
ABSTRACT

If we will say about the population of cities and of course India is increasing day by day. If consider the problems of cities than the traffic has become the crucial factor for any city and we will get the space to park the vehicle. If we consider the locations, the spaces to park the vehicles are available, but we are not aware for those spaces and the proper utilization of parking is not taking place. In this paper, we have surveyed the locations of city Indore, where parking is very important and provide a way through which, we can efficiently utilized those spaces.

KEYWORDS: Parking, Efficiency, Complexity, cost, cities.

INTRODUCTION

All the cities in India face severe parking problems. Though parking has negligible effect on quality of transport but there is damage to the life of engine due to parking. Due to anonymous increase of traffic in India, parking has become the new problem along with pollution and poor quality roads. There are two types of parking's, they are off-street parking and the other is on-street parking. Off street parking is common in big shopping malls and theatres and huge offices which are used by employees & customers, on the other hand on-street parking is traffic problem causing as the parking is directly controlled by market forces, with individual parking and hence has high demand and is considered as public property. Some might argue that parking is one of the lesser woes of urban transport, but this view has led to its exclusion from the policy frame work, causing many traffic bottlenecks. This results in poor quality urban transport, misuse of land and increasing social and environmental costs. Now –a – days parking - problem is related to space so we should minimize the space to decrease the parking problems due lack of parking there will be a problem of fuel loss and low air quality or congestion. So in some cities, pay for the usage of parking is also been introduced in busy markets as this the cost of the land is refunded and there will be control of demand and preventing the market from distorted. For its maintenance where the cost is not so high and not free and researches are being done to reduce the area. Fundamentally parking is a problem of space. With the growing culture of automobile dependency in INDIAN cities, the demand for parking spaces are sky rocketed. This is especially because the infra-structural growth of our cities is unable to keep up with the growing demand for spaces to park. The resultant scarcity of parking space has begun to spill over to other aspects of urban life in form of congestion, fuel loss, dispersed land use and low air quality. So as long as there are inexpensive provisions for parking, there will be an increase in usage of private vehicles, further abetting the problem. Therefore it is imperative to arrive at a solution that on one hand provides space for parking while simultaneously managing demand for parking on the other.

PROBLEMS IDENTIFIED

Problems identified are:-

1. Fundamentally parking is a problem of space.
2. Infra-structural growth of our cities is unable to keep up with the growing demand for spaces to park. Growing culture of automobile dependency in INDIA (private vehicles).
3. The resultant scarcity of parking space has begun to spill over to other aspects of urban life in form of congestion, fuel loss, dispersed land use and low air quality.

4. Unless and until the modes of public transport are not plentifully available, people will keep on relying on cars and the problem will never be solved.



Figure1: Parking Problem

Reasons for making this application:-

Before :-

1. Long duration of parking at curb
2. Double parking
3. High rates of illegal short-term parking
4. Low turnover
5. Competition between residents and customers

After :-

1. Shorter duration
2. Reduced illegal parking
3. Higher turnover
4. Reasonable on-street parking for residents
5. Ultimate support for transit (discouraging some car ownership)

CASE STUDY AT 56 , INDORE

The eating joint-'56 shops' shopkeepers are struggling with problem of parking. Shopkeepers of the area have requested traffic police to regulate movement of vehicles. A shop owner Mahesh Agarwal said, "There is a rush during evening hours. On Saturdays and Sundays there is hardly any place to park. The road becomes so jam packed that vehicles crawl and commuters suffer deciding to shun this stretch in favour of the swankier malls".

Amit Behel another shop owner said, "The traders are also responsible in part as in a bid to out do competition they hail a passing vehicle right in front of their doorstep and persuade the prospective customer to make purchase from them".

Aman Saxena another shop owner said, "The traffic police is currently carrying out a major drive at Janjeerwala circle and MG Road incidentally located on both ends of the 56 shop stretch. Yet the plight of the commuters and shopkeepers woe at handling an out of control crowd goes unnoticed right under their nose".

