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TRIP DISTRIBUTION FOR AHMEDABAD NEW WEST ZONE

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Abstract- **The Trip Distribution is the most complex and also important model in the urban transportation planning process. This paper gives a Flow of the framework to calibrate a doubly constrained gravity model of the trip distribution stage for the West Zone - Ahmedabad area based on a Household Information Survey (HIS) and Cordon Line Survey (CLS) which is carried out in 2016-2017. Samples are used for the calibration of gravity model. Calibration is carried out for different trip purposes like home, Service, Business etc. trips using Trans CAD software.**

Keywords- *Trip Distribution, Gravity Model, Future Trips, Calibration of Gravity Model*

I. INTRODUCTION

Transportation engineering is the application of scientific principles to the planning, design, operation and management of transportation system. The transportation System in the reference to society as a whole because it provides a service for the movements of goods and people from place to place. Population growth and Economic growth seems to have generated levels of demand exceeding the capacity of most transport facilities. Due to the continuing expansion of cities with the development of societies and technology the existing transportation systems are not sufficient to meet the increasing demands. To provide the free and safe flow of traffic from one place to another without encountering any congestion problem, it might be necessary to improve the existing transportation facilities or to construct new facilities. Transportation Planning Process plays an important role in construction of new transport facilities. The basic purpose of transportation planning and management is to match transportation supply with travel demand. For any city like Ahmedabad which already facing the problem of Traffic it is very much important to know about Future Traffic Conditions.

II. LITERATURE REVIEW

Study done by Abdel et al in Alexandria (2014) serves as a framework for calibrating a gravity model for the purpose of analyzing the travel behaviour for different purposes... The proposed model demonstrates the different patterns of trip distribution per purpose. It also shows a considerable shift toward non-compulsory trip purposes in the city of Alexandria. Also, the value for dispersion parameter ranges between 0.12-0.14.

Study done by Zala K in (2013) describe the calibration of a gravity model for various trip purposes like business, service and home and also for the same, the value for the deterrence functions ranges between 1 to 3 depending upon travel factors.

Study done by Guler in Turkey (2014) aims to calculate the transportation demand of the Marmaray corridor. The model was used to estimate freight and passenger transportation between Istanbul and other Turkish provinces. The estimated results were used to calculate the required train numbers on a daily basis through the Marmaray corridor and some suggestions were put forward to increase the capacity of this corridor.

Study done by Jin & Yang (2014) shows that LBSN (Location based social networking) has increased in popularity and sophistication, emerging as a new travel demand data source. Users of LBSN provide location sensitive data interactively via mobile devices, including smartphones and tablets. This data has the potential to provide origin-destination estimates. The proposed methodology is calibrated and comparatively evaluated against the OD matrix generated by gravity model based method as well as a reference matrix from the local metropolitan planning organization. The results of this method illustrate significant improvement in reducing the OD estimation errors caused by the sampling bias from the gravity model based method.

III. STUDY AREA

New-West Ahmedabad is separated from the other parts of the city by Sabarmati River. There are plenty of residential colonies located in this region. The place also boasts of housing some reputed colleges, which are world renowned. The region also flaunts good network of roads. Sardar Patel Stadium is housed here. This part of Ahmedabad is primarily a residential area with educational institutes. Total area of New-West Ahmedabad is 164.06 sqkm.

