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Study of "On-Street" and "Off-Street" Parking Choice Behaviour

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Abstract: Growth of population and motor vehicle coupled with economic ideas are resulting in high increase in transport demand. India has influenced a tremendous increase in the overall number of registered motor vehicles. However because of the enhancement in development worldwide it is estimated that nearly 30% of urban congestion is developed by drivers looking for parking. Unreliable situations that enhance such congestion include checking for on street parking facility, requirements and cost-comparison shopping between parking alternatives, which are all combinated by the need to reinimize walking distance or make timely appointments or connections. The technology is developed to receive it does not appear to have enhanced at the same level as still ticket system is being followed. All the popular cities of India the problem of parking is one of them. The vehicle to population ratio is higher than one. The data's collected under the study from various sub-areas of CBA has estimated to get the globed view of parking behaviour in CBA and advance parking technologies and parking supply and management techniques such as park and wide facilities. Observations included 500 interviews with individuals who chose between on-street and off-street parking. The characteristics of individuals choosing both facilities were presented. The resulting observations were used to estimate various log it models with different utility functions. Dynamic pricing or segment of customer and consumer / provider constrains has been taken in consideration to tackle the problem have been suggested. Then a correlation matrix was formed from the database using the software SPSS. These predicted models help a designer to make suitable model for parking choice behaviour.

Keywords: Parking choice behaviour, License plate method, Binary logit model, Questionnaire survey**.**

I. INTRODUCTION

THE 30% of urban congestion is created by drivers looking for parking. Parking is one of the major problems that are created by the increased demand for parking space especially in central business area. This affects the mode choice also. This has great economical impact.

A. Background

Fig.1 Study stretch

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As the vehicle ownership rapidly increasing, parking is becoming a serious problem in Thrissur. An efficient parking policy is an important component of urban transport planning. As the aim of parking policy measures is to influence decisions made during the parking process, it is important to gain an understanding of the factors affecting parking behaviour. In this paper we conduct a survey of the parking lots around the Thrissur temple round of 2 km. The study area consisted of Thrissur temple, Puthanpali, Zoo, Park, etc, This area is mainly for tourism, commercial purposes also there is resident and business.

II. OBJECTIVES

- Evaluation of present scenario of parking system.
- Determination of parking characteristics which will consists of parking volume, parking loads, parking turnover, parking accumulation.
- Determine the parking choice behaviour model.

III. LIMITATIONS

The survey has been carried out only on the working days in the middle of the week. A detailed parking study spread over longer duration of time would have yielded more reliable results.

IV. NEED FOR THE STUDY

Thrissur is considered to be an industrial and commercial centre. Every car owner would wish to park their 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 parks their vehicles on the on-street. With the growing population of motor vehicle, the problem of parking has assumed serious proportions. A systematic study of parking characteristics, demand, behavior choice and regulatory measures that are possible for controlling is of great help to a traffic engineers as well as town planner. Parking survey and questionnaire survey is intended to supply all these kind of information.

V. PARKING STUDIES

Parking characteristics

There are certain characteristic which have full impact on parking demands such as:

1. **Parking accumulation:** It is defined as the number of parked vehicle at a specified time is called Parking accumulation. Normally his is expressed by accumulation curve. Accumulation curve is a graph obtained by plotting the numbers of bays occupied with respect to time.
2. **Parking duration:** Parking duration is defined as the length of time for which vehicle uses the facility.
3. **Parking volume:** Parking volume means number of vehicle involved in parking activity is called parking volume.
4. **Occupancy:** It is defined as the ratio of number of vehicles using parking facility to the number of parking facility available at a specified time.

VI. TYPES OF PARKING SURVEYS

The most common parking surveys are

A. In-Out Surveys

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 vehicle that leaves the parking lot is also taken. The final occupancy in the parking lot is also taken. Here the labour 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 use that parking lot. Parking duration and turnover is not obtained. Hence we cannot estimate the parking fare from this survey.

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B. Fixed Period Sampling

This is almost similar to in-out survey. All vehicles are counted at the beginning of the survey. Han 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

C. License Plate Method

The results in the survey are 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 because fare is estimated based on the duration for which the vehicle was parked. If the time interval is shorter, than there are less chances of missing short term parkers. But this method is very labour intensive.

