of Morning Peak Hour at Olpad of Saroli Direction

The traffic in Avg. morning peak hour going from Olpad to Saroli is normal. The two wheels and car are mainly in that traffic, it is near about 38% and 31% respectively of total volume of morning peak hour. Which are only 649 and 537 per hour and the only reason of that is the purpose of working, study and other purpose of the public for coming in city area.

Average Evening Peak Hour Analysis

a. Saroli to Olpad

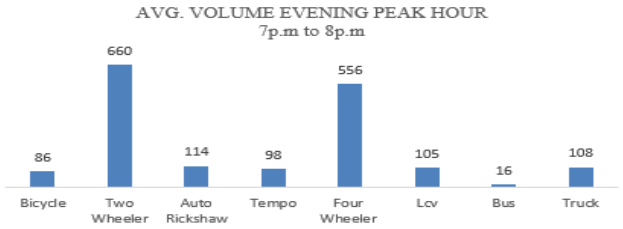

Fig. 7 Avg. Hourly Volume of Evening Peak Hour at Olpad of Olpad Direction

Traffic on this lane is normal in evening period. There is Avg. Hourly volume 4wheeler 32%; it is % of total hourly volume. 2wheelers and autos are 32% and 7% respectively of Avg. hourly volume.

b. Olpad to Saroli

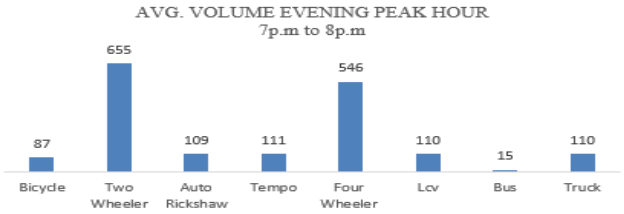

Fig. 8 Avg. Hourly Volume of Evening Peak Hour at Olpad of Saroli Direction

The traffic is regular in this lane. The total percentage of auto is 6% of total volume, two wheelers is 38%, four wheeler is 32% which is too high and indication the unavailability of public transport system.

Average One Hour Volume Analysis

a. Saroli

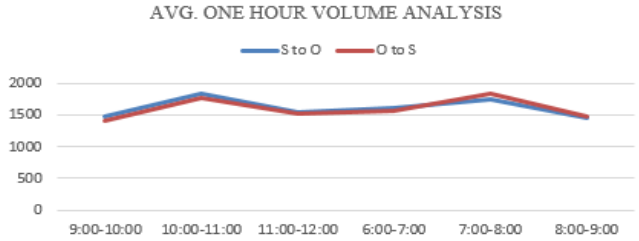

Fig. 9 Avg. One Hour Volume Variation at Saroli for Both Directions Flow

In above charts, line chart shows the hourly variation of avg. one week volume of vehicle passing through the lane hourly. In line chart the blue line indicates vehicle passing through lane Saroli to Olpad and red lien indicates vehicle flow from Olpad to Saroli. The blue line has peak point during morning peak hours and it is 1841 vehicles/hour. And the red line has peak point during evening peak hours and it is of 1838 vehicles/hour.

b. Olpad

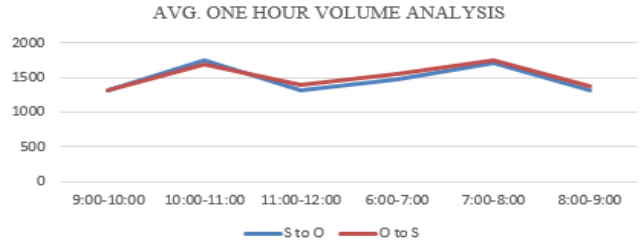

Fig. 10 Avg. one hour Volume Variation at Olpad for Both Directions Flow

In above charts, line chart shows the hourly variation of avg. one week volume of vehicle passing through the lane hourly. In line chart the blue line indicates vehicle passing through lane Saroli to Olpad and red lien indicates vehicle flow from Olpad to Saroli. The blue line has peak point during morning peak hours and it is 1762 vehicles/hour. And the red line has peak point during evening peak hours and it is of 1747 vehicles/hour.

C. One week Daily Passenger Car Unit per Hour

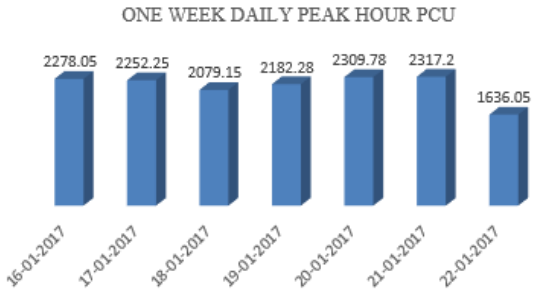

Fig. 11 one week daily Pcu/hr Variation at Both Directions Flow

In above chart shows the one week daily variation of passenger car unit per hour(PCU/hr). In bar chart is indicates Passenger Car Unit per hour through lane Saroli to Olpad and Olpad to Saroli. In this bar chart show to the maximum PCU/hr. value is 2317.2 and minimum value is 1636.05.

V. CONCLUSION

With the respect to the above research work can say that due to increase in population use of private vehicles is increase and also increase industries in the city which result in people more travel for the jobs. To overcome this behavior of traffic problem and to see the planned development, the present study aims to traffic volume survey of Jahangirpu-Olpad Corridor which is one of the entry-exit road for Surat City. Through the traffic volume survey analysis to find out the morning and evening peak one hour traffic volume is high. From the traffic volume of the one week peak hour volume to find out the passenger car unit per hour. One week daily PCU/hr. maximum value is 2317.2 and minimum value is 1636.05. From the value of PCU per hour to conclude that the overcome the traffic problem though the improving road width and proper transit planning.