Several shopkeepers of the area have been united at the dwindling commerce related to their trade. They are facing parking problems from long time. A joint petition has been submitted to civic authorities, administration and police for relieving them of this predicament. Plea to utilise vacant parking lot of the unused City Heart building presently under litigation has been made.



Figure 2: Parking Problem at 56 Dukan



Figure 3: Parking Problem at 56 Dukan

SOLUTION FOR ABOVE PARKING PROBLEMS ARE

The solutions for parking scarcity are –

1. Increasing the parking spaces so that more vehicles can be parked.
2. Improving accessibility and pedestrian paths around parking spaces to make it more convenient to walk from parking space to the destination. This reduces the inconvenience of parking in a space that may not be very close to the desired location.
3. Maximum usage of available space so we can save the la. Parking management, it can be done by more usage of public transportation than private transportation as it entails both cost and monetary.
4. Charge motorists directly for using parking space. This will facilitate immediate recovery of cost and will also act as a tool of demand management.
5. The parking spaces in commercial districts should be priced higher to ensure the space of priority users-customers and clients of the particular stop/building.
6. Time variable pricing will be employed to increase charges, reduce demand and manage parking during peak hours.
7. Progressive prices can be charged to discourage long term parking. Long term counting must not be discounted.
8. Weekly or monthly pricing should be done for long term users, such as employees or residents. The space can be leased out, too.

There are few methods to minimise the space they are –

1. parking in parallel
2. parking in perpendicular
3. Parking in 60° angle

1. Parallel parking :-

The vehicles are parked along the length of the road. Here there is no backward movement involved while parking or unparking the vehicle. Hence, it is the most safest parking from the accident perspective. However, it consumes the maximum curb length and therefore only a minimum number of vehicles can be parked for a given kerb length. This method of parking produces least obstruction to the on-going traffic on the road since least road width is used. Parallel parking of cars. The length available to park N number of vehicles, $L = N/5.9$.

2. 30° parking :-

In thirty degree parking, the vehicles are parked at 30° with respect to the road alignment. In this case, more vehicles can be parked compared to parallel parking. Also there is better maneuverability. Delay caused to the traffic is also minimum in this type of parking.

3. 45° parking :-

As the angle of parking increases, more number of vehicles can be parked. Hence compared to parallel parking and thirty degree parking, more number of vehicles can be accommodated in this type of parking. length of parking space available for parking N number of vehicles in a given kerb is
 $L = 3.54 N + 1.77$

4. 60° parking :-

The vehicles are parked at 60° to the direction of road. More number of vehicles can be accommodated in this parking type. length available for parking N vehicles = $2.89N + 2.16$.

5. Right angle parking :-

In right angle parking or 90° parking, the vehicles are parked perpendicular to the direction of the road. Although it consumes maximum width kerb length required is very little. In this type of parking, the vehicles need complex maneuvering and this may cause severe accidents. This arrangement causes obstruction to the road traffic particularly if the road width is less. However, it can accommodate maximum number of vehicles for a given kerb length. Length available for parking N number of vehicles is $L = 2.5N$.

ABOUT OUR APP TO SOLVE PROBLEMS RELATED TO PARKING

Every medicines come with its own side effects. Indore with its sky rocketing growth has its own challenges and infrastructure is leading the way. When we go out for a movie there are high chances you might miss the first 10 min looking for parking. The problem for parking remains unsolved despite the fact that we have made several attempts to resolution by increasing the infrastructural facilities to accommodate growing number of vehicles in city. In india,the search of parking space leads to wastage of more than aolit of gasoline every hour per 1000 cars. So, here is the solution for problem in very different manner.

This application helps the user to block the parking space before they venture out. It helps parking space owners and provides like malls,airports,municipal corporation as well as vehicle owners ,by connecting them and helping them utilize their space for parking , solving this perennial problem. Once the user decides to leave his home and go some place , they can search for parking space through the map view and the space by paying in advance. Once the user selects a space, he can make a secure online payment and head to thedestination .In case the parking space is not available the app guides the user to nearest parking lot. If there is a change of plan, people can also cancel their booking . However, the cancellation is largely governed by parking policies of space.

