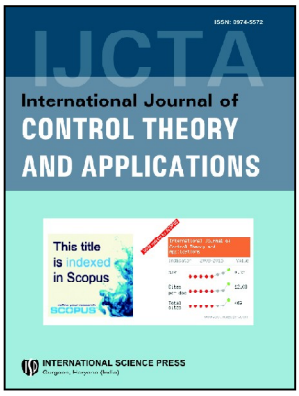

International Journal of Control Theory and Applications

ISSN : 0974-5572

Volume 10 • Number 26 • 2017

Analysis and Estimation of Parking Parameters of Bhimavaram Town – Andhra Pradesh – India

[1]Trinadh Varma Penumatsa, [2]M. Jagapathi Raju and [1]Pradeep Varma Uppalapathi

[1] Assistant Professor, Department of Civil Engineering, S. R. K. R. Engineering College, India
[2] Professor & HOD, Department of Civil Engineering, S. R. K. R. Engineering College, India
E-mails: trilu.srkr@gmail.com; profmjraju99@gmail.com; pradeepkumarvarma.23@gmail.com

Abstract: *Objectives:* Parking Parameters are the important considerations to be studies before taking any development activities in concern with Parking Regulations. The study aims at studying the Parking parameters of the Study Area and also the Estimation of the Parking Load.

Method: Parking usage survey by Patrol method is adopted to study the parking parameters and further Parking load is calculated based on the collected data. The studies were carried during 2009,2012 & 2015.

Findings: Out of studied area few locations are having sufficient space for On-street parking and at remaining location On-street parking reducing the carriageway width, thus creating congestions during peak hours.

Improvements: For the locations where On-street parking creating congestions, it is better to identify Off-street parking spaces and also to adopt the other regulations like paid parking in order to discourage On-street parking. Thus that will reduce the congestions.

Keywords: Parking Studies, Parking Demand, Urban Transportation System, On Street Parking

1. INTRODUCTION

India is developing country by rising its production which is generating huge Traffic not only in cities but also in small towns. Bhimavaram is selected as Study area, It is the second largest Urban Local Body in the West Godavari District of Andhra Pradesh. It is spread over an area of 25.64 Sq.Km with a population of 1, 42,184 (2011 Census). It is located at 16.50N 80.640E latitude and longitude. It is a major centre of aqua culture, trade, commerce, education and industries in the Region. Two important temples are situated in Bhimavaram town one is Someswara Swamy temple and another one is Sri Mavullamma Temple. Someswara Swamy temple is one of the Pancharama kshetra. These temples draw pilgrims from various places all over the country predominantly from State of Andhra Pradesh and Karnataka. Thus, the traffic in the town increased and also parking demand his high on the major corridors. At present the on street parking is not standardised, creating congestions and leads to increased travel times and delays. In this aspects, the present study aims with,

1. To Study the Parking Parameters in the study area
2. To Estimate the Parking Load
3. To Suggest appropriate measures to develop well organised Parking System

2. DEFINITIONS

Parking Accumulation: Total number of Vehicles parked at a given time.

Parking Volume: The Total number of Vehicles parked in a particular area over a given period of time.

Parking Load: The Total number of Space hours used during a given period of time.

Parking Duration: The Average amount of the spent in a parking space.

Parking Turnover: The average number of times that a parking space is used by different Vehicles during a given period of time.

3. CONTEXTUAL

One of the problems created by road traffic is parking. Not only do vehicles require street space to move but also to park where the occupants can be loaded and unloaded. Due to lack of organised parking facilities, the carriage way, in most cases, is used as parking space resulting in chaotic and congested traffic conditions, traffic jams, low travel speeds and high accident proneness, very much affecting the economic functioning of the central area which often loses much of its attraction [3].

Every Car owner would wish to park the car as closely as possible to his destination so as to minimise his walking. This results in a great demand for parking space in the Central Business District (CBD) and other areas where the activities are concentrated. With the growing population of motor vehicles, the problem of parking has assumed serious proportions.

The Planning and management of parking facilities within downstream areas are among the most challenging tasks facing transport planners. Before any measures for the betterment of the conditions can be formulated basic data pertaining to the availability of parking space, extent of its usage and parking demand are essential [5].

A Study was conducted in Norfolk, Virgina in response to a significant loss of Downstream relating to suburban areas caused in part by congested Downstream traffic and inadequate short term parking. The study focused on parking and consisted of an assessment of the existing parking conditions in Downstream Norfolk, establishing of new parking strategies [4].

