A CASE STUDY ON PARKING AND ITS MANAGEMENT IN HIGH DENSED URBAN CORRIDORS

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ABSTRACT
The number of vehicles is increasing at an alarming rate in the urban areas. The commercialization of the area is also happening at a fast rate. The investment on roads and for parking facilities have not kept in pace with these growing traffic leading to congestion and accidents. The propensity to own private vehicles and the necessity for their use has generated huge parking demand in metropolitan cities. Almost all the metropolitan cities are experiencing increased problems related to parking. With the rapid increase of cars the need to find available parking space in the most efficient manner, to avoid traffic congestion in a parking area, is becoming a necessity in 'car park management'.

Many cities in the developing world are rapidly growing and the economic patterns of the people living in these cities in changing. With these changes there is a need for these cities to stay up to the mark in providing the mobility facilities or in other words meet the needs of mobility for the citizens. Often city officials presume that the providing of more parking spaces for the citizens means meeting the mobility needs. On the contrary, every car that is on the road needs a place to be parked. It is a key issue in almost all urban areas.

One of the problems created by road traffic is 'parking'. Not only do vehicles require street space to move about, but also they do require space to park where the occupants can be loaded and unloaded. The period over which a car is parked is very great compared with the time it is in motion. The size of average parking is $14m^2$. It is roughly estimated that out of 8760 hours in a year, the car runs on an average for only 400 hours, leaving 8360 hours when it is parked. Every car owner wish to park their car as closely as possible to his destination so as to minimize walking.

Cars take up space when they are moving but for an average of 23 hours of the day they are parked, and if they were to be used for all journeys then they would need a parking space at both ends of every trip – so many spaces are required for every car. A parked car takes up around 8 square meters when parked and often the same again in maneuvering space – a huge amount in dense urban areas where land is expensive. Often, cars get more space to park than humans have to live in! The above mentioned reason justifies the need for having a parking management system.

More focus needs to be devoted towards better public transport and non-motorized transportation. Parking needs to be used as a demand management tool. Transportation experts recognized that 'Parking' is a critical component of Transportation Policy and Management as it effects travel behavior, safety, economic development, revenue, land use, traffic congestion and air quality etc. 'Parking management' refers to various policies and

programs that result in more efficient use of parking resources.

In the present study, problems with current parking practices are studied with the parking accumulation and supply survey in "Kothapet to T.V. tower" corridor area in Hyderabad metropolitan city. The length is of 2.7 kms stretch. The sudden rise in the rate of the growth of urban population, extent of urban area and vehicle ownership without developing proportionate amount of infra structural facilities in urban areas resulted in frequent traffic congestions (jams), increased travel delays, number of accidents, pollution problems that reduced pedestrian safety and comfort & convenience of vehicle users. The present project is an attempt to understand the severity of the parking problems. To solve the parking problems immediately, short-term solution are recommended in the study area

In -Out surveys were conducted in the study corridor to estimate the time taken by the vehicles which were parked on the kerb side of the road. Most of the parking types were of mixed parking. In the observations made in the study, it is noted that there are no authorized parking lots for the vehicles; as a result all the vehicles were parked on the road side itself resulting in traffic congestions, reduced speeds of the vehicles. As there is no authorized parking in our corridor area parking fares cannot be determined.

The study has focused on identifying the parking problems in the study area and collected data from the surveys conducted and analyzed. The results of the study with recommendations are presented.

INTRODUCTION:

Transportation is the key infrastructure of a country. A country's economy status depends upon how well the country is served by its roads, railways, air ports, ports, pipelines and shipping. The rate at which a country's economy grows is very closely linked to the rate at which the transport sector grows. As road transport gives personal mobility to persons, the vehicle ownership rate has been increasing at a fast rate round the world. Due to increase in car ownership, the problem of parking is becoming more and more acute day by day.

There is significant and tremendous increase in the demand of parking spaces due to increase of road traffic during the last one decade in small cities, leading to congestion of On-street spaces in official neighborhoods may give rise to inappropriate parking area in office and shopping mall complex during the peak time of official transactions. The demand also leads to economic, social and environmental losses and with increase in population the problem becomes more critical. As such parking spaces optimization and control has become a real challenge for city transport planners and traffic authority.

Need For Parking:

Vehicles parked at the kerbs in urban areas are responsible for several accidents by parking or unparking. Angle parking is more unsafe than parallel parking. Road way capacity can be increased by prohibiting or restricting kerb parking. Even a few parked vehicles along a road effectively reducing its ability to carry the traffic flow. The space for kerb parking should be used as efficiently as possible. Before imposing the parking control, study must be undertaken of the parking resources available and the present demand. Most of the road users like to park on the kerb rather than using the off street parking spaces. The traffic engineering has to weigh the balance of provision of long-term spaces to short-term spaces, the balance of on street spaces to off-street. He has to consider to the provision and need of

ground -level, underground or multistory parking facilities, and satisfy the drivers, shopkeepers, commercial vehicles, public transport operators etc.,

Purposes Of Parking Study:

The purpose of a parking study is to develop a parking programmer which meets the requirements of an area. For a parking study, it is necessary to have the following information:

- The supply and type of parking facilities, both on-street and off-street.
- How and for what purposes parking facilities are used including parking duration and illegal parking.
- The demand for parking space.
- The characteristics of parking demand.
- The location of parking generators.
- Legal, financial and administrative factors associated with parking situation, and the adequacy of the existing enforcement measures.

