

Parking Facility Design for Different Corridor of Anand City

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Abstract— Rapid Growth in vehicles population has enormous strain in all million plus cities. Due to high vehicles ownership and poor transport facilities specially in the cities where the population between 1 to 2 million. The demand for parking has increase in alarming proportion in Central Business District (CBD) areas and other work or activity centers of the cities. This study focused on parking demand by collection of parking data, such as parking demand, parking accumulation, rate of turnover, to check the feasibility of paid parking service as well as it response on the mode shift of the two wheeler parkers. Feasibility of pay and park facility on two busy street “M.G.Road”, “MayFair Road” have been studied in this research work. The detail license plate surveying method and fixed period sampling method are used for analysis of survey data. This study also include the In-Out survey or personal interview of people using the on-street parking at this two busy streets. In the study, On-street parking demand is very high in the study area on M.G.Road and MayFair Road for most part of day, but turnover is very poor, which reflects over occupancy of prime urban space for longer duration. All two streets having high commercial potential and high traffic flow.

Key words: Parking Turnover, Parking Accumulation, Parking Demand, Congested Area

I. INTRODUCTION

Urbanization gives rise to problem of congestion. As cities are growing, it will be important to plan and build new facilities for both public and private transport. There is a strong relationship between parking facilities and traffic flow characteristics in the city. Unplanned urbanization and transport facilities cause parking problems. Improper parking facilities result in decreased road capacity and many side effects such as air and noise pollution. It also causes economic consequences by losing time and fuel, loss of productivity, high energy consumption and increased accidental death rates. These parking problems are most disturbing problem in urban city. There are two type of parking facilities like on-street parking & other off-street parking. Customers and businessmen regards on-street parking as an essential service because on-street parking and provides convenient access to destination. All parking facilities should be designed and planned properly in order to provide a better life for the people and for the prosperity of the city.

II. NEED OF STUDY

Anand is considered to be an educational and cultural center of Gujarat. Every car owner would wish to park the car as closely as possible to his destination so as to minimize his walking. High volume of traffic consisting of both fast and slow moving vehicles is plying through the road. Major traffic generators such as commercial centers, shopping centers, restaurants, bank, residential flats, government

office, hospitals, city bus stop, near railway station etc. are located in study area. In the scarcity of adequate off-street parking facilities, vehicles are parked haphazardly along curb causing traffic congestion and hazards. No parking bay is marked; hence people park their vehicles capital punishment on the on-street parking in all two streets. Capital punishment parking automatically reduced the carriage way width which create conflict and delay to through traffic, which also creates congestion problems.

III. OBJECTIVE OF STUDY

- 1) To study existing parking facility of area.
- 2) To analyze parking accumulation, turn over, parking duration.
- 3) Recommendation for better parking Facilities.
- 4) To Pay of on-street parking for two wheelers and peak hours park vehicles.

IV. STUDY AREA

The details description of all two roads are given in table no. 1

Busy street	Right of way	Carriage way width	Commercial Activity	On-street parking
Mahatma Gandhi road	11.0m	8.2m	Both side	Either side
Mayfair road to laxmi char rasta	10.3m	8.0m	Both side	Either side

Table 1: Existing properties of the various busy street in Anand city



Fig. 1: Google map of all two roads

V. METHODOLOGY

To most common parking survey conducted are as below:

- 1) In-out survey: In this survey, the occupancy count in the selected parking lot is taken at the beginning. Then the

number of vehicles that enter the parking lot for a particular time interval is counted. The number of vehicles that leave the parking lot is also taken. The final occupancy in the parking is also taken. Hence the labor is required is very less. Only one person may be enough. But we won't get any data regarding the time duration for which a particular vehicle used that parking lot. Parking duration and turnover is not obtained. Hence we cannot estimate the parking fare from this survey.

