

INDIAN ROAD TRAFFIC CONGESTION PROBLEMS, ITS REASONS WITH SPECIAL REFERENCE TO ON-STREET PARKING SPACE

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Abstract:

The purpose of this research is to analyze congestion and parking relationship and develop scenarios for predicting congestion mitigation in order to build solutions for traffic congestion. In the study traffic congestion overview along with contribution of parking as reason of congestion is evaluated through work carried out by various researchers. The results showed that the severe traffic jams that limit transportation within the city are due to intersections, T-junctions, U-turns, parking, and complex events.

The growth in private vehicle use increased at a faster rate in some major cities, overall car ownership and usage rates remain much lower in the Indian context.

Due to the increasing level of development, the demand for local amenities such as on-street parking for projects adjacent to traffic corridors has increased. However, the community process of using on-street parking can reduce road capacity as well as achievable driving speeds for roads adjacent to developments. Therefore, traffic delays are a common experience in most urban transport corridors due to the complex interaction between traffic flow and land use. To date, the literature has not presented an in-depth study that quantifies the impact of on-street parking on traffic in the Sydney metropolitan area and this study aims to fill this gap.

Traffic congestion in urban transport networks has been a dilemma for traffic planners and traffic engineers for decades. Traffic jams are a daily occurrence on Sydney's highways and arterial corridors during peak times. Traffic congestion can be the result of a number of factors including lack of capacity during peak times, disruptions in the network such as traffic accidents, vehicle breakdowns, road works and traffic control measures.

Street parking is a popular form of parking, recognized for its land use efficiency and convenience for motorists, as it allows them to park closer to their destination. On-street parking has certain advantages as well as disadvantages, depending on the case.

They found that street parking could be allowed on side streets as it would potentially provide a safer environment for pedestrians in this setting.

The sooner we, individually and as a city, limit the occupation of our streets with parked vehicles and shift to walking, cycling, and public transport, the better it is for our collective good.

Public support for parking controls that alter travel behavior must be developed gradually in association with area wide planning objectives. The majority of the parking measures were found to be long-range planning elements rather than transportation system management components.

Keywords: Traffic Congestion, Parking, Parking Space, Street side Parking

1. Introduction

Urban transport is an important element of economic activity and urban development, and a major facilitator of community mobility and freight transport. In addition, the number of motor vehicles

increased due to the increase in population in urban areas due to the relatively high urbanization rate. In addition, the public transport system in most developing countries is not the main means of transportation because it lacks safety and convenience. As a result, people prefer personal cars because they facilitate personal mobility, while providing a sense of security and higher status. (Said & Syafey, 2021)

Most cities in Asian countries are facing such problems due to rapid urbanization. Urban congestion is one of the burning problems for urban areas in Asia and has many impacts on urban economies. Urban congestion is often defined as an excess of travel demand relative to its supply. In fact, if governments are forced to rethink their urban mobility policies, it is because of the growing demand for travel with limited service provision. Presence of urban congestion affects free flow in many ways, rapid urbanization is an indicator of economic growth in Asia and is likely to continue if the scenario remains the same. According to estimates by the Asian Development Bank, about 44 million people are added to Asia's urban population each year. Asian cities are also characterized by high population densities. For example, Dhaka, Bangladesh has grown rapidly over the past decade to become the most populous city in the world, while Mumbai comes in second. According to the situation in India, the road traffic situation is getting worse day by day. The average number of vehicles in India has been growing at a rate of 10.16% per year for the past 5 years. Spending hours in traffic jams has become an integral part of the city's way of life, resulting in health and environmental risks. Traffic congestion is a big problem for transport professionals in India. Most cities suffer from moderate to high levels of traffic congestion.

Vehicles require a parking space to stop. If parking is not well serviced, this can disrupt traffic and cause traffic jams. The most common parking problem is roadside parking. This type of parking lot will cause losses to drivers and the public if not managed properly. Parking on the street reduces roadways and disrupts traffic.

2. Congestion Preview

Congestion on urban road networks has increased dramatically since the 1980s. In addition, certain special circumstances, namely a decrease in road capacity at a certain point or section, have increased the number of roads. The volume of vehicles required for a movement of people or goods, heavy traffic, traffic incidents, road works and weather phenomena, causing or exacerbating congestion. Rainfall also reduces traffic capacity and speed, leading to greater congestion and loss of road network productivity. Root causes of congestion include industrialization, urbanization and inefficient land use patterns. Unplanned industrialization and urbanization have raised some serious problems, including increased traffic density and congestion, as well as pollution and scarcity of urban land (Uzun, 2010).