ACKNOWLEDGEMENT

The authors convey a deep sense of gratitude to Dr. Vaishali Mungurwadi, Principal, Sarvajanik College of Engineering & Technology and Prof (Dr.) Pratima A. Patel, Faculty Head-Civil Engineering, Sarvajanik Collage of Engineering & Technology, Surat for consistent support and motivation.

REFERENCES

[01] Ana Galeloa, Anabela Ribeirob, Luis M. Martinezc. “Measuring and evaluating the impacts of TOD measures - Searching for Evidence of TOD characteristics in Azambuja train.” 2013.

[02] Arefeh Nasri, Lei Zhang. “The analysis of transit-oriented development in Washington, D.C. and Baltimore metropolitan areas .” 2014.

[03] BRT And TOD: Case Studies On TOD Around BRTS In North America And Austalia. 2008, n.d.

[04] Chen Yang, Wei Wang, Jian Lu, Qian Wan. “A Research on Adaptive Transit Combined with Transit-Oriented Development for Small and Medium-Sized Cities.” 2008.

[05] Daniel A. Rodriguez, Erik Vergel-Tovar, William F. Camargo. “Land development impacts of BRT in a sample of stops in Quito and Bogotá .” 2015.

[06] Edward Beimborn, Harvey Rabinowitz, Charles Mrotek, And Shuming Yan. “Transit-Sensitive Suburban Land Use Design: Results of a Competition.” n.d.

[07] Electricwala Fatima, Rakesh Kumar. “Introduction of public bus transit in Indian cities .” 2014.

[08] Geethu Lala Divya L. G.a, Nithin K. J.a, Susan Mathewa, Bennet Kuriakosea. "Sustainable Traffic Improvement for Urban Road Intersection of Developing Countries: A case Study of Ettumanoor, India." 2016.
[09] Handayenia, Ketut Dewi Martha Erli. "TOD Best Practice: Lesson Learned for GHG Mitigation on Transportation Sector in Surabaya City, Indonesia." 2014.
[10] Hayati Sari Hasibuana, Tresna P Soemardia, Raldi Koestoerb, Setyo Moersidikc. "The Role of Transit Oriented Development in constructing urban environment sustainability, the case of Jabodetabek, Indonesia." 2014.
[11] Jiawen Yang, Junxian Chen, Xiaohui Le, Qin Zhang. "Density - oriented versus development - oriented transit investment: Decoding metro station location selection in Shenzhen." 2016.
[12] John Black, Kam Tara, Parisa Pakzad. "Planning and Design Elements for Transit Oriented Developments/Smart Cities: Examples of Cultural Borrowings." 2016.
[13] Jonas De Vos, Frank Witlox. "Transportation policy as spatial planning tool; reducing urban sprawl by increasing travel costs and clustering infrastructure and public transportation." 2013.
[14] Jonas DeVos, Veronique Van Acker,Frank Witlox. "The influence of Transit-Oriented Development: An explorative analysis ." 2014.
[15] Keith A. Ratner, Andrew R. Goetz. "The reshaping of land use and urban form in Denver through transit-oriented development." 2012.
[16] Kinan Bahbouh, James R.Wagner, Catherine Morency. "Travel demand corridors: Modelling approach and relevance in the planning process." 2016.
[17] Liu Liu, L'Hostis Alain. "Transport and Land use interaction: a French case of suburban development in the Lille Metropolitan Area (LMA)." 2014.
[18] M. Borg, R. Orsini. "Transit oriented development – integrating land-use and transport in small island states." 2008.
[19] Ma, Sujith K. "Access Controlled High Speed Corridor and Urban Development of Kerala." 2015.
[20] Madhu Errampalli a, Ravinder Kayitha b. "Traffic management plan for Port Blair city, India." 2014.
[21] Matthew J.Nahlik, Mikhail V. Chester. "Transit-oriented smart growth can reduce life-cycle environmental impacts and household costs in Los Angeles ." 2014.
[22] Muhammad Ermando Nurman Sasono, Santika Purwitaningsih, Lukman Yusuf. "Surabaya Smart Subway Development as an alternative mode in Ahmad Yani Corridor Surabaya By TOD concept Application." 2016.
[23] Ni Luh Asti Widyaharia, Petrus N. Indradjatia. "The potential of Transit-Oriented Development (TOD) and its opportunity in Bandung Metropolitan Area." 2015.
[24] Rathod Urvi Bhupensinh, Himanshu J. Padhya. "Transit Oriented Development: Smart Growth as a Solution for Sprawl in Surat City ." 2015.
[25] Robert Cervero, Jennifer Day. "Suburbanization and transit-oriented development in China. ." 2009.
[26] RobertCervero, DanielleDai. "BRT TOD: Leveraging transit oriented development with bus rapid transit investments ." 2014.
[27] RuiMu, MartindeJong. "A network governance approach to transit-oriented development: Integrating urban transport and land use policies in Urumqi, China ." 2016.
[28] Sohail Ahmad, Ram Avtar, Mahendra Sethi, Akhilesh Surjan. "Delhi's land cover change in post transit era." 2015.
[29] Wu, Yuanyuan, and and Peng He Jun Chen. "Synergetic Analysis of the Public Transit System and Urban Form for Smalland Medium-Sized Cities." 2002.
[30] Xin Li, Yue Liu , Zhigang Gao , Daizong Liu. "Linkage between passenger demand and surrounding land-use patterns at urban rail transit stations: A canonical correlation analysis method and case study in Chongqing." 2016.