The author describes that the shortage of car parking facilities in towns has become a problem. At present, the overall parking and collecting operation is very complex. Also it has no security, reliability, not economical and other problems [8].

Information relating to a wide range of components in a city's transport and landuse systems must be processed, analysed and effectively communicated to policy makers and concerned groups. These tasks are not easily performed by traditional methods because of the spatial nature of the data, large amount of data required and large number of interactions involved [5].

The growth of Schipol will generate a significant increase in road traffic movements, involving not only airport users but also staff at (and visitors to) the world Trade Centre, the shopping complex and other business springing up in the vicinity. Maintaining the accessibility of Schipol has necessitated the installation of a purpose designed traffic management and control infrastructure [7].

The George Town area, which is the focal point of all commercial, business office and recreational activities, is facing an acute problem of parking vehicles, as the roads are incapable of accommodating moving vehicles during peak hours. Parking near intersections and other illegal parkings lead to accidents and hindrance to free flow of traffic [3].

No reasonable private use of the road should be prohibited or restricted, unless public demands for more essential use become pressing. On this principle, parking should be permitted on all roads and streets for as long as a period as it does not interfere with requirements of traffic movement. Therefore, the kerb parking problem involves primarily a study of the supply and demand for parking and for traffic movement and the best possible balance between the two conflicting uses [2].

In Central areas which are likely to be redeveloped, FSI is used as a guide in assessing the change in parking demand. It may be found to be more economical to use cheaper "Back land" for car parking rather than allocate a portion of an expensive site. Separate parking lots should be provided for taxis and autorickshaws [3].

Part of the plan for a better Downtown must include efforts that address Downstream parking. Making parking more user, friendly and convenient for customers, clients, patrons and visitors will ultimately result in more business to the Downtown area [6].

No public "Off Street Parking" is provided in the study area (Mount Road). The method adopted is to induce the establishments located along Mount Road to make adequate provision themselves for parking for their employees within their own premises. Provision of Kerb Side parking off street parking in the selected areas are given [2].

The policy towards on street parking is to eliminate it. Parallel parking may be allowed on minor roads. Since cycle movement cannot be reduced in the future years, atleast off street parking facilities should be provided at commercial buildings. The off street parking may be multi-storeyed garages at some places where space is available and cheap. Some of the places are N.S.C.Bose road, near Flower Bazaar Police Station, in evening bazaar road [3].

Downtown public/private partnership have successfully revitalized many Downtown areas in cities across the country. It is only by adjoining together the public sector, the business sector, the civic sector and the community that the very best decisions can be made for the overall community [6].

The parking saturation and turnover rates of unfenced surface parking lots are higher than those of fenced car parks or garages in market areas and business- and office-oriented areas [9].

4. METHODOLOGY

In order to Estimate Parking Parameters, the Data was collected during 2009, 2012 and 2015 using "Parking Survey by Patrol" method where the Survey include counts of parked vehicles at regular intervals throughout the period. The data collected from four locations along the major corridors of Bhimavaram. They were represented in Figure A.

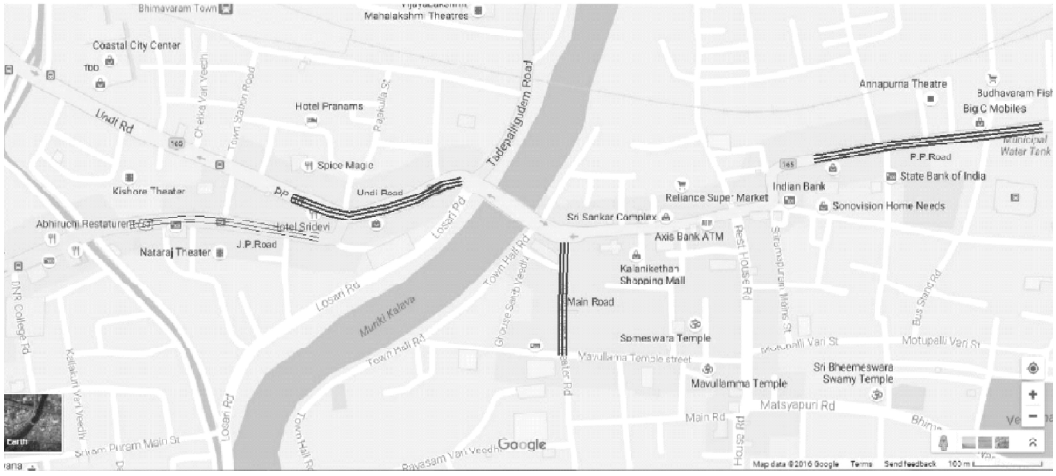

Figure: A: Map of Study Area with depiction of Data Collection locations (Source: Google Map)