VII. PARKING MODELS

A. Parking Choice Model

As Hensher and Button (2000) discuss these models generally aim in modelling parkers behavior to changes in (supply, price, operation) of parking facilities. These are expressed in form of multinomial logit model. These models have been used extensively to model mode choice and location choice

B. Parking Search Model

These models attempts to understand the parkers behavior recognizing the role of searching for a parking spaces in a parking system. According to Hensher and Button(2000) they account for drivers preconceived perception about the system in order to making a parking choice decision. They model individual drivers or group of drivers thus replicating the temporal and dynamic aspects of choice. These models can be used to investigate impact of parking information on route choice, the time spent in parking search and the characteristics of parking space that attract drivers (like location, comfort, safety on route, safety in space, quality of route etc).

C. Parking Design Model

Parking design models give an opportunity to understand the performance of the parking system at parking lot or parking site level. They have been used to calculate the delay to parking vehicles on links, the relationship between traffic flow and parking inconvenience, need for parking spaces and the possibility that a person will not find a place to park and the dynamic capacity of car parks. Also these models enable to investigate competition between the parking lots for patrons (Hensher & button,2000).One advantage of such models is that working on microscopic level they have the capacity to model detailed interactions between individual vehicles thus also investigate impact of parking on a link.

D. Parking Allocation Model

The problem that parking allocation models focus on is of allocating a fixed number of arrivals to the parking stock. They have their application at activity centres or metropolitian or sub-regional transport level (Arnott & Rowse,1999; Hensher & Button,2000;Young & Taylor,1991).

E. Parking Interaction Model

The allocation, search and choice models can be collectively used for parking policy analysis (Hensher and Button (2000).These models can be used at any hierarchal level but are mostly used to assess impacts of regional or local parking policies. These models can use a combination of empirical or modeling and simulation techniques in different components of the study.

VIII. DATA COLLECTION AND METHODOLOGY

The basic data required for the study are:
1. Parking survey data
2. Questionnaire survey data

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This study of parking includes, parking load, parking duration, parking turnover, parking accumulation, etc. And also considered socio-economic characteristics, trip characteristics, and location characteristics for the parking choice behaviour, study. The study sections chosen mainly the five different locations in Thrissur .Two main criteria were set in selecting these parking locations. The first is the availability of both types of parking facilities; off-street and on-street parking. The second criterion is the variability in land uses and activities among the selected parking locations in order to study the effect of trip purposes on individuals‟ choices. The selected parking locations are in the following areas:

1. Near SIB bank, control room junction
2. Near east police station
3. Chettiyangadi parking area
4. Pooram hotel (Near kuruppam road)
5. Marar road (opp.swedessi auto mobiles)

These locations where expected to have more work recreational and commercial trips, respectively.

Two types of basic data where manually collected. One is the parking facility's basic information such as parking charge rate and capacity, and another is the parking duration and number of parking turnovers for individual parking space. The performance data were collected on typical weekdays (Tuesday and Thursday). All the parking spaces were observed from 8:30 a.m. to 5:30 p.m. parking space. I conduct a face-to-face parking survey in three parking lots. Each interview lasted approximately 5 minutes. Totally, 500 drivers were interviewed.

IX. DATA ANALYSIS

Understanding how users select parking facility is curtail in parking planning and design. The objective of the interview was to investigate attitudes and behavioural patterns with regard to parking. The purpose of parking is illustrated in Figure 2. Although these parking facilities are designated for the control room junction, it shows that almost half of people parked vehicles there are for personal, and 41% for work. Due to the mixed land use development, there are 10% parking for recreational and 3% for shopping home.

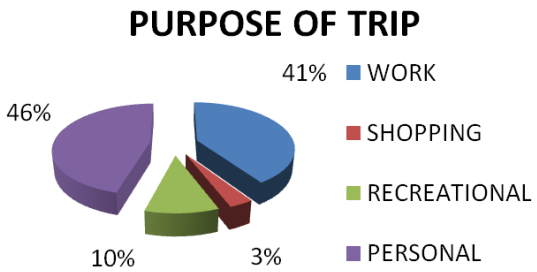

Fig.2 Purpose of trip

The frequency of trip is illustrated in Figure 3 shows that 52% of people parked vehicles daily, and 18% for weekly.