Traffic congestion has thus become a major problem due to the increasing concentration of population and activity in cities, especially in this automobile age (Zhang & Li, 2010) .

Congestion is a common problem in developed and underdeveloped countries, so it is a global problem (Najneen, et al., 2010). Various surveys are carried out by other countries to find accident data. India applied investigative technique conducted by police agency to find the reason of accidents (Sikdar, Rabbani, Dhapekar, & Bhatt, Hypothesis Testing of Road Traffic Accident Data in India, 2007), especially in big cities, according to a study done in Swedish cities, traffic congestion also causes noise pollution too (Bjork, Ardo, Lovkvist, Ostergren, & Albin, 2006). Due to economic growth, vehicle users are increasing, so road accidents are increasing (Sikdar, Rabbani, & Dhapekar, Hypothesis of Data

of Road Accidents in India-Review, 2007). Other studies have shown that development in any county in the world is imperfect if traffic congestion leads to significant economic costs (Chien & Shih, 2007).

The existence of parking problems in major cities includes maneuvering, drop-off and roadside parking. This leads to a decrease in vehicle speed, increasing traffic congestion. Parking is an integral part of the transport infrastructure of the transport network system, so its regulations can affect the performance of the road network. Previous studies have taken into account the reduction in road width due to on-street parking and its effects

Vehicles require a parking space at the start and destination of each journey. The demand for parking in urban areas is increasing with the rapid increase of car traffic in the past decades. Although designated parking lots have increased in most municipalities, parking lots are still frequently inadequate for vehicles during peak hours (Marsden, 2018).

Today, urban transport planners are faced with difficulties and want to know where and when to allow parking on the street, asserting that its advantages outweigh its disadvantages. Again, if it is allowed, the question is whether to park parallel or angled. Before allowing or restricting street parking, the various consequences should be explored (Biswas & Chandra, 2017).

In the Journal (Parmar, 2020), parking is an important issue at both the local and strategic levels of planning. In fact, it is one of the main concerns when planning and designing any infrastructure project. If ignored, it will contribute to congestion and traffic violations, accidents and injuries, and waste of time and money. One of the first parking studies showed that parking problems arose mainly because people wanted to park right in front of their destination. People's behavior of parking near their destination tends to increase parking volume, thus encouraging them to use curbside parking. Parking on the street/curbside endangers traffic and is also one of the biggest factors affecting delays.

In many urban areas, illegal parking is also a common problem, endangering traffic safety. In Greece, analysis was performed (Spiliopoulou & Antoniou, 2012) on illegal parking in six different cities for which data was collected in 2010. Of these three cities were taken as Athens and three other cities are smaller Greek towns. As can be seen, illegal parking is increasingly common in large cities due to saturation of parking spaces and the tendency to park as close to the destination as possible. One of the main solutions to reduce the need for parking is to reduce or stabilize the rate of private car ownership and to shift the mode from private cars to public transport. A study on the willingness of people to switch from private cars to public transport was carried out by (Ahmadi Azari, 2013) in the CBD area of Mshhad (Malaysia).

The number of parking spaces on highways along major urban roads affects local traffic, especially when there is heavy traffic. In Greece, illegal parking in six different cities was studied by (Spiliopoulou & Antoniou, 2012). They discovered that legal parking spaces were full, but illegal parking spaces were completely filled in many areas.

3. Parking characteristics

Parking characteristics are the basic features that can make an assessment of parking services and parking problems occurring in the study area. Parking characteristics include parking agglomeration,

parking volume, parking rotation, parking index, parking time and parking capacity. The characteristics of the parking lot are necessary to analyze the operating conditions and design the layout of the parking lot. Parking accumulation is the number of cars parked at a location at a given time. The number of cars parked at a certain location or on a parking lot during a given time. Usage time is usually one day. The results of analysis of parking survey data obtained peak parking hours, accumulation and parking volume for motorcycles, light vehicles and heavy vehicles (Sonya Sulistyono, 2018).

Recently, (Chen, 2015) investigated parking characteristics in downtown Shanghai of Shanghai city, China. The authors classified the entire study area by land use and analyzed parking facilities alike. The authors also propose parking policies for different zones and use modern parking techniques to balance parking vehicle types and provide choices for parking users.