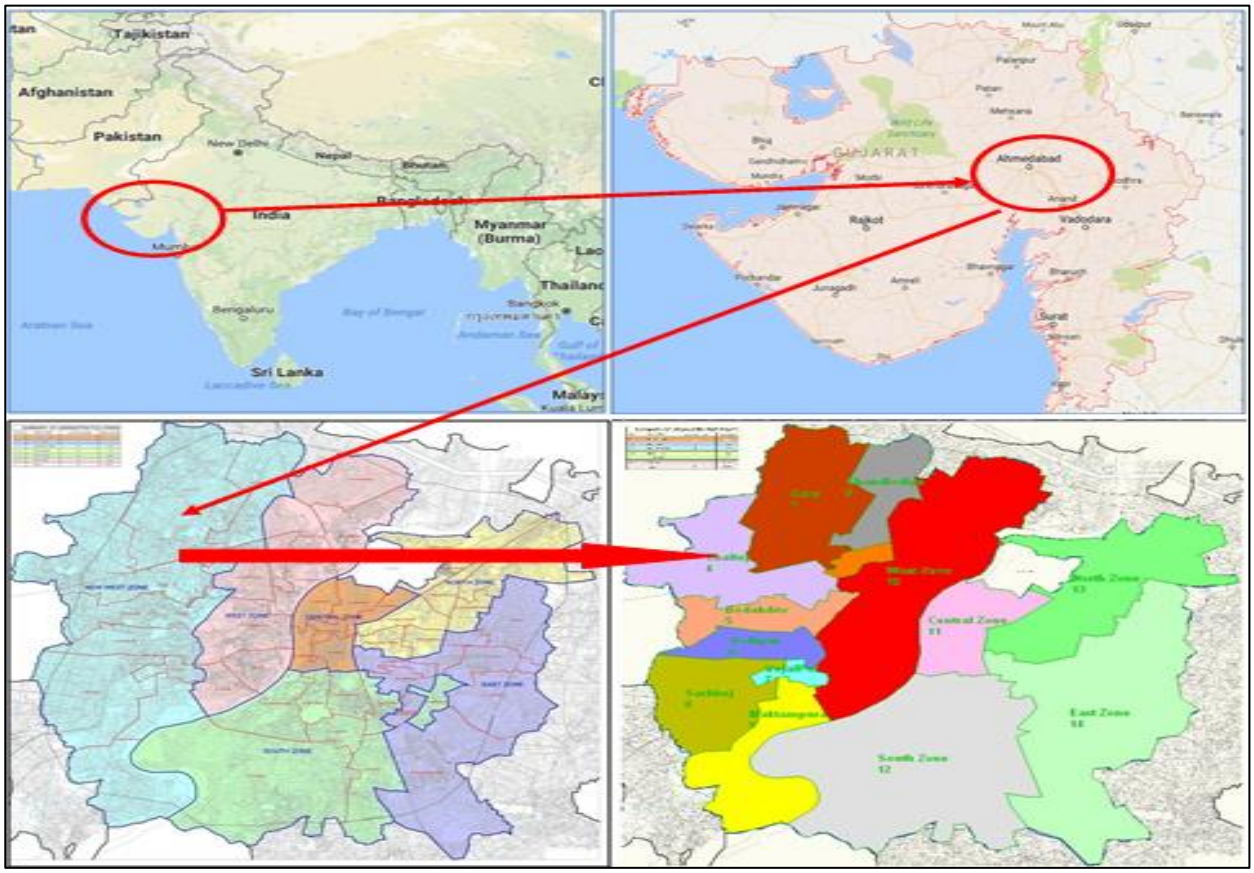


Figure: Study Area Ahmedabad NEW West Zone

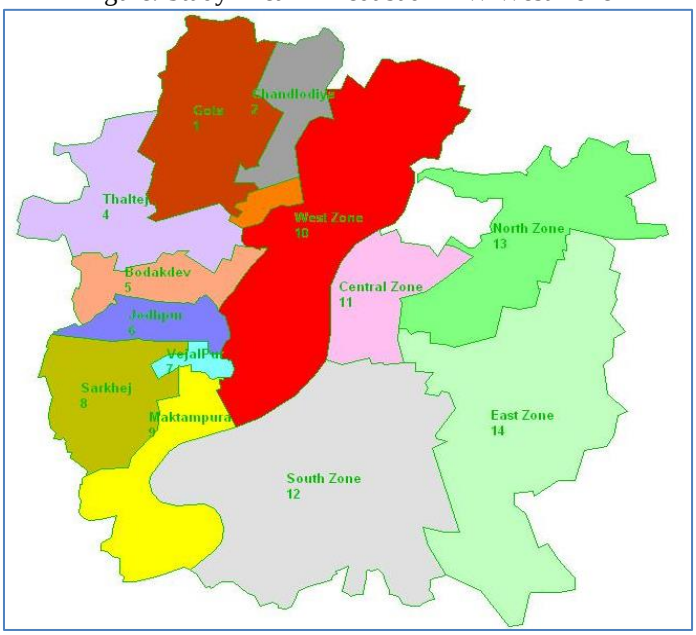


Figure: Study Area Details Ahmedabad New West Zone

IV. DATA COLLECTION AND ANALYSIS

Data Collected in the 2 phases one as the House Hold Interview Survey (HIS) and Second Phase is Cordon Line Survey (CLS). 1703 House Hold Surveyed During HIS and 1610 Survey Conducted at the Different Entries of Ahmedabad New West Zone. Using Home Interview Survey will only Give Internal to Internal and Internal to External Trips but there is the another big amount of Trip Originate from other Zone rather than New West Zone i.e. West Zone, Central Zone, South Zone, East Zone and North Zone. It observed that Boundary Sharing Zone like Central Zone, New West Zone and South Zone Contributed higher External to Internal Trip for West Zone.

