Research Paper ENGINEERING

Estimating the Revenue Due to on Street Paid Parking Program on Busy Urban Streets - A Case Study of Surat City

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ABSTRACT

Many cities in urban and suburban areas are characterized by parking space problems, especially during peak hours and special events. To overcome these problems, some local governments initiate on-street short term paying programs to limit length of stay and generate revenue. The problem becomes which data should be collected, for what frequency and for how long in order to produce significant results. This study givesinformation of amount of time spent for parking, rate of turnover and utilization of parking space from data collection using license plate survey method. Due to paid parking program people park their vehicles for less time period so turnover is increased and revenue is generated.Though parking pricing is not considered as a revenue generator but, global experience reveals that Payable On-street Parking is one of the effective parking management strategy.

KEYWORDS | Parking, on-street, turnover, utilization, license plate, revenue.

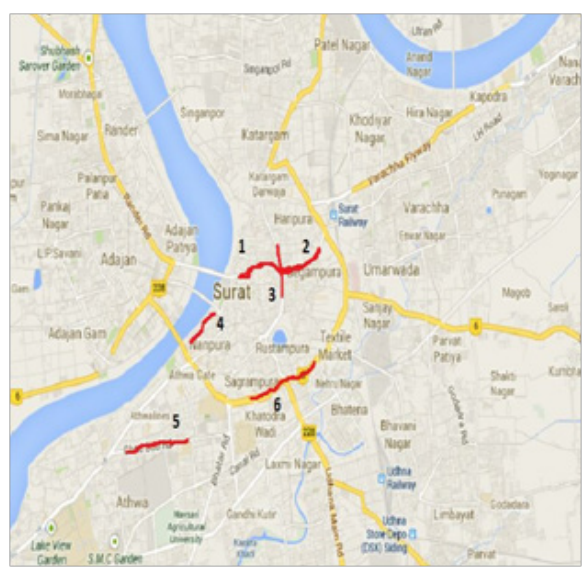
INTRODUCTION

Parking in urban areas is increasingly becoming a major problem. Due to the attractiveness of business outlets in urban areas, parking has become an evident problem for most of the day in major to medium size cities. In particular the belief that parking restraint measures could damage the attractiveness of city centers to both retail and commercial enterprises limits the political acceptability of pricing policies and planning. For paid short-term parking, the charged fee may reflect the length of the parking period and control congestion. To implement short-term parking payment programs, intensive parking study has to be conducted to evaluate all factors and elements associated with the parking characteristics within the study area. Apart from controlling parking, short-term parking paying programs are also geared to generate revenue to the governing bodies. To evaluate possible revenues from short-term parking enforcement, the following elements amongst others may need to be known in advance; exact number of parking spaces (obtained from parking inventory), parking occupancy/utilization (average number of parking spaces utilized per defined unit of time), rate of turnover (percentage of vehicles parked in the same space beyond the defined time interval), and expected parking fee rates (per the defined unit short-term parking, e.g. Rs/hour).For on-street parking, space utilization, occupancy rate, rate of turnover, and length of stay both play part in the entire process of parking management. For a successful short-term parking program, accurate data which details parking characteristics on occupancy/utilization, length of stay, and rate of turnover has to be established. It becomes important to obtain parking data that is properly constructed and conducted through surveys.

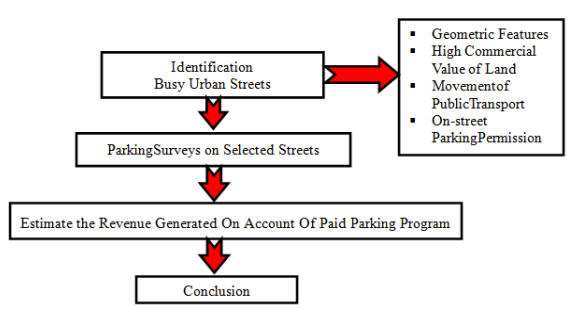
STUDY AREA

Six urban streets of CBD areas of Surat city is taken as study area.