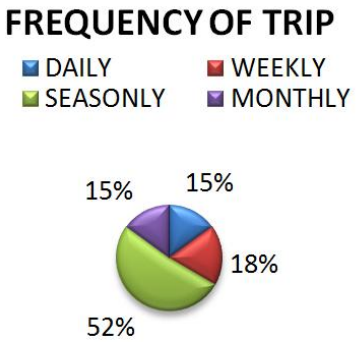

Fig.3 Frequency of trip

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The distance to destination is illustrated in the figure 4, it shows that 55% of the trips are short.

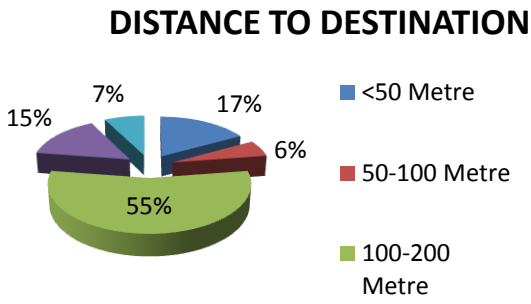

Fig.4 Distance to destination

From the analysis part we can measure that the peoples choose more off street parking for work and shopping purposes compared to other. And they choose small distance to destination.

X. CONCLUSION

Parking takes considerable street space leading to the lowering of the road capacity. Hence, speed will be reduced; Journey time and delay will also subsequently increase. The operational cost of the vehicle increases leading great economical loss to the community. According to the parking study on existing traffic condition on the road network it is must and required to remove on street parking system for efficient transportation system. Careless manoeuvring of parking and un-parking leads to accidents which are referred to as accidents. Common type of parking accidents occur while driving out a car from the parked area, careless opening of doors of parked cars, and while bringing in the vehicle to the parking lot for parking. They also cause pollution to the environment because stopping and starting of vehicle while parking and un-parking results are noise and fumes to reduce the parking of vehicles we can implement the following.

1) For short term measures pay and park method will be done at peak hours to control and regulate the parking.
2) For long term measures Off street parking have to be provided near CBD areas, within the radius of 1 Km.

XI. FUTURE SCOPE

This study intended to carry out parking surveys for the area located in Thrissur city by License plate survey method. The data collected would be analyzed and information gets from the data analysis would be helpful in formulation of parking behavior model.

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REFERENCES

[1]. A.Costa, C.Rocha and S,Melo (2014) Parking Management Policies And The Effectiveness Of Public Policy Solutions, Procedia-Social and Behavioral Sciences, 111, 965-973
[2]. A.Dogru, S.Malaitham, M.Okamura, A.Fukuda, and T.Fukuda (2017) Parking Management Policies Based on Behavior Analysis at Fatih District in Istanbul, Turkey, Transportation Research Procedia, 25, 5205-5219
[3]. Barter, P.A (2012) Off-street parking policy surprises in Asian cities, Cities, 29, 23-31
[4]. G.Antolín, Á.Ibeas, B.Alonso and L.dell'Olio (2018) Modelling Parking Behaviour Considering Users Heterogeneities, Transport Policy
[5]. H.Lim, Williams, G.T, D.Abdelqader, J.Amagliani, Z.Ling, Priester, D.W, Cherry, C.R (2017) Alternative Approach for Forecasting Parking Volumes,Transportation Research Procedia, 25, 4171-4184
[6]. J.Golias, G.Yannis and M.Harvatis (2002) Off-street parking choice sensitivity, Transportation Planning and Technology, 25, 333-348
[7]. J.Simićević, N.Milosavljević and G.Maletić (2012) Influence Of Parking Price On Parking Garage Users Behavior, Promet—Traffic &Transportation, 24, 413-423
[8]. Kolhar, M.P (2012) Offstreet Parking Management Plan for Dharwad City, Karnataka, India, Journal of Engineering Research and Studies.