Depending on the location, service purpose, type of building and management model, parking lots can be divided into the following types: Depending on the location, there are on-street and off-street parking lots. When parking on the street, vehicles are parked inside the red line of the road. Street parking can be divided into roadside and roadside parking. Street parking is a special parking lot, garage or parking building beyond the red line. Off-street parking can also be divided into outdoor parking and indoor parking ((Yan-ling, 2016).

In the Journal (Parmar, 2020), Parking Characteristics Analysis before describing the analysis, it is necessary to consider some important definitions related to parking statistics illustrated as follows:

- 1) Parking accumulation: Parking accumulation is the number of cars parked at a given time. Normally it is transmitted along the cumulative curve.
- 2) Peak Parking Saturation: This is the ratio of the number of cars parked at peak times to the parking capacity by number of seats.
- 3) Number of parking spaces: Number of parking spaces indicates the value of the total number of vehicles parked during a given period or survey period. The actual volume of vehicles entering the parking lot is recorded.
- 4) Parking load: It is obtained by multiplying the total number of vehicles occupying the parking space at each time interval by this interval. It is expressed in vehicle hours.
- 5) Peak Hour Parking Rate: The ratio of the number of vehicles parked during peak hours to the average number of vehicles per time.
- 6) Average parking time: Is the ratio obtained by taking the parking load (vehicle hours) divided by the total amount of parking during the survey period.
- 7) Parking Turnover: This is a measure of the capacity of a particular space in a parking lot, calculated by taking the number of cars parked in a given period of time divided by the total number of parking spaces available.
- 8) Parking Index: The Parking Index is a measure of the efficiency of a parking space. It is defined as the ratio between the total number of vehicles parked during a period and the total available space, i.e. capacity.

In the Journal (Eedan Al-Jameel, 2020), it was concluded that street parking should be limited along main streets. Where permitted, parking on the street should be parallel and not inclined, as the latter will be dangerous in all respects. They also recommend banning on-street parking near certain locations such as dedicated walkways, intersections, schools, etc. The type of effective parking management is smart parking. This type of parking mainly depends on sensors and variable notifications. These vehicles should be set up or installed at least in the main parking area to manage parking demand (Al-abassi, 2018).

In Journal (Kita, 2000), Traffic service level of a road segment is a concept to assess the quality of road service perceived by drivers using that road segment. These service level indicators are used where, such as traffic density and throughput, are not the service level itself, but simply characteristics of traffic conditions that are related closely related to traffic service level and does not necessarily reflect the perceived service quality of the driver. This disadvantage is due to the use of these traffic characteristics as alternatives (Rifai, Wibowo, Isradi, & Mufhidin, 2020).

(Moran, 2017)When planning the road network, it is necessary to analyze both factors and future traffic needs before deciding on routes. Road width, curb radius, and grades are determined by required traffic density, vehicle type and bends circles. Amount and type of road traffic required to operate and maintain, therefore, ideally, the requirement should be identified at the initial planning stage. Single-lane roads should allow two vehicles to pass comfortably. Right corner radius suitable for both inside and outside rotation of larger vehicles Adjacent to roads should be allowed in crowded areas and high traffic zones.

4. Street side Parking:

Street parking in city centers is an attractive means for drivers. However, the availability of such parking lots can affect the capacity of the expressway and contribute to the high number of traffic accidents, as well as other direct or indirect impacts on the traffic problems. Other topics include public transit use, business, the environment, and property values (Chick, 1996). Studies (Kimber, 1984)(Hobbs, 1979)have shown that street parking design often affects road capacity if parking locations are not carefully selected and controlled. Improper parking can cause serious delays, especially on busy roads, leading to a halt in traffic. London is one of many cities where these problems can be solved by implementing so-called 'Red Roads', primarily aimed at controlling parking on these busy roads (Turner, 1999).

During the design and evaluation of the traffic management system, the maneuvering of vehicles in and out of the parking lot is often overlooked. This is likely due to the relatively short time period required for such operations and the seemingly insignificant local interaction with traffic. Thus, with increased parking frequency and increased vehicle traffic, it will become a potential cause of congestion.

Most previous studies have looked at reducing road width to accommodate street parking and its impact on reducing road capacity. (Hobbs, 1979)The study reported the effect of physical use of road space, parking maneuvers, and car door opening on the increase in delays. Studies in Nebraska, USA (James, 1992)have shown that corner parking is more dangerous than parallel parking. However, not all of these