However, the problem is big. But app gives the advantage to user to book spot for parking in advance. Looking at future, it can be easily judged that startups in this is area are going to flourish as parking is a problem faced by almost everyone and efficient technology solution are the way to go.

How our app will work:-

Download app and sign up giving basic details and mobile number

- Enter starting point and destination and press View Route to find nearest parking space near destination.
- Check rates and pictures, if any, and get real-time data on how many slots are available Rate/give feedback on app.
- If you find a new, legal parking space (public or private), add it on the map with details about space, type of parking rates ,pictures, number of slot
- If a particular space gets maximum negative feedback, backend team will pull it off the map If you're a space holder, you can sign up and locate space on map, give details about business, parking area, number of slots, rates and pictures. Space holder can also give real-time data of slots available

What Happens in Advanced Countries?

In advanced countries like Europe people need to get to an area of tourist attraction either on foot or by using a mode of public transport. It is not like in India where people can drive to any such place in their cars and clog up the surrounding area with their private vehicles.

In a developed country, which is among the prominent manufacturers of cars, not many people own cars. The reason for this is that a car license is really expensive and people who want one also need to prove that they have sufficient parking space in offices as well as their homes.

STATISTICAL DATA ACCORDING TO SURVEY CONTAINED

Pie charts shows the data according to a survey contained in indore :

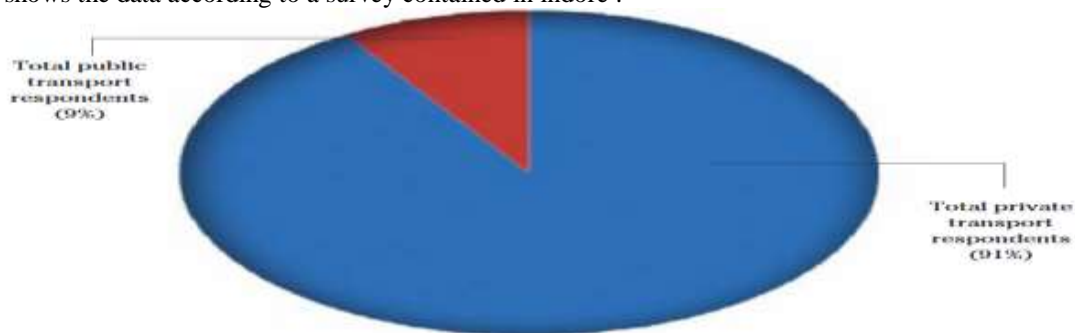


Figure 3:- As much as 59 per cent come from within 10 km distance and about 21 per cent from within 5kms

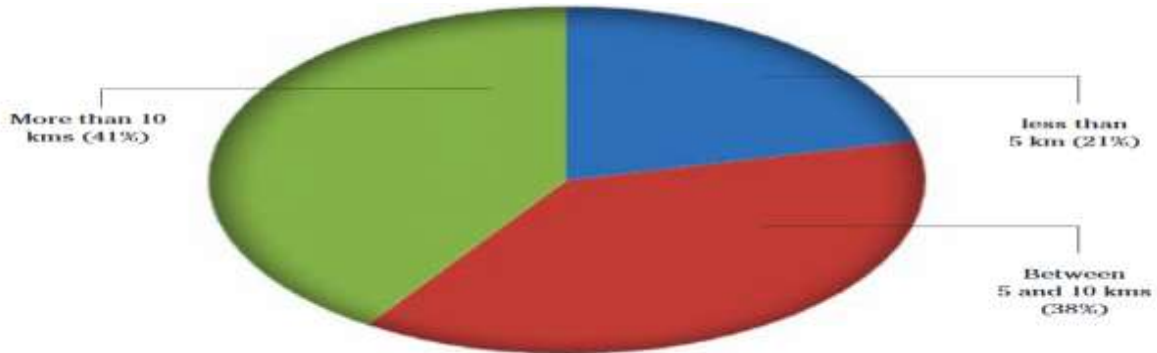


Figure 4:- Already close to a quarter spend 5-10 minutes looking for a parking space. With congestion, this time will increase and add to fuel loss and more pollution