Primary O-D Matrix where generated in the SPSS Statistical 17.0 after that same will be prepared in TransCAD. Expanded Matrix and Future OD Matrix where found with help of Current OD Matrix and Expand Factors with help of current and future Population. After Preparing all 3 OD Matrix Prepare Desire Line Diagram in TransCAD for Current and Future.

TransCAD

File Edit Map Dataview Selection Matrix Layout Tools Procedures Networks/Paths Route Systems Planning Transit Routing/Logistics Statistics Window Help

Matrix2 - Current OD (Matrix 1)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	452.00	139.00	81.00	49.00	38.00	28.00	22.00	50.00	39.00	69.00	85.00	125.00	53.00	48.00
2	144.00	213.00	55.00	41.00	48.00	47.00	48.00	36.00	31.00	80.00	56.00	104.00	28.00	18.00
3	84.00	54.00	160.00	87.00	69.00	42.00	37.00	25.00	40.00	76.00	38.00	99.00	22.00	13.00
4	49.00	40.00	84.00	151.00	74.00	36.00	61.00	44.00	45.00	115.00	57.00	80.00	35.00	21.00
5	38.00	46.00	73.00	70.00	121.00	110.00	79.00	44.00	38.00	121.00	50.00	101.00	34.00	37.00
6	26.00	45.00	43.00	38.00	112.00	135.00	69.00	44.00	62.00	47.00	52.00	78.00	41.00	28.00
7	21.00	48.00	37.00	61.00	78.00	69.00	173.00	98.00	133.00	81.00	81.00	133.00	56.00	35.00
8	51.00	34.00	25.00	44.00	44.00	42.00	97.00	160.00	122.00	71.00	118.00	122.00	54.00	38.00
9	39.00	30.00	40.00	45.00	38.00	65.00	132.00	119.00	285.00	74.00	90.00	122.00	63.00	52.00
10	47.00	61.00	51.00	56.00	36.00	33.00	36.00	16.00	25.00	0.00	0.00	0.00	0.00	0.00
11	33.00	29.00	25.00	37.00	30.00	31.00	48.00	64.00	51.00	0.00	1.00	0.00	0.00	0.00
12	29.00	57.00	47.00	41.00	29.00	44.00	52.00	72.00	59.00	0.00	1.00	2.00	0.00	0.00
13	16.00	14.00	8.00	13.00	13.00	28.00	22.00	27.00	35.00	0.00	0.00	0.00	0.00	0.00
14	13.00	4.00	2.00	4.00	9.00	15.00	8.00	11.00	18.00	0.00	0.00	0.00	0.00	0.00