The Four Locations and their Lengths considered are,

1. A 250 meter Stretch near Nataraj Theatre on J.P Road
2. A 150 meter Stretch near Venkatramana Theatre on Main Road
3. A 300 meter Stretch near Annapurna Theatre on P.P Road
4. A 250 meter Stretch near Bombay Sweet Junction on Undi Road

5. DATA COLLECTION AND ANALYSIS

Table 1
Consolidated Data of Cycles at Location - 1

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	70	144	132
1.0	44	74	76
1.5	21	49	52
2.0	8	18	13
2.5	3	18	17
3.0	3	21	19
Parking Volume	149	324	309
Parking Load	143	364	346

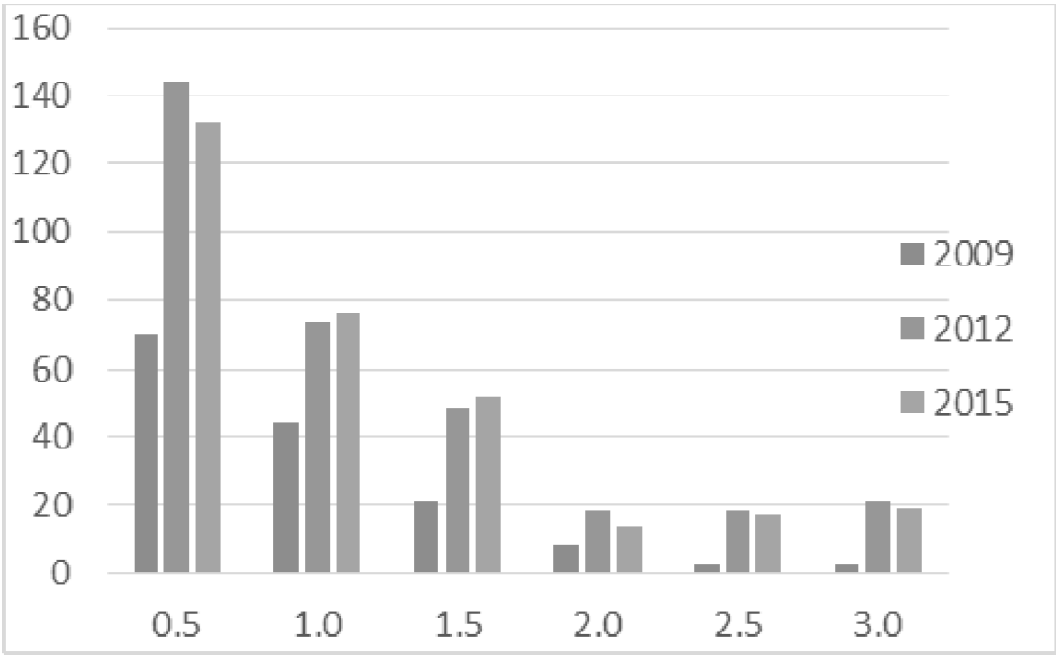

Figure 1: Graphical Representation of Cycles at Location 1

Table 2
Consolidated Data of Cycles at Location - 2

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	42	86	91
1.0	48	54	49
1.5	32	38	34
2.0	10	19	21
2.5	3	9	11
3.0	2	14	13
Parking Volume	137	220	219
Parking Load	151	257	254