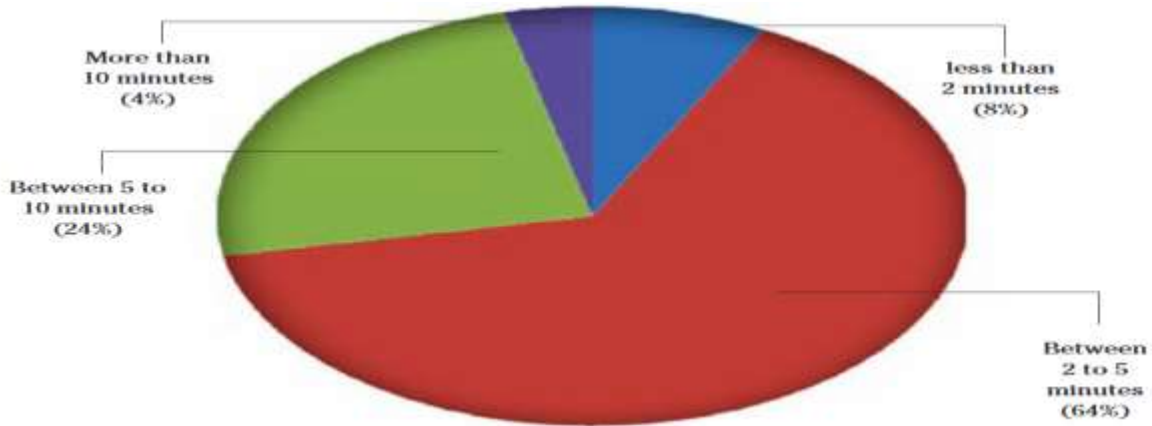
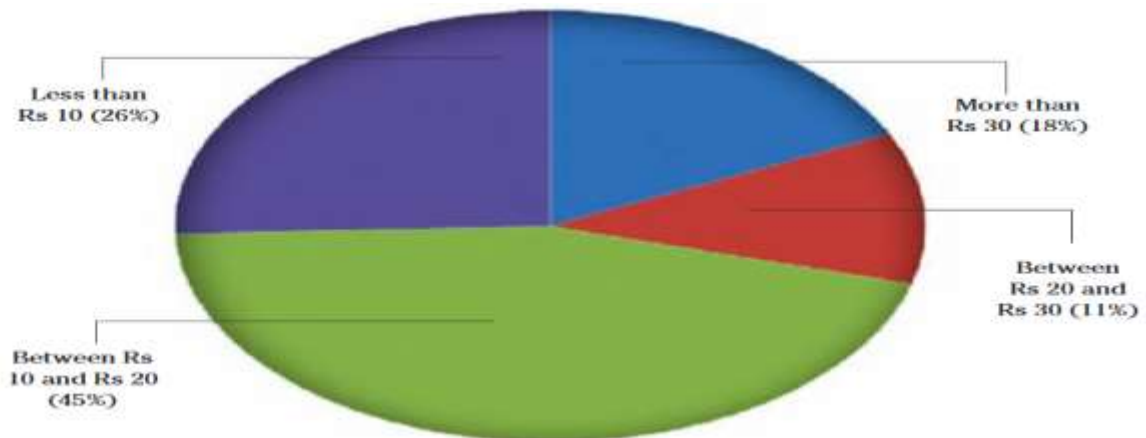


Figure 5:- As many as 18 per cent are willing to pay more than Rs 30 per hour showing their resistance to shift to other modes