Route No	Route Name	Total Route Length	No Of Enume-Rator	No of parking bays	turnover
1	Chock-Bhagal Road	900 m	5	864	3.30
2	Bhagal-Station Road	800 m	5	630	3.15
3	Kotsafil Road	550 m	3	484	3.10
4	Navdi Bandar Road	900 m	5	600	3.07
5	GhodDod Road	900 m	4	870	3.27
6	Ring Road	500 m	4	484	3.51



METHODOLOGY OF STUDY



PARKING SURVEY&DATA COLLECTION

❖ Parking Survey

The following are the types of parking surveys usually conducted:

1. Parking space inventory.
2. Parking usage survey by petrol.
   - In-out survey method
   - License plate method of survey
   - Fixed period sampling method
3. Questionnaire type parking usage survey.
4. Cordon count.

License Plate Survey Method: Registered number plates of on-street parked vehicles were noted manually at 1hr interval. Full day 12 hours survey conducted at time of 9.00a.m to 9.00p.m.This will give the data regarding the duration for which a particular vehicle was using the parking bay.This will help in calculating the parking charges as it is estimated based on the duration for which the vehicle was parked.Shorter time interval of the survey also enabled to include short term parkers using the on street parking facility.

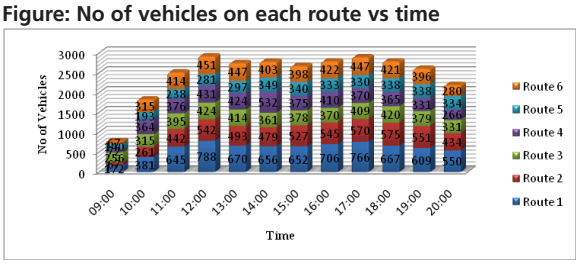
❖ Data Collection of Parked Vehicles

A manual survey has been conducted to record the registration number plates of on-street parked vehicles at an interval of one hour. As the traffic volume in the study area remains high from 9:00 am to 9:00 p.m. and it is difficult to conduct the survey of all days round the year, manual survey has been conducted for 12 hours from 9:00 a.m. to 9:00 p.m. for one day in all the streets. These data has been analysed to get the Parking accumulation, Parking Volume, Parking turnover and Parking duration of the respective busy streets.

Personal Interview of Commuters: Personal interview of the on-street parking users on field has been conducted to understand the response to paid parking program. The survey was conducted and results are analysed in this chapter.

RESULTS

Figure: No of vehicles on each route vs time



PARKING REVENUE

The revenue generated from the parking may be used to develop off-street parking facilities. It is seen from the past experiences cars are potential off-street parking users and motorized two wheels prefer on-street location. Therefore to encourage them to park off-street it is recommended adopting lesser charges at off street parking and higher incremental charges according to parking duration at on street parking.

❖ Proposed Paid Parking For 12 Hours (9:00 Am To 9:00 Pm)

From the collected data, study provides in a tabular form the Parking duration of different vehicles parked at the street. This parking duration helps to find out the probable scenario for Revenue.

Table: Probable parking revenue for chowk bazar road

Duration in hrs	Nos. of Two Wheelers	Parking Charge	Total
1	1590	5	7950
2	357	10	3570
3	129	20	2580
4	92	30	2760
5	62	40	2480
6	61	55	3355
7	77	70	5390
8	69	85	5865
9	64	10	640
10	85	115	9775
11	26	130	3380
12	21	145	3045
		Total	50790

❖ Overhead Charges for On-Street Parking

Now to calculate the net revenue, it is necessary to account the Overhead charges, as the revenue collection and controlled parking system is not possible without operators and Parking machine.

Attendants cost

Wages of attendants has been calculated on the basis of the following assumption.

1. Daily wages of a worker is 250 Rs. per day, hence wages per hour will be (250 ÷ 8 = 31.25) say 31 Rs. per Hour.
2. Therefore practically single attendant can handle 35 Parking bays.