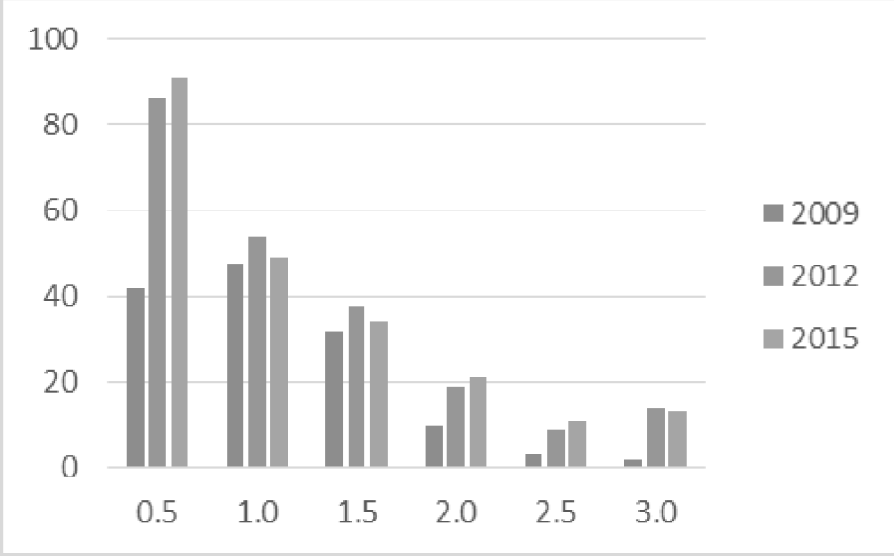

Figure 2: Graphical Representation of Cylces at Location 2

Table 3
Consolidated Data of Cycles at Location - 3

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	41	89	87
1.0	33	64	72
1.5	58	45	53
2.0	7	16	26
2.5	5	19	8
3.0	4	17	14
Parking Volume	148	250	260
Parking Load	179	307	309

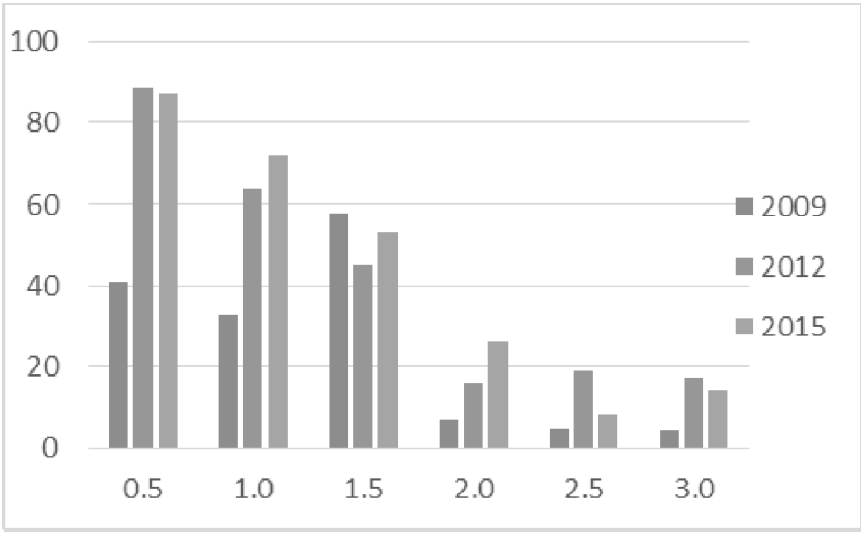

Figure 3: Graphical Representation of Cylces at Location 3

Table 4
Consolidated Data of Cycles at Location – 4

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	68	76	72
1.0	37	29	43
1.5	12	15	16
2.0	12	13	8
2.5	8	13	14
3.0	7	8	4
Parking Volume	144	154	157
Parking Load	154	172	166

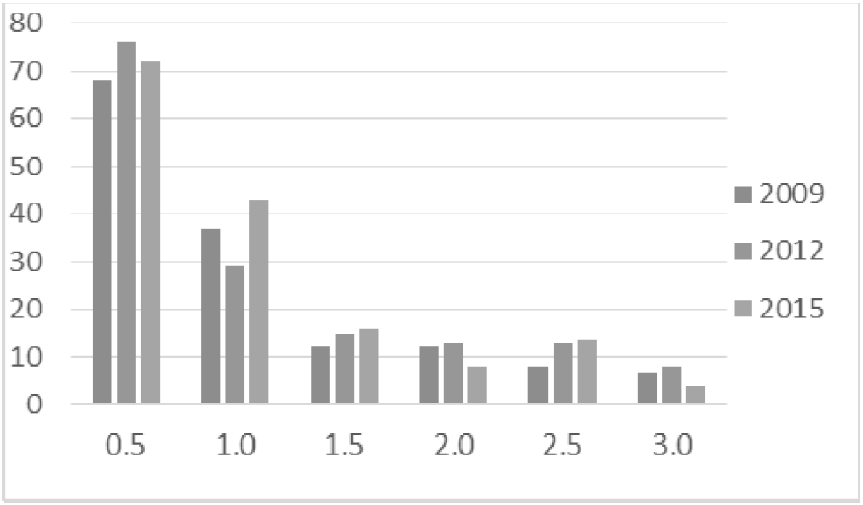

Figure 4: Graphical Representation of Cycles at Location 4

Table 5
Consolidated Data of 2-Wheelers at Location - 1

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	219	357	389
1.0	29	42	62
1.5	20	31	45
2.0	14	27	52
2.5	17	20	29
3.0	7	15	26
Parking Volume	306	492	603
Parking Load	260	416	579

