

# PERFORMANCE EVALUATION OF EXISTING PUBLIC TRANSPORT SERVICE IN A TRAVEL DEMAND ZONE OF A URBAN CITY: A CASE STUDY OF VADODARA

Neha P. Bali<sup>1</sup>, Bharvi A. Shah<sup>2</sup>

1. Lecturer, Department of Civil Engineering, The M.S University of Baroda, Vadodara, India
2. Research Scholar, Department of Civil Engineering, Gujarat Technological University, Ahmedabad, India

**Abstract:** *Urbanization is one of the major changes that a country experiences in its course of development. One of the current issues pertaining to urban traffic is the role of Public transport. Travel demand is increasing with the passage of time and the resources available are limited. The purpose of this study is to estimate number of students coming to the college by using public transport and to evaluate the performance of public transport during the college hours that is before starting of the college 7 am and after 1:50 pm so that students using public transport do not face any difficulty to commute from home to college and back. Hence for the above study data was collected using google forms from various departments in the college. Origin destination matrix was generated from the data collected using TransCAD software and desire lines were obtained for the same. Routes of public transport were compared for evaluating the efficiency of public transport during college hours.*

**Keywords:** *Trip generation, Origin destination matrix, TransCAD Software*

## I. INTRODUCTION

The first stage of the classical first generation aggregate demand models is Trip Generation. The prediction of the total number of trip generated and attracted to each zone of the study area is the aim of trip generation. It finds the answer to the question such as how many trips originate at each zone, on the basis of the data on household and socio economic attributes. In other words it links the land use and travel. Trips are made for different purpose and a classification of trips by purpose is necessary. The trips can be classified as work, school, Business, Social or recreational and others. This study focuses on the educational trips generated in Vadodara city.

## II. TYPES OF TRIPS

Since a considerable confusion can occur in the meaning of the various terms used in trip generation, it is desirable to understand the exact meaning of various terms.

A trip is a one way person movement by a mechanized mode of transportation having two ends, an origin (the start of the trip) and a destination (the end of the trip).

Trips are usually divided as home based and non-home based. Home based trips are those having one end of the trip at the home of the person making the trip, while non home based trips are those having neither end at the home of the person making the trip. The trips ends are classified into generation and attraction.

A generation is the home end of any trip that has one end at home (i.e. home based trip) and is the origin of the trip with neither end home based (i.e. non home based trip). An attraction is the non-home end of the home based trip and is the destination of the trip with either end home based (i.e. of non-home based trip).

Trips can be classified according to their purpose as trips are made for different purpose and a classification of trip by purpose is necessary. The following are some important classes of trip purpose work, school, business, social or recreational, sport and others.

### III. PROBLEM STATEMENT

Polytechnic, is constituent of The M.S University of Vadodara, which is an educational hub of Vadodara city and a renowned university known worldwide. A number of students from different countries, states, cities and zones secure admission here. Multiple modes of transport are used by the students to reach the college, out of which about 40% of student use public transport (bus). However, a number of reasons have been identified for decreasing demand of usage of the public transport buses among the students. The uncertainties in the frequency of public transport with respect to timing of the college classes, is found to be one of the major reasons for the same. Hence, this project is carried out to evaluate the performance of the public transport in demand prone areas.

### IV. AIM OF THE STUDY

The aim of the study is to evaluate the performance of public transport used by the students coming to Polytechnic, The M.S University of Baroda.

### V. OBJECTIVES OF THE STUDY

The study is done to fulfill the following objectives:

- 1) The objective of the present work is confined to evaluate public transport service for the study area.
- 2) To generate origin destination matrix.
- 3) To plot desire line using Transcad.

### VI. TRANSCAD SOFTWARE

TransCAD is the first GIS software that is designed to be used by transportation planner to store, display, manage and to analyze transportation data. TransCAD breaks new ground as a tool for transportation planners in terms of GIS support for planning and modeling, and in streamlining and improving the demand modeling process. TransCAD combines a complete and ever-expanding set of tools for travel demand modeling with unique capabilities for digital mapping, geographic data base management, presentation graphics and application of sophisticated transportation, operations research and statistical models. TransCAD greatly reduces the effort that has been traditionally been associated with network development. TransCAD matrices are used to store flow data and other measure such as travel times that pertain to entity-entity relationships that are difficult to handle with relational data tables. Routes demonstrate ways taken by trucks, rails, autos and several other modes or individual setting out from place to place. TransCAD incorporates devices to make, show innovation for mapping courses in a reasonable and convincing design TransCAD can show and investigate these informational collections without transformation and incorporates dynamic division capacity to combine and breakdown different referenced informational indexes.