- 2) Fixed period sampling: This is almost similar to in-out survey. All vehicles are counted at the beginning of the survey. Then after a fixed time interval that may vary between 15 minutes to 1 hour, the count is again taken. Here there are chances of missing the number of vehicles that were parked for a short duration.
 - 3) License plate method of survey: This results in the most accurate and realistic data. In this case of survey, every parking stall is monitored at a continuous interval of 15 minutes or so and the license plate number is noted down. This will give the data regarding the duration for which a particular vehicle was using the parking bay. This will help in calculating the fare is estimated based on the duration for which the vehicle was parked. If the time interval is shorter, then there are less chances of missing short-term parkers. But this method is very labor intensive.
 - 4) Personal Interview Survey: Persona interview of on-street parking users has been conducted to understand parking behavior of the people using busy streets, their willingness to pay for parking and probability of shifting mode as well as shifting parking areas.
- From the survey, it was observe that there is high demand of on-street parking on Mahatma Gandhi road. The total numbers of vehicles used on On-street parking during the survey is 1318. The analysis of data reveals various parking parameters such as parking accumulation, parking duration, parking turn-over of this street. I have shown that Only 1 day of data collection analysis of Mahatma Gandhi Road.

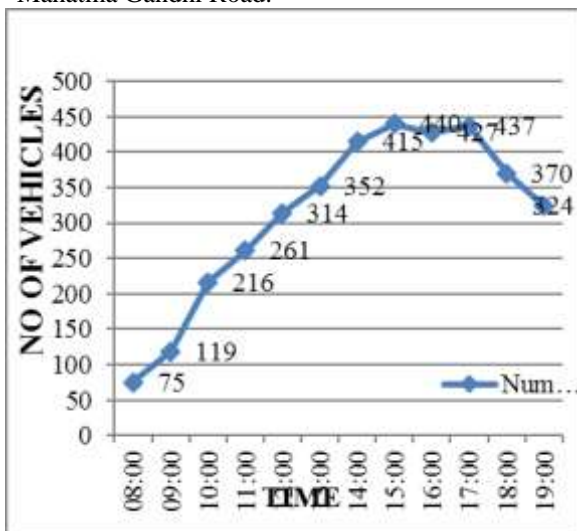


Fig. 2: Line diagram of parking accumulation

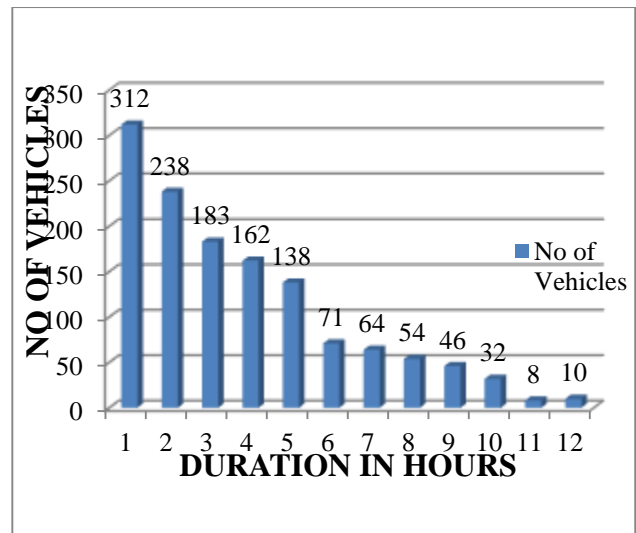


Fig. 3: Bar chart of Parking Duration

Fig 2 is representing accumulation in number. It shows that demand is very high during 12:00pm to 7:00pm. It also shows that maximum accumulation of 440 vehicles occurs at 3:00pm.

Fig 3 is represent that total 1318 number of vehicles used on-street parking during survey day-1. 70% to 80% of commuters are long term parkers, which should be discourage

- Personal Interview survey:

Data collection by personal interview of the on-street parking users reveals. The commuters are travel to various parameters like as when parking problem occurs, purpose of trip, trip length, parking duration, vehicles ownership, etc. as well as their response to parking fees in terms of shifting the parking place. The results of analysis are below. The majority of travellers shows that they will be shift off-street parking at lower rates but walking distance will be less than 100 meter.