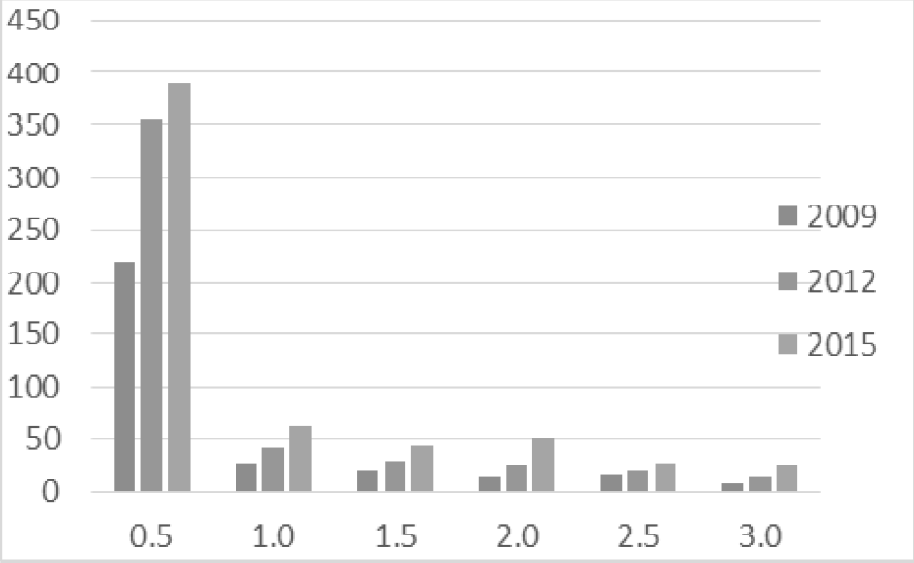

Figure 5: Graphical Representation of 2-Wheelers Data at Location 1

Table 6
Consolidated Data of 2-Wheelers at Location – 2

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	177	198	235
1.0	46	68	57
1.5	25	40	45
2.0	28	33	41
2.5	5	10	21
3.0	15	17	20
Parking Volume	296	366	419
Parking Load	286	369	437

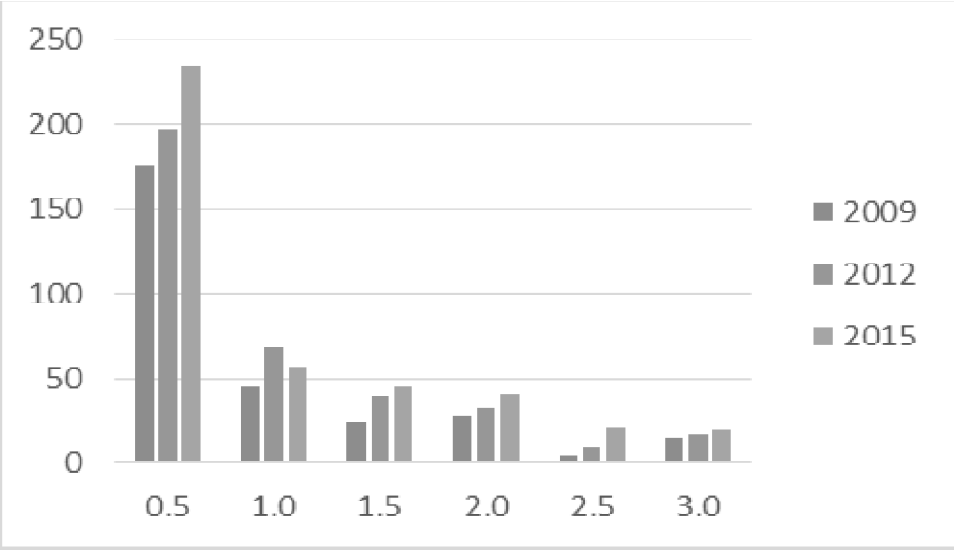

Figure 6: Graphical Representation of 2-Wheerler Data at Location 2

Table 7
Consolidated Data of 2-Wheelers at Location - 3

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	113	183	225
1.0	30	65	78
1.5	19	22	18
2.0	15	20	10
2.5	5	10	8
3.0	7	16	26
Parking Volume	189	316	365
Parking Load	179	303	336