Figure: Current OD Matrix

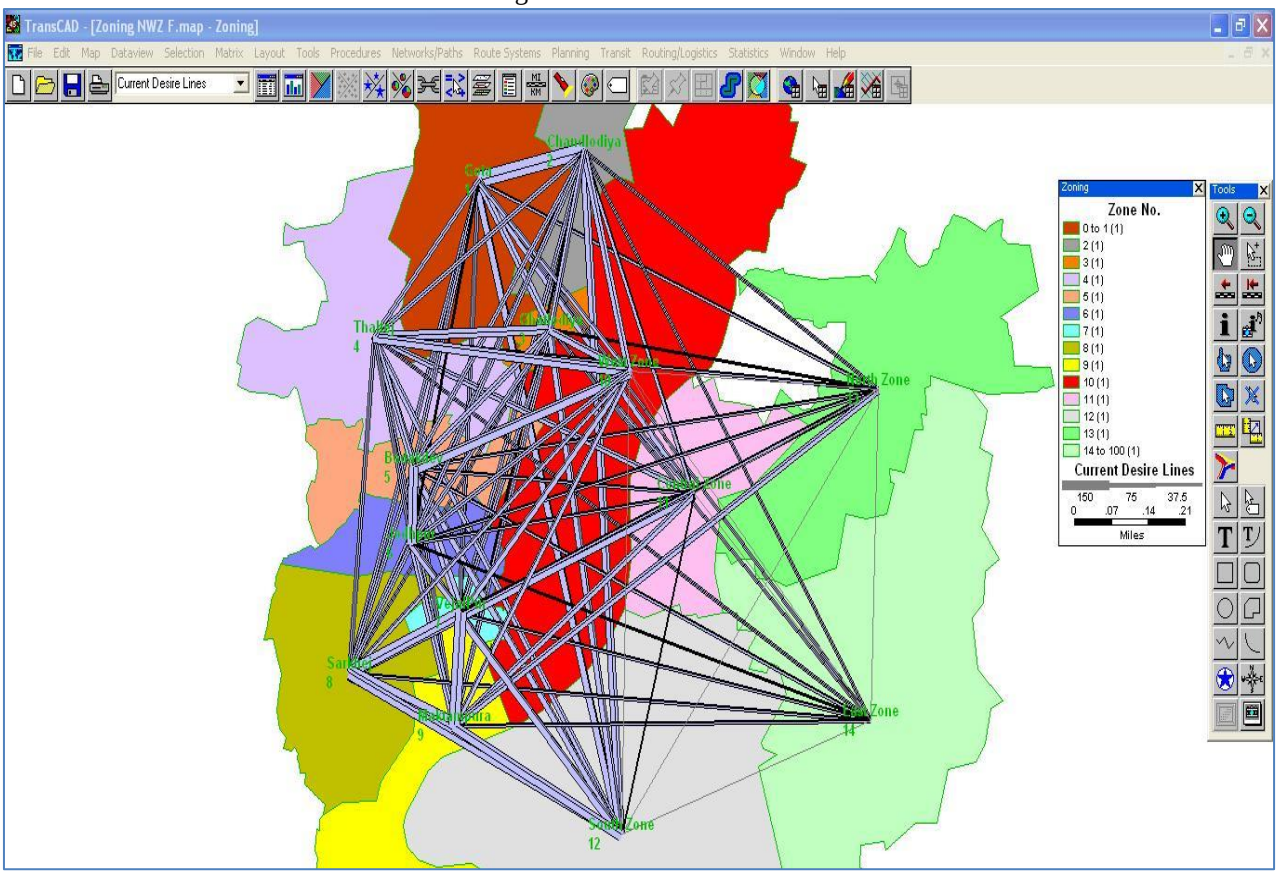
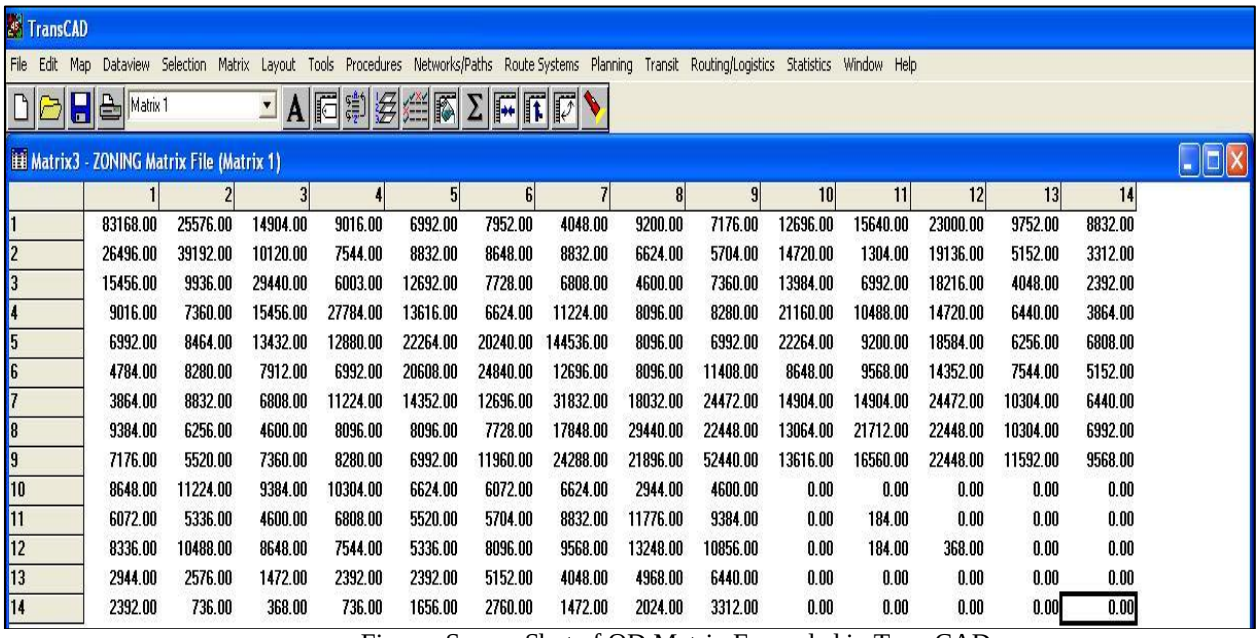