### VII. STUDY AREA

Vadodara is administered by the Vadodara Mahanagar SevaSadan (VMSS). Some of the regions surrounding the city are administered by the Vadodara Urban Development Authority (VUDA). The details of selected intersection are mentioned in Table-2.

**Table -1 Civic Administration Of Vadodara**

Country	India
State	Gujarat
District	Vadodara
Zone	4
Ward	28
Governing Body	VMSS and VUDA
Legislation type	Municipal Corporation

Area Rank	18
-----------	----

**VIII. FIELD SURVEY AND DATA COLLECTION**

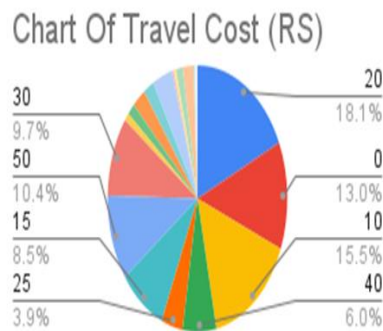
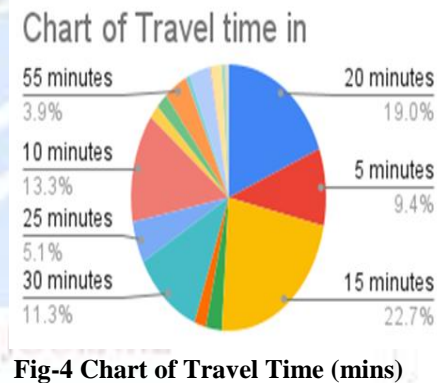
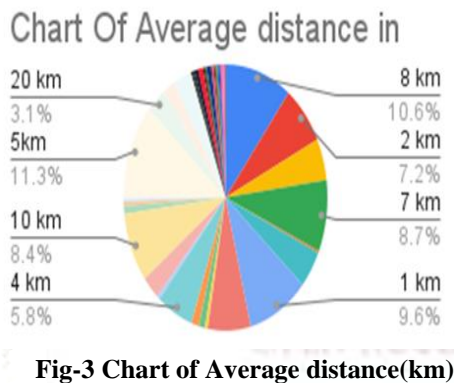
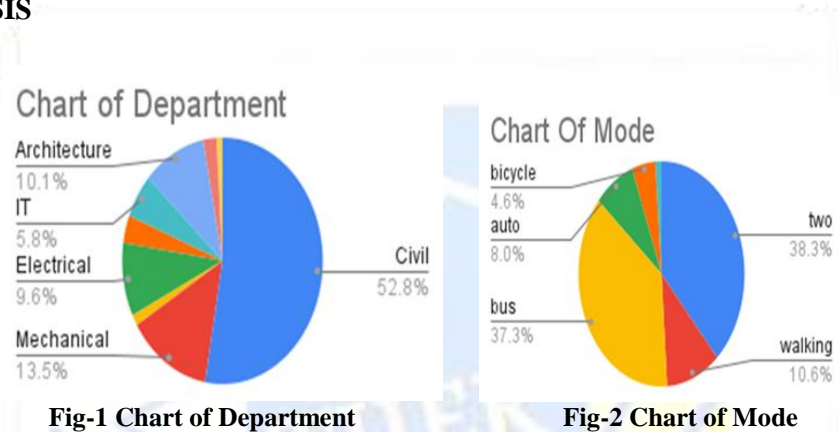
The data was collected via google form and the form consisted of Trip Data: This part of the questionnaire deals with obtaining information regarding trip details such as origin, destination, travel time, travel cost incurred and the mode of travel. It consists of Trip details such as Origin, Destination, travel time and cost and mode used by the Student.

**IX. DATA ANALYSIS AND RESULTS**

**A) DATA COLLECTION**

For data collection a google form was designed and about 400 responses were collected from students of various departments studying in Polytechnic, The M.S University of Baroda. From the data collected origin and destination were bifurcated according to the Ward numbers and respective origin and destination were marked on the map of Vadodara using TransCAD Software. From the origin and destination data further O-D matrix was developed on the TransCAD and desire lines were plotted.