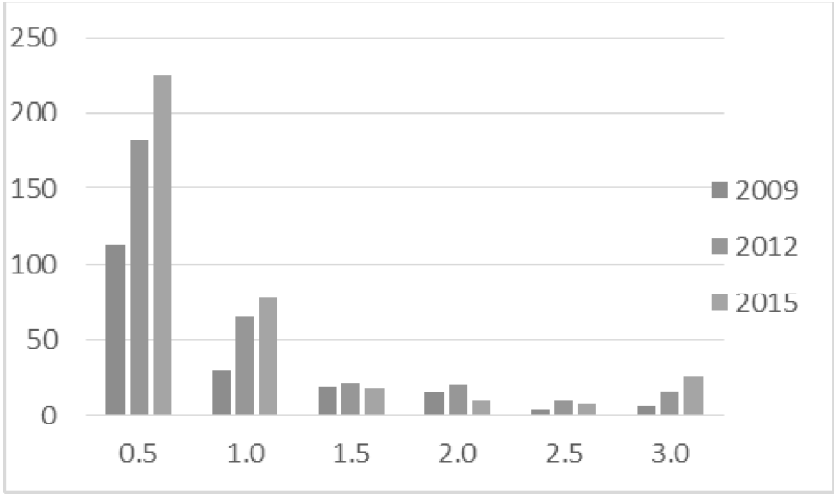

Figure 7: Graphical Representation of 2-Wheelers Data at Location 3

Table 8
Consolidated Data of 2-Wheelers at Location - 4

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	169	223	257
1.0	26	42	38
1.5	21	31	36
2.0	17	27	23
2.5	14	20	18
3.0	9	15	18
Parking Volume	256	358	390
Parking Load	238	349	366

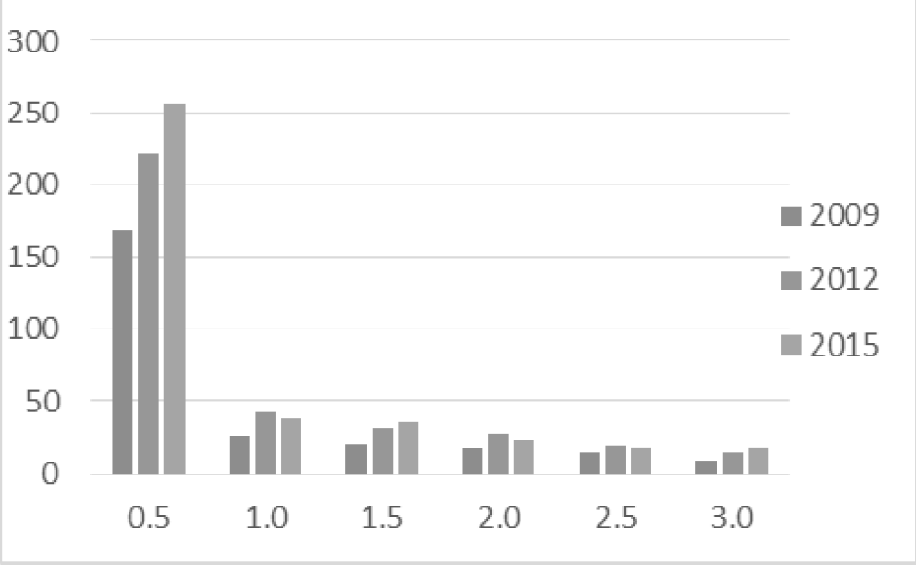

Figure 8: Graphical Representation of 2-Wheelers Data at Location 4

Table 9
Consolidated Data of 4-Wheelers at Location - 1

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	25	47	41
1.0	4	6	6
1.5	2	2	1
2.0	2	1	0
2.5	1	1	0
3.0	2	3	2
Parking Volume	36	60	50
Parking Load	32	46	34