Figure: Current DLD for New West Zone Ahmedabad



	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	83168.00	25576.00	14904.00	9016.00	6992.00	7952.00	4048.00	9200.00	7176.00	12696.00	15640.00	23000.00	9752.00	8832.00
2	26496.00	39192.00	10120.00	7544.00	8832.00	8648.00	8832.00	6624.00	5704.00	14720.00	1304.00	19136.00	5152.00	3312.00
3	15456.00	9936.00	29440.00	6003.00	12692.00	7728.00	6808.00	4600.00	7360.00	13984.00	6992.00	18216.00	4048.00	2392.00
4	9016.00	7360.00	15456.00	27784.00	13616.00	6624.00	11224.00	8096.00	8280.00	21160.00	10488.00	14720.00	6440.00	3864.00
5	6992.00	8464.00	13432.00	12880.00	22264.00	20240.00	144536.00	8096.00	6992.00	22264.00	9200.00	18584.00	6256.00	6808.00
6	4784.00	8280.00	7912.00	6992.00	20608.00	24840.00	12696.00	8096.00	11408.00	8648.00	9568.00	14352.00	7544.00	5152.00
7	3864.00	8832.00	6808.00	11224.00	14352.00	12696.00	31832.00	18032.00	24472.00	14904.00	14904.00	24472.00	10304.00	6440.00
8	9384.00	6256.00	4600.00	8096.00	8096.00	7728.00	17848.00	29440.00	22448.00	13064.00	21712.00	22448.00	10304.00	6992.00
9	7176.00	5520.00	7360.00	8280.00	6992.00	11960.00	24288.00	21896.00	52440.00	13616.00	16560.00	22448.00	11592.00	9568.00
10	8648.00	11224.00	9384.00	10304.00	6624.00	6072.00	6624.00	2944.00	4600.00	0.00	0.00	0.00	0.00	0.00
11	6072.00	5336.00	4600.00	6808.00	5520.00	5704.00	8832.00	11776.00	9384.00	0.00	184.00	0.00	0.00	0.00
12	8336.00	10488.00	8648.00	7544.00	5336.00	8096.00	9568.00	13248.00	10856.00	0.00	184.00	368.00	0.00	0.00
13	2944.00	2576.00	1472.00	2392.00	2392.00	5152.00	4048.00	4968.00	6440.00	0.00	0.00	0.00	0.00	0.00
14	2392.00	736.00	368.00	736.00	1656.00	2760.00	1472.00	2024.00	3312.00	0.00	0.00	0.00	0.00	0.00