**B) DATA ANALYSIS**



**Fig-3 Chart of Travel cost (Rs)**

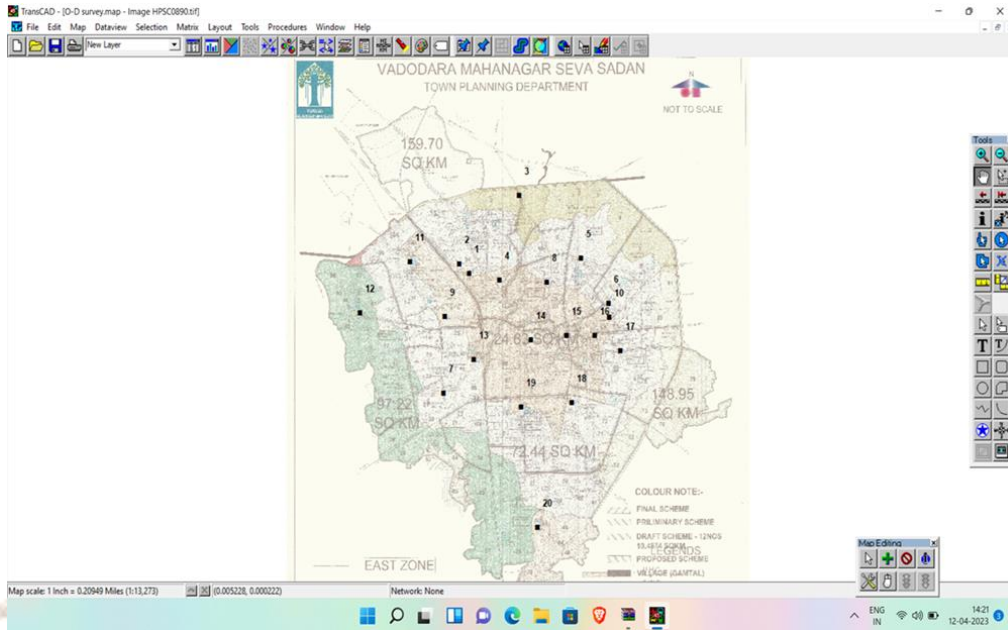


Fig-4 Study Area

ID	Longitude	Latitude	[Ward no]	[Name of ward]
1	-1195	2119	--	Polytechnic
2	-2114	3405	--	Nizzampura
3	208	5085	--	New sama road
4	-1017	2884	--	Fathehgurj
5	1495	3962	--	Vip road
6	3759	1941	--	Kishanwadi
7	-5459	716	--	Op road
8	285	2842	--	Karelibuag
9	-2480	633	--	Alkapuri
10	3772	1290	--	Ajwaroad
11	-3535	2900	--	Gorwa
12	-5646	2770	--	Gotri
13	-4821	363	--	Akota
14	1124	82	--	Dandia bazar
15	2171	1328	--	Mandvi
16	2084	485	--	Panigate
17	4029	885	--	Waghodia
18	1112	-1556	--	Pratapnagar
19	128	-1887	--	Manjalpur
20	1045	-4739	--	Makarapura

Fig-4 Ward Details

TransCAD - [Matrix2 - project ward list new Matrix File (Destination ID)]

File Edit Map Dataview Selection Matrix Layout Tools Procedures Window Help

Destination ID

1	1
2	35.00
3	22.00
4	72.00
5	24.00
6	12.00
7	14.00
8	40.00
9	14.00
10	24.00
11	18.00
12	36.00
13	21.00
14	1.00
15	20.00
16	13.00
17	29.00
18	11.00
19	18.00
20	29.00