Proper design of parking space is very important for good transporting system. If there will be lack of parking space and facility then it will be a chaotic condition for everyone. But designing of any parking space is not a easy job. It seeks a lot of parameters which we need to know, we need to find out with the help of simple data by applying some technique.

Parking is broadly classified into On-street and Off-street parking. Off-street parking is passive in operation and mostly used for work trips or for long duration trips with more than 2 to 6 hours and even for more than 12 hours duration. They are parked mostly in garages or multi storied parking lots. On an average, Off-street parking requires 300 sq. ft area per car.

There are two type of parking pattern:

1. On-street parking

2. Off-street parking

On-street parking:

On street parking means the vehicles are parked on the sides of the street itself. This will be usually controlled by government agencies itself. Common types of on-street parking are as listed below. This classification is based on the angle in which the vehicles are parked with respect to the road alignment. As per IRC the standard dimensions of a car is taken as 5 × 2.5 meters and that for a truck is 3.75× 7.5 meters.

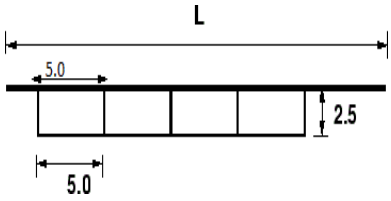
Advantages: On-street parking is convenient, visible and cost efficient. It is a form of Shared Parking, with each space serving many destinations, and so tends to have a high load factor. It does not require access lanes, and so uses less land per parking space than off-street parking. It is relatively inexpensive. On-street parking can provide a buffer between pedestrians and vehicle traffic. Converting parallel to angled parking increases capacity (it can almost double the number of spaces), and make parking faster and easier (Edwards 2002).

Disadvantages*:* Only a limited amount of curb parking can be provided in an area. It often involves trade-offs with traffic lanes, bike lanes, sidewalk space, and other uses of street space. Parallel parked cars are a hazard to cyclists, particularly if lanes are narrow. Under some conditions, angled parking increases the rate of collisions, although it tends to reduce their severity.
It has two types:

a) Parallel parking

b) Angle parking

a) **Parallel parking:-**

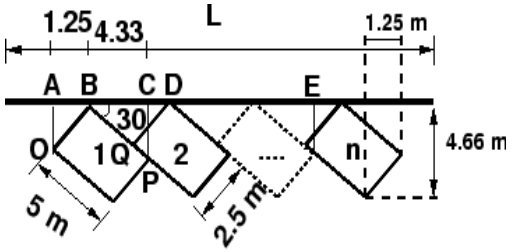


b) Angle parking:

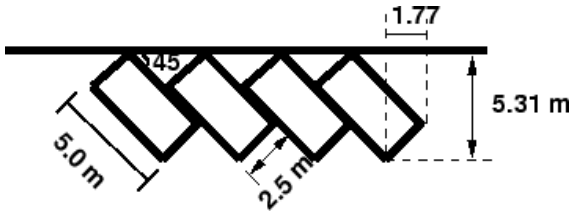
Angle parking, known as 'Echelon Parking' in Britain, angle parking of cars is similar to perpendicular parking for this vehicles, except that cars are arranged at an angle to the aisle

Angle parking is very common in car parking lots. It may also be used in street side car parking in U.S. when there is more width available for car parking than would be needed for parallel parking of cars, as it creates a large number of parking spaces.

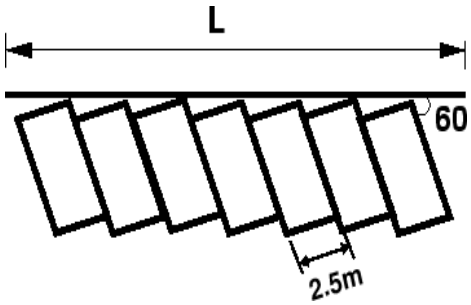
i)30◦ parking:



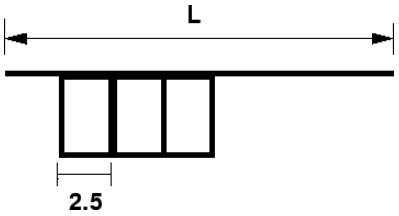
ii) 45◦ parking:



iii) 60◦ parking:



iv) Right angle parking



Off-street parking:

In many urban centers, some areas are exclusively allotted for parking which will be at some distance away from the main stream of traffic. Such a parking is referred to as off-street parking.