FUTURE SCOPES

Establish goals of the parking policy: The biggest lesson from Sarojini Nagar experience is that multi-level parking cannot be constructed in policy vacume. At one level there is need to restrict their construction to free up land for other competing uses. But wherever they are necessary a clear pricing and management strategy must be in place before they are constructed. It is clear that cities are now expected to develop parking policy as a travel demand management tool to reduce pollution and dependency on personal vehicles. Parking policy should aim to reduce vehicle traffic (particularly urban-peak traffic) in order to reduce congestion, accidents, and pollution. Parking policy must aim towards eliminating parking subsidies. When combined with priced parking, limit on parking space and improved access through other modes of transport, parking strategies can help to switch alternative modes of travel and restrain car usage in targeted areas. In Delhi this is expected to take an ugly turn as the rich car clientele will continue to clamour for fee and cheap parking. If the recently concluded municipal elections are any indication then all political parties are also clamouring to give more parking sops to the car owners. Some regressive trends have also set in as evident in the recent case of Khan Market, a posh commercial area in Central Delhi where the traders have fought to assure free parking to the rich clientele (See Annex 1: Parking imbroglio in Khan market). This has also shown how the societal and environmental benefits of paid and restricted parking is not well understood and also ignored in our cities. It is therefore important to outline the immediate steps to improve parking strategy in Sarojini Nagar and also keep that in view for the management strategy for other locations in Delhi.

1. Lessons for parking management and enforcement:-

Sarojini Nagar and other prominent commercial areas across cities need to enforce a local area management plan:

The available legal parking spaces will have to be utilized to highest efficiency and financial viability. Parking facilities should be multi-use shared amenity to increase efficiency in use of space, time and finances. A management strategy that hinges on charging for parking, stopping parking on walkways, and adding on-street roadway parking can also generate parking surplus. Efficient management strategies for existing parking – both on-street and off street, will be needed to improve efficiency. This is needed as on-street parking can be controlled not eliminated. In India Chennai, Pune, Delhi are among others who are trying to introduce measure for disciplining street parking.

- Designate and demarcate legal parking areas, and improve operations of the existing parking lots – valet parking, upgradation of metering, IT application for improved user information, parking management for spill over etc. Each parking area will also require design guidelines and the IRC guidelines with requisite improvements.

- Enforce strict penalty for violation of parking regulations and walkway encroachment. The current penalty for parking violation under Central Motor Vehicles Rules is ineffective. Tokyo and other Japanese cities have very successfully implemented stringent penalty for parking violation which it is said has pushed up the marginal cost for the car owners.

- Parking for non-motorised transport – cycles and cycle rickshaws and para transit will have to be built into the parking design. Cities like Delhi are developing Rent-a-cycle systems near metro and BRT stations. Their parking will have to be integrated with the system design. Sarojini Nagar has earmarked area for autos.

- The future parking structures in other places will certainly need to reconsider the technology especially if they are located in heavy traffic areas. Automated systems may sound or even look attractive but are prone to glitches, time delays etc that eventually affect the usability and attractiveness. Needs very stringent management and operational measures to ensure at least 90 per cent occupancy during peak hours.

- Siting of the structure is important. It should not be too close to the commercial and market complex. It should have adequate circulation space around it.

- There should be integrated management of both the multi-level structures as well as the surface area parking in the same location. The management should be common. Bifurcation of the management must not be allowed. Only this will enable rationalization of operational and pricing practices.

- Leverage the multi level parking structure to curtail surface area – especially strategic and congested on-street parking, enforce legal parking and completely ban illegal and free parking in the vicinity.

- Surface parking area will also require design improvement in which cars should not be allowed to come close to the shops and crowd around the pedestrian access.

Lessons for parking pricing:-

- NUTP has stated that parking rates should reflect the true value of the land. Government led parking involves a subsidy if the parking charges do not cover the full costs. All parking areas have an opportunity cost that is not considered for parking pricing. Neither private developers nor government should ensure plentiful parking if motorists are not paying all or most of the cost through parking fees.

- The parking rates for structured parking and surface parking should be rationalized in a way that the rates are higher in surface. This will encourage higher occupancy of the structured parking and ensure utilization. Currently, the lower and free parking in the surface parking is undermining the utilization of the multi-level parking. Charge convenient parking spaces on the surface higher than the inconvenient places to reduce congestion and influence commuting choices.