VI. PROBABLE REVENUE

The Parking Policy management of road side parking will be assigned to the "shop keepers association" of the respective road where Street parking is being promoted. For income earned 50% from shopping will be given back to the associations to pay for the facilities created and surplus if it will be used for the development of the road on which on street shopping has been provided. The comparison of probable revenue generation and cost of enforcement can be used to decide parking pricing policy. The off-street parking facility will be developing for vehicles parking. It's seen from past decade, cars are potential off-street parking users and two wheelers motorized prefer on-street parking. To encourage off-street parking, it is recommended adopted lesser charge at off-street parking.

- Proposed paid parking for 12hours (8:00 am to 8:00 pm):
From the collected data, study area provides in a tabular form the Parking duration of different vehicles parked at this street. This parking duration helps to find out the probable scenario for Revenue.

	Average	Parking Charge	Total(Rs)
1	262	5	1310
2	210	5	1050
3	162	10	1620
4	128	10	1280

5	87	15	1305
6	62	15	930
7	44	15	660
8	44	15	660
9	34	15	510
10	25	15	375
11	7	15	105
12	10	15	150
Total			9955

Table 2: Probable revenue of Mahatma Gandhi Road

From the above table 2 is estimated that about 9955/- rupees can be generated by paid on-street parking for 12hrs from Mahatma Gandhi Road.

– Overhead charges for on-street parking

Operator cost:

The wages or pay of operator has been calculated on the basis of the following assumption:

- 1) Daily wages of worker is 300 Rs. per day. Hence, wages par hours will be $(300 \div 8 = 37.5)$ say 38 Rs. per hour.
- 2) Operator is work 8 hours only. After than pay for extra rupees.
- 3) Practically single operator can handle 35 parking bays.

Time	Accumulation in no. of vehicles	Number of Operator required	Number of operator provide	Wages per hour for operator	Wages of operator in Rs.
8:00	64	$64 \div 35 = 2$	10	$10 \times 38 = 380$	$380 \times 12 = 4560$
9:00	97	3			
10:00	172	5			
11:00	223	6			
12:00	258	7			
13:00	284	8			
14:00	326	9			
15:00	330	9			
16:00	340	10			
17:00	350	10			
18:00	299	9			
19:00	262	7			
Total					4560

Table 3: Wages of Operator for Mahatma Gandhi Road

Operating cost of parking ticket printer:

- 1) The total demand of 20 machines will be required.
- 2) Daily cost of machine would be 2 Rs.
- 3) Cost of all 20 machines per day will be 40 Rs.
- 4) Daily paper roll will be required for ticker printing machine which cost around 250 Rs per day.
- 5) Consider maintenance cost of 40 Rs per day.

- 6) Total operating cost of machine will be around 350 Rs par day.

VII. CONCLUSION

The study area is provide with right angle or 90 angle On-Street parking for two wheelers on either side of carriage way according to odd-even date. It cause to frequent conflict and cross maneuvering with through traffic. There are some absence of mark parking bay in this study area leads to spillover of parking space and improper parking of vehicles. There is need to think about present parking policy of study area. On-Street parking, which provides parking nearer to destination place of users is free and Off-Street parking, which cause the users to walk for their destination place is payable. In this study area is free on-street parking policy leads to very poor turnover, which cause that maximum users are short-term parker. It consists of high commercial activities, some measures should be taken to discourage this long-term parker. In this survey conclude that high congestion of parked vehicles during afternoon time on all working days. This indicates poor level of service in parking area. The most of trip will generate to 50% for shopping purpose and also 32% for work. Many peoples are goes to shopping purpose and it is short-term duration parking. On-street parking is developing for short-term. It shows that 30% users are parking for entire parking survey period which most of them are shopkeepers, they should discourage for long duration parking. The major trip lengths of commuters are within 5 to 15 kms in study area.

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