They may be operated by either public agencies or private firms. Off-street parking has five types:

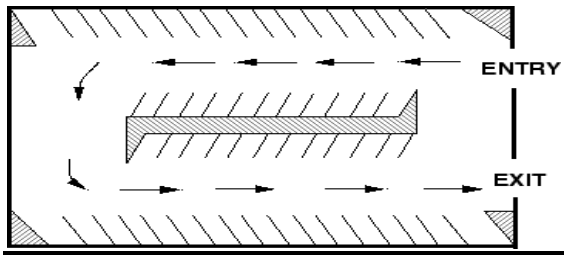
a) Surface car parking

b) Multi stored car parks

c) Roof parks

d) Mechanical parks

e) Underground parks



Effects of parking:

Parking has some ill-effects like congestion, accidents, pollution, obstruction to fire-fighting operations etc.

1. **Congestion**: 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 to great economical loss to the community.

2. **Accidents**: Careless maneuvering of parking and unparking leads to accidents which are referred to as parking accidents. Common type of parking accidents occur while driving out a car from the parking area, careless opening of the doors of parked cars, and while bringing in the vehicle to the parking lot for parking.

3. **Environmental pollution**: They also cause pollution to the environment because stopping and starting of vehicles while parking and unparking results in noise and fumes. They also affect the aesthetic beauty of the buildings because cars parked at every available space creates a feeling that building rises from a plinth of cars.

4. **Obstruction to fire fighting operations**: Parked vehicles may obstruct the movement of fire fighting vehicles. Sometimes they block access to hydrants and access to buildings.

5. Effect on Environment : Parked vehicles degrade the environment of the town centre. Stopping and starting of vehicles result in noise and fumes. Cars parked into every little available space debase the visual aesthetics and "buildings seems to rise from a plinth of cars".

In spite of the above ill-effects, parking has to be allowed on the streets or off the streets close to the user's destination. The well being of the community and the town centre demands that great thought should be bestowed with the parking needs and how best to fulfill them.

1.10 Issues In Parking Management:

Objectives:

In managing equitable access to limited parking spaces the town will aim to align itself with as many of the following objects as possible:

- The plan for the future
- The integrated movement network strategy.
- Objects of the equitable access-parking management project.
- Relevant state and national strategic directions.
- Best practice parking management that is relevant to the issue at hand.

These will then be assessed against he recommended parking management changes in consideration being given the following four elements of parking management:

- The people and modes of transport involved.
- The attractiveness and distance to destination from a parking space.
- The time a person or mode of transport is allowed to remaining parking spaces.
- The cost to the person and the community for the parking space

1.11 Objectives of the study:

- To measure the impact of On-street parking that affects the speed of traffic stream.
- To develop suitable mathematical models to predict the variations in profile of traffic flow due to the provision of On-street parking facility.

1.12 On-street parking – Importance and parameters:

Availability of maximum variety of goods, high density population and high connectivity from all parts of city, maximum traffic volume and parking

problems are the normal features of any CBD.

There is a casual relationship between vehicle speed and road safety. A 10% of mean speed reduction results in 37.8% reduction in fatality. The National Highway Traffic Safety Administration (2002) states that there is a 95% survival rate in the accidents involved with less than 32 kmph speed.

The roads with 7.0 m to 9.1 m are concluded to be safest roads in view of 0.36 accidents/mile/year.

Street widths with 6.7 m to 9.7 m consisting of two lanes of traffic with one side On-street parking are successfully functioning with 32kmph to 40kmph of travel speeds.

Thus On-street parking facility on city/urban roads and CBDs is considered to be the most effective measure for traffic calming down solutions.

LITERATURE SURVEY

1. An Analysis Of The Spatial Distribution Of Parking Supply Policy And Demand.
2. Behavioral Characteristics Of Car Parking Demand(A Case Study Of Kolkata):
3. Analysis On Parking Demand Of The Commercial Buildings Considering The Public Transport Accessibility.
4. Attitudes And Behavioral Responses To Parking Measures:

STUDY AREA DESCRIPTION AND DATA COLLECTION

S.No.	Name of the junction	Length (m)
1.	Kothapet to Chaitanyapuri	800 m
2.	Chaitanyapuri to Dilsukhnagar	800 m
3.	Dilsukhnagar to Moosarambagh	1100 m

Conclusions and Recommendations :-

Summary:

The heavy concentration of population and consequently increasing activities in urban settlements particularly in larger ones, has strained urban services and severely affected all types of urban environment viz. physical, social, economic and aesthetic, in these settlements. It is experienced in the world over that, this sort of rapid urbanization has resulted in tremendous pressure on urban infrastructure facilities and services, thereby affecting the quality of life in our urban settlements to a great extent. In order to achieve healthy living conditions in our urban areas, it is necessary to resort to innovative and efficient systems of urban transportation planning, challenges and policy initiatives, which have to play an important role not only in fighting the urban growth, but to accept it as an inevitable outcome of economic change and to prevent or minimize many negative effects of urban growth, such as traffic problems, slums and environmental degradation etc.

5.2 Conclusions:

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 onstreet

parking system for efficient transportation system. Careless maneuvering 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:

- The Two wheelers were found to occupy more spaces in all the locations of the study area.
- Commercial centers need more parking space than that for offices with the same working space and with no sufficient parking area provided; the vehicles are parked on kerb side, creating traffic congestion.
- For short term measures pay and park method may be done at peak hours to control and regulate the parking.

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