- The EPCA/NDMC proposal to increase the parking rates in the surface parking area should be implemented. However, the rates should increase cumulatively every hour to be able to penalize the longer term parker. Limiting parking duration for short term users can ensure higher customer turnover rates for local businesses and also reduce local congestion.

- Parking charges need to be fixed at a level that catalyses shift to other modes. In case of Sarojini Nagar it is evident that commuters will begin to shift to other modes when the minimum charges are fixed at Rs 30 per hour and more. Appropriately priced parking can help to reduce demand for parking and car usage. Global experience shows that appropriately priced parking can reduce automobile commuting by 10-30 per cent especially if linked with transportation choices.

- Introduce time variable rates to discourage long term parkers. Eliminate free parking. Free parking should be allowed only to cycles and cycle rickshaws and battery operated vehicles and public transport vehicles. Parking rates should be higher for big cars and SUVs etc.

- Cities need to move towards full cost pricing. But there are strong doubts if the government will be able to fix parking rates at full cost and market driven rates for demand management. It may be advisable to move toward market driven parking rates eventually with strong enforcement of legal parking. If free and illegal parking do not undercut then market demand and supply can work effectively to keep the rates effectively high while ensuring at least 90 per cent occupancy of the parking lot at the same time. This is the emerging global trend today. This hinges on the principle that parking provision for personal vehicles is not a public good.

Lessons for parking revenue :-

- The big gain from parking can be revenue for the local government. Globally the trend is moving towards privately managed public parking in which the government plays the role of setting the terms of issuing parking lease to augment revenue from parking. Periodic license renewal pegged to the parking earnings can help to enhance revenue. The NUTP has also stated that revenue from parking should be used for public transport betterment.

- Global review also indicates that the tax policy for parking should be designed in a way that the parking spaces are taxed at the same rate if the land was used for other developments. This will also help to offset revenue losses from the other potential uses of the land. Land cost of the off-site parking is subsidized by the government. Well managed parking and increased/free pricing can help to augment the returns of the concessionaire. Accordingly, the agreement for the concession period can be designed. Appropriate methods of estimating parking revenue may be worked out. Maximize the revenue gains to be ploughed back for other sustainable practices.

●Increasing parking charges is an opportunity to enhance the revenue for the municipality as well. Currently, NDMC is expected to earn less than Rs 2 crore from the multi level car park based on the lease agreement and the current rates. But substantial increase is possible if the multi-level rates are further rationalized. Similar increase is possible in surface parking as well.

●Currently, the revenue estimates in the lease agreement for the multi level parking are based only on the parking earnings. And parking earnings are expected to be a mere 2 per cent of the operational costs. More than 98 per cent of the earnings for the developers are expected to come from the commercial component. But there is nothing in lease agreement to tap the rental earnings for the NDMC. Keeping in view the larger objective of tapping earnings from parking for mobility/accessibility enhancement the rental earning of the developer should also be tapped.

LESSONS: IMPROVE CONNECTIVITY OF THE AREA TO INDUCE SHIFT TO OTHER MODES

●The local area planning should include good public transport connectivity to influence commuting behaviour. As of now there is no plan to augment public transport supply to the area. Delhi Transport Corporation needs to reorient and intensify bus service to improve connectivity. DMRC should design feeder connection with the nearest metro stations on Aurobindo road and also provide remote parking facilities. This can substantially help to cut captive use of surface parking by the local shopkeepers as well as visitors.

●Parking can be creatively deployed within the framework of multimodal integration to improve usage of alternatives – buses, cycling and walking. Cities like Delhi are already developing guidelines integration of interchange points and make neighbourhoods more public transport oriented. These guidelines are expected to prioritise the parking needs of different modes within the influence zone of mass transit network and terminals. These are being designed to enhance walking, cycling and public transport access within the influence zone. In the parking design spaces for buses, inter-mediate transport vehicles and cycles are given priority followed by car. Park and ride concept is customized according to this principle.

●MOUD parking guidelines have made a provision for parking legislation. But its prerequisites should be assessed and detailed along the travel demand management principles.

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