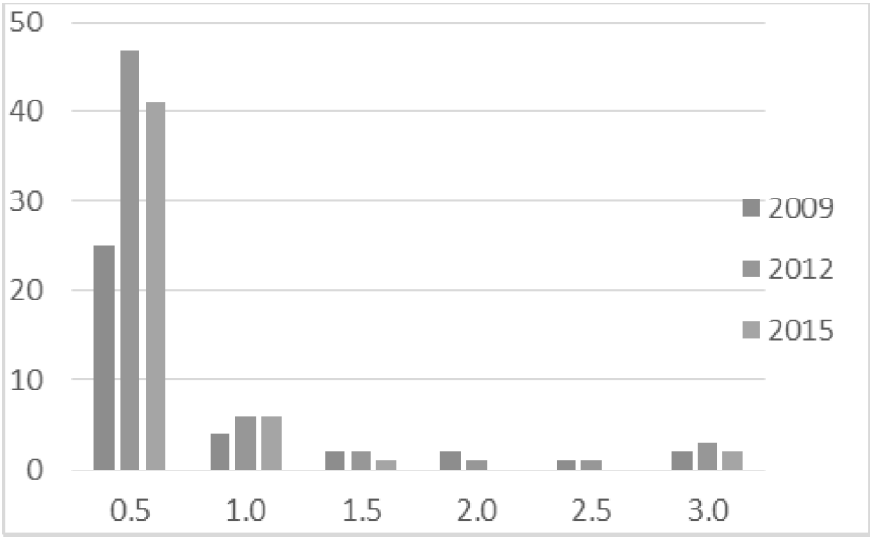

Figure 9: Graphical Representation of 4-Wheelers Data At Location 1

Table 10
Consolidated Data of 4-Wheelers at Location - 2

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	2	5	4
1.0	0	0	0
1.5	0	0	0
2.0	0	0	0
2.5	0	0	0
3.0	0	0	0
Parking Volume	2	5	4
Parking Load	1	3	2

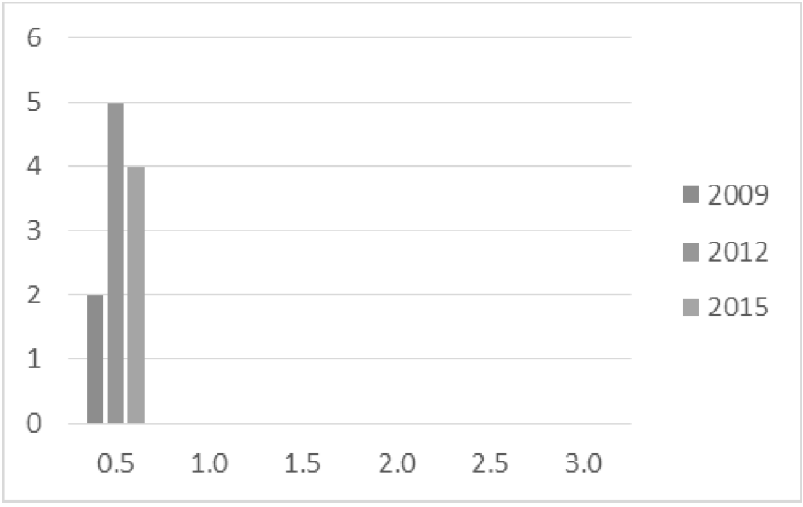

Figure 10: Graphical Representation of 4-Wheerler Data at Location 2

Table: 11
Consolidated Data of 4-Wheelers at Location - 3

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	17	28	34
1.0	10	17	16
1.5	2	3	0
2.0	3	2	0
2.5	0	2	0
3.0	3	0	0
Parking Volume	35	52	50
Parking Load	37	45	33