Figure: Screen Shot of OD Matrix Expanded in TransCAD

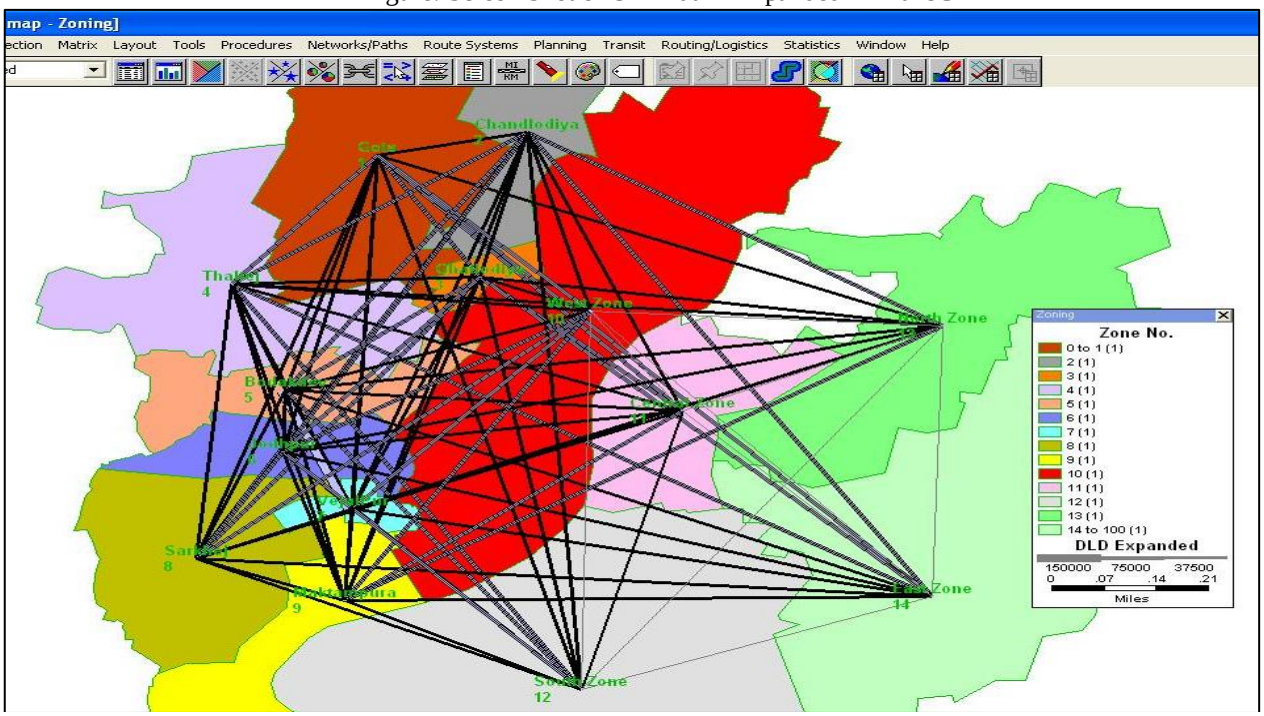


Figure: Screen Shot of DLD Expanded in TransCAD

V. CONCLUSION

Followings are the major conclusion of the study

1. The population growth rate in the last decade (2001-2011) is 1.68%.
2. The trip rate observed is 5.5 trips/HH/day.
3. The proportion of purpose based trip types is 54.0% Work, 42.0% Educational trips, 0.62% Social trips, 2% Shopping trips, 1.42% Recreational trips.
4. The derived final O-D Matrix can be used for transportation corridor planning.