Operating cost of parking ticket printer

1. Hence daily cost of the machine would be 2 Rs.
2. So cost of required 30 machines per day will be 60 Rs.
3. Machine also requires the Roll of Paper which costs around 400 Rs per day.
4. Consider maintenance expenses of 40 Rs per day.
5. Therefore total operating cost of the machine will be 500 Rs. / day.

❖ Wages of attendants of Chowk Bazar Road

Table: wages of attendants for chowk bazar road

Time	Accumulation in no. of vehicles	No. of Attendants Required	No. of Attendants Required	No. of Attendants Provided	Wages per Hour for Attendants	Wages of Attendants in Rs
09:00am	225	(225/35) 6.43	7	23	23*40= 920	920*12= 11040
10:00am	411	11.74	12			
11:00am	667	19.06	19			
12:00pm	788	22.51	23			
01:00pm	666	19.03	19			
02:00pm	654	18.69	19			
03:00pm	640	18.29	19			
04:00pm	728	20.80	21			
05:00pm	728	20.80	21			
06:00pm	688	19.66	20			
07:00pm	640	18.29	19			
08:00pm	575	16.43	17			

Assuming wages of attendant Rs. 40 per Hour.

❖ Net estimated revenue of 12hr. survey

Probable parking revenue and attendant cost of other five

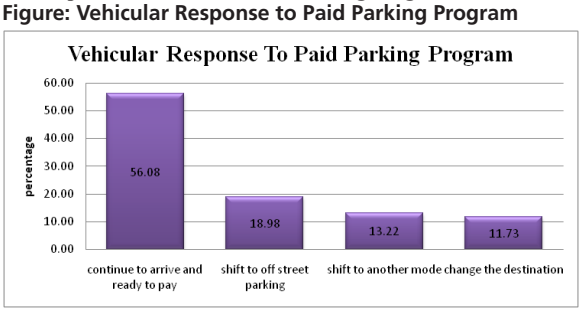
routes were also calculated by using above method. And after that the net estimated revenue of 12hr survey was carried out following.

Table: All Road Net estimated Revenue of 12hr. survey

Road name	No. of attendant required/ day	Total one day income in rs	Total wages of attendants in rs	Cost of parking ticket printer	Net probable revenue per day in rs	Net annual revenue in rs
Chowk Bazar Road	23	50790	11040	500	39250	14326250
Bhagal - Station Road	17	38360	8160	500	29700	10840500
KotSafil - Kanskiwad Road	13	29075	6240	500	22335	8152275
Navdi Bandar Road	16	26940	7680	500	18760	6847400
GhodDod Road	10	21920	4800	500	16620	6066300
Ring Road	13	29515	6240	500	22775	8312875
Total	92	196600	44160	3000	149440	54545600

❖ **Response of Visitors to Paid Parking Program**

Figure: Vehicular Response to Paid Parking Program



The above figure shows that about 90% respondents agree with paid parking program. Due to paid parking program 20% visitors will shift to off street parking and 15% visitors will change their mode of travel.

CONCLUSION

1. Present free On-street parking policy in the study area leads to very poor turnover, which concludes that maximum users are long term parkers. As study area consists of high commercial activities, some measures should be taken to discourage these long term parkers.
2. Poor enforcement was observed during the survey focuses on the following issues:

I. Parking outside the surface.
II. Encroachment by shopkeepers in parking area.
III. Illegal parking is not be penalised.
IV. Four wheelers being park in the designated two wheeler parking bay.
V. Vehicles parked in double line.

3. The estimation of probable revenue generation for 12 hour duration for the paid parking program is economically viable and effective tool to manage the parking demand in study area. The estimate revenue may be utilized for improvement of public transportation system.
4. The results suggest that paid parking program may be effective in reducing congestion in the business district and increasing the use of public transport. However, they may also have a negative effect on the vitality of the business district as shoppers and other visitors are likely to go to other places in response to the change.

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