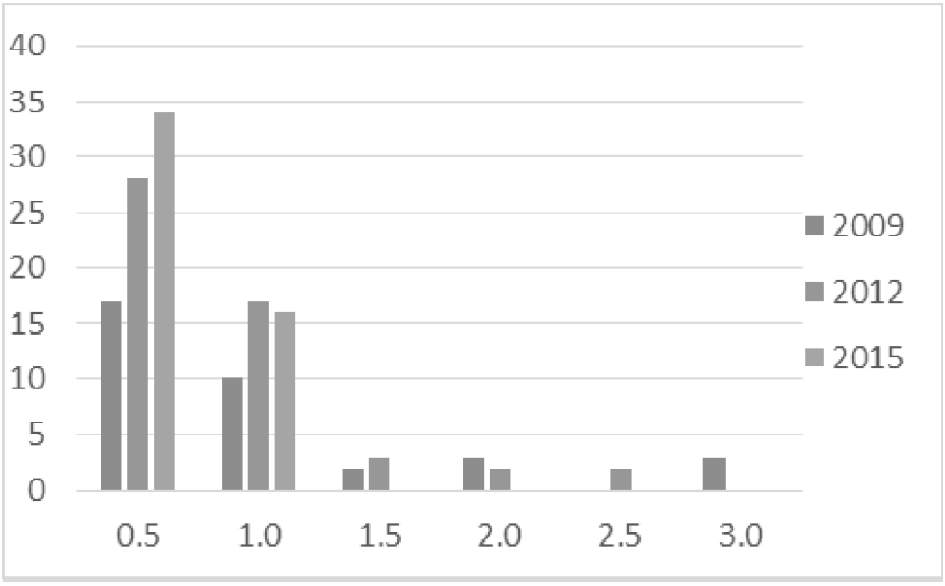

Figure 11: Graphical Representation of 4-Wheelers at Location 3

Table 12
Consolidated Data of 4-Wheelers at Location – 4

Duration of Parking, hours	*Year of Survey*		
	2009	*2012*	*2015*
0.5	18	26	37
1.0	12	21	23
1.5	5	3	5
2.0	2	0	0
2.5	1	2	4
3.0	0	1	2
Parking Volume	38	53	71
Parking Load	35	47	65

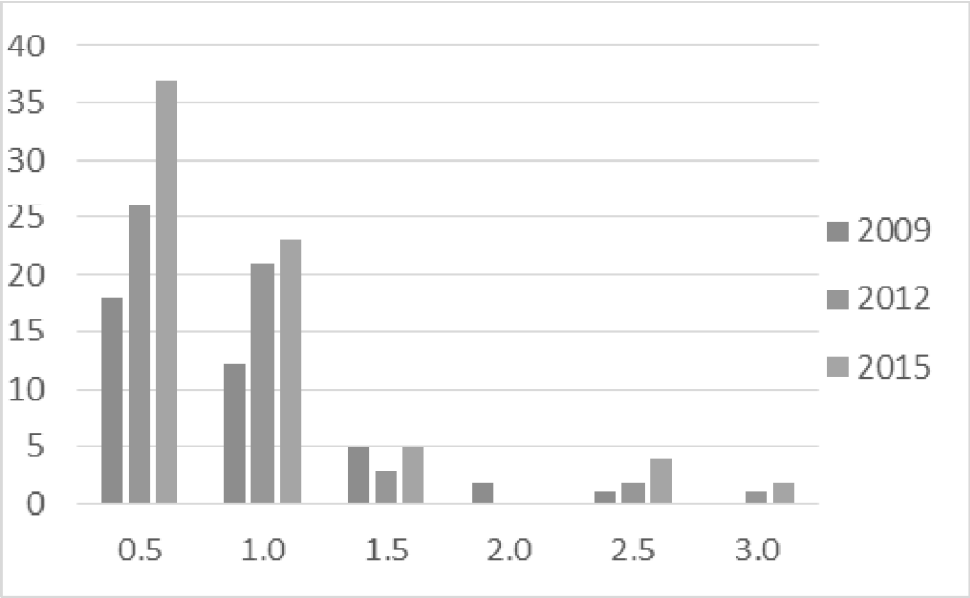

Figure 12: Graphical Representation of 4-Wheelers at Location 4

6. CONCLUSIONS

The Parking Volume for all the four locations and for the entire three Modes usually parked at Business places are calculated and from the results it is observed that at location -1 the Parking load is more when compared to other three locations.

There is sufficient space for On-street parking at locations-1 & 3, i.e., near Natraj theatre and Annapurna theatre but at locations 2 & 4 i.e Near Venkatramana theatre and Bombay sweets junction, On- Street parking is reducing the carriageway width, thus creating congestion during peak hours. So, it is better to go for Off-Street parking at locations 2 & 4 selecting a suitable place nearby.

REFERENCES

[1] L.R.Kadiyali, "Traffic Engineering and Transportation Planning", Khanna Publishers, Delhi, (1978).

[2] Thillainayagam, R. and Srihari, P.S., (1981), "Parking in Mount Road", Highway Research Board.

[3] Ramamoorthy, A.(1990), "A Study of Parking Problems in Madras', M.E.Thesis, Division of Traffic and Urban Systems Engineering, Anna University.

[4] Akan, G. (1994), "Parking Management in downtown Norflok", Transportation Research Record.

[5] Thompson, Collin, R.G. (1994), "Parking Utilization at work sites in King and South Snohomish Countries, Washington, Transportation Research Record.

[6] Palma, D.P.(1994), " Downtown Partnership and parking take centre stage, National Parking Association.

[7] Scheidt and Bachmann, (1995), "Amsterdam gets to GRIPS with parking", Intelligent Traffic System.

[8] Ing Antonio Arienti, (1998), "Intelligent and Ecological Parking Systems".

[9] Qun Chen, Ph.D etal, (2016), "Characteristics of Parking in Central Shanghai, China", ASCE, J. Urban Plann. Dev.