Fig-5 Origin Destination Matrix

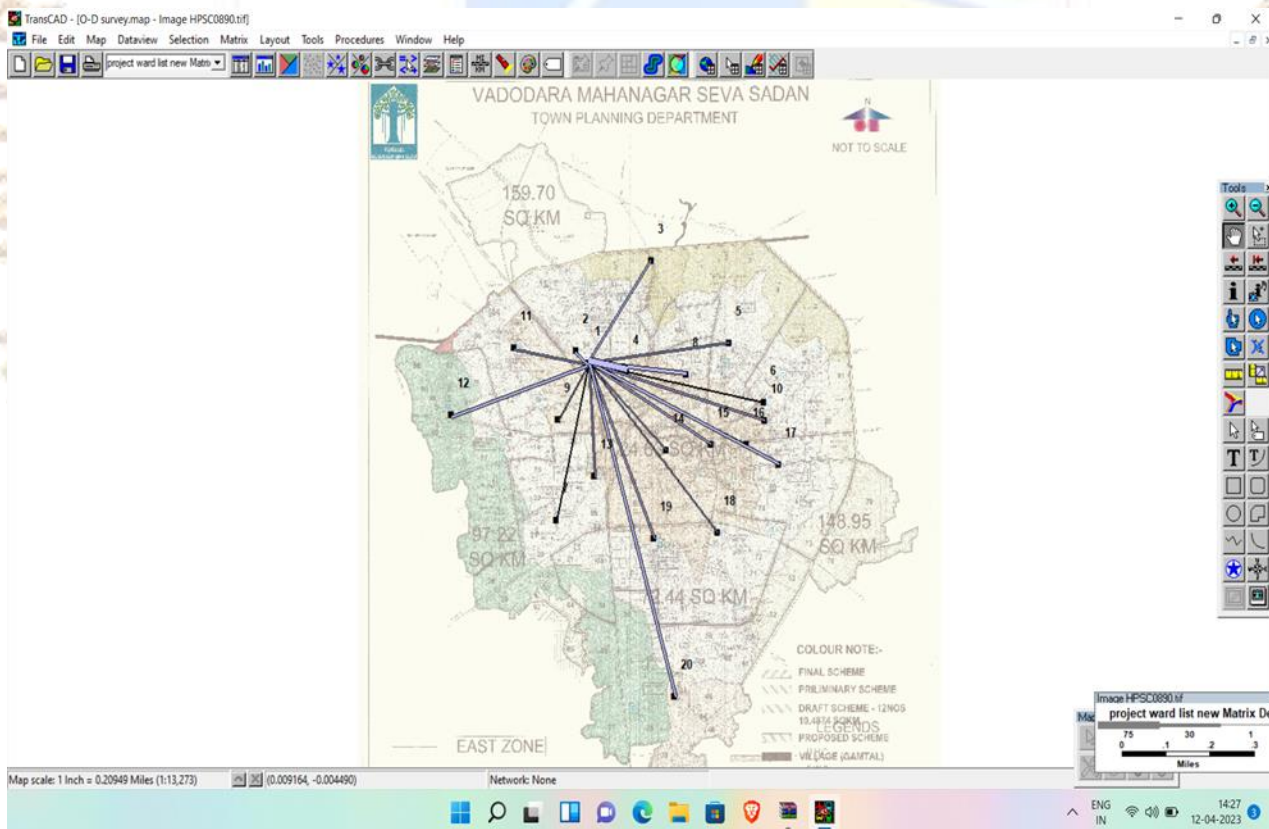


Fig-6 Desire Line

## CONCLUSION

The data is collected randomly from students of different departments of Polytechnic via google forms. The mode graph shows that all the possible modes of transport are covered. The trip modes used currently constitute about 38 % of privately used vehicles.

After taking the survey, and analyzing the mode graph it was found that 38% of the students who took the survey, come by their vehicles, due to the unavailability of buses from

a) Various areas of Vadodara

b) The bus-stop that is “Pandya hotel”, which is the nearest bus-stop to the polytechnic building, is covered only under 3 routes i.e. route no. 19, 19B and 19C, which was verified through the official website “ smartcitybus.vmc.gov.in”. Furthermore, the number of buses, scheduled as per the college timings is only one, which cannot cater to all the students.

Hence, through this study it can be concluded that there is a need to increase the buses and frequency of buses which corresponds to the institute’s timing.

## CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest or personal relationships that could have influenced the work reported in this paper.

## ACKNOWLEDGEMENTS

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## REFERENCES

1. Anderson D.M and Olander P.J (2002) , “ Evaluation of two trip generation technique for small area travel models, journal of Urban Planning Development, ASCE Vol. 128
2. Mayer.J.R (1974) “The future and implication for regional transportation planning”
3. Muller P.O (1995) “Transportation and urban transportation form : stages in spatial evolution of the American Metropolises in “The Geography of Urban Transportation Planning.
4. City Development Plan Vadodara 2012

## BOOKS

Kadiyali L.R (2002) A Textbook on “Traffic Engineering and Transport Planning” Khanna Publishers.