REFERENCES

[1] Report 2004 & 2011, Transport Department of Gujarat, Ahmedabad
[2] Annual Report 2014-2015, Ministry of Road Transport and Highway (MoRTH)
[3] Annual Report 2011, Central Road Research Institute (CRRI), New Dehli
[4] Zala K., Dr. L.B.Zala ''GRAVITY MODEL CALIBRATION AND USE IN TRIP DISTRIBUTION'', Journal of International Academic Research for Multidisciplinary (2013), Vol. 1 Issue 4, ISSN 2320-5083
[5] Prof. Rinkal Sutaria, Prof. Sapana Shah, "TRIP DISTRIBUTION ANALYSIS OF VADODARA CITY", Global Research and Development Journal for Engineering March 2016, e-ISSN: 2455-5703
[6] Mathew T. V., Krishna Rao K. V. (2006) "INTRODUCTION TO TRANSPORTATION ENGINEERING", NPTEL, May 2006.
[7] Essam Almasri, Mohammed Al-Jazzar, "TRANSCAD AND GIS TECHNIQUE FOR ESTIMATING TRAFFIC DEMAND AND ITS APPLICATION IN GAZA CITY" Open Journal of Civil Engineering, December 2013.
[8] Roshani J. Makwana, Dr. L.B.Zala, Prof.A.A.Amin, "CALIBRATION OF GRAVITY MODEL:
A CASE STUDY OF AVKUDA REGION" International Journal of Advance Research in Engineering, Science &Technology (IJAREST), Volume 2, Issue 5, May- 2015, ISSN (P): 2394-2444.
[9] Mounir Mahmoud Moghazy Abdel-Aal "CALIBRATING A TRIP DISTRIBUTION GRAVITY MODEL STRATIfiED BY THE TRIP PURPOSES FOR THE **CITY OF ALEXANDRIA"**, Alexandria Engineering Journal 53, 677–689.
[10] Errampalli Madhu* and S. Velmurugan, "ESTIMATION OF ROADWAY CAPACITY OF EIGHT-LANE DIVIDED URBAN EXPRESSWAYS UNDER HETEROGENEOUS TRAFFIC", International Journal of Science and Technology Education Research Vol. 1(6), ISSN 2141-6559.
[11] Fangxia Zhaoa, Huijun Suna, Jianjun Wub,, Ziyou Gao, "URBAN ROAD NETWORK EVOLUTION TO MAXIMIZE THE CAPACITY" Procedia - Social and Behavioral Sciences 138 (2014) 251 – 258, Available online at www.sciencedirect.com.
[12] Zheng Yu Wanga, Wei Li Zhanga, Lei Wanga, Jin Xin Caoa, "STUDY OF INFLUENCE OF PARKING IN THE WAYS ON ROAD CAPACITY AROUND SCHOOLS BASED ON FLOCKING THEORY", Procedia - Social and Behavioral Sciences 96 (2013) 1030 – 1038, Available online at www.sciencedirect.com.
[13] Srijith Balakrishnan∗, R. Sivanandan, "INflUENCE OF LANE AND VEHICLE SUBCLASS ON FREE-flOW SPEEDS FOR URBAN ROADS IN HETEROGENEOUS TRAffiC", Transportation Research Procedia 10 (2015) 166 – 175, Available online at www.sciencedirect.com.
[14] Indrajit Ghosha, Satish Chandra, Amardeep Boora, "OPERATIONAL PERFORMANCE MEASURES FOR TWO-LANE ROADS: AN ASSESSMENT OF METHODOLOGICAL ALTERNATIVES" Procedia - Social and Behavioral Sciences 104 (2013) 440 – 448, Available online at www.sciencedirect.com.
[15] Ahmad Munawar, "SPEED AND CAPACITY FOR URBAN ROADS, INDONESIAN EXPERIENCE", Procedia Social and Behavioural Sciences 16 (2011) 382–387, Available online at www.sciencedirect.com.
[16] Birva B. Shah, Prof. N. G. Raval, "ESTIMATION OF CAPACITY FOR ARTERIAL ROAD OF URBAN AREA" INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN TECHNOLOGY, Volume 2 Issue 12 | ISSN: 2349-6002.
[17] Tomasz Kulpa, Andrzej Szarata, "ANALYSIS OF HOUSEHOLD SURVEY SAMPLE SIZE IN TRIP MODELLING PROCESS", Transportation Research Procedia 14 (2016) 1753 – 1761, Available online at www.sciencedirect.com.
[18] Gary D. Long, "AN EVALUATION OF THE GRAVITY MODEL TRIP DISTRIBUTION" Research Report Number 60-13, The Texas Highway Department, U. S. Department of Transportation.
[19] Dr. Michael J. Demetsky, "CALIBRATION OF THE GRAVITY MODEL FOR TRUCK FREIGHT FLOW DISTRIBUTION" Research Report No. UVACTS-5-14-14 August 2002, Center for Transportation Studies http://cts.virginia.edu, University of Virginia
[20] Kevin B. Modi, Dr. L. B. Zala, Dr. F. S. Umrigar, Dr. T. A. Desai," Transportation Planning Models: A Review" National Conference on Recent Trends in Engineering & Technology.
[21] Mathew, T. V., Krishna Rao, K. V. (2007) "Introduction to Transportation Engineering - Travel Demand Modeling".
[22] Mathew, T. V., Krishna Rao, K. V. (2007), "Introduction to Transportation Engineering - Trip Generation".
[23] Mathew, T. V., Krishna Rao, K. V. (2007), "Introduction to Transportation Engineering - Trip Distribution".
[24] Kadyali, L. R. and Lal, N. B. (2007), "Traffic Engineering and Transport Planning", Khanna Publishers, Delhi-6.
[25] Kadyali, L. R. & Lal, N. B. (2008-09), "Principles and Practices of Highway Engineering", Khanna Publishers, Delhi-6.
[26] Kadiyali, L. R. and Lal, N. B., "Traffic Engineering and Transport Planning", Khanna Publishers, 9th Reprint, 2011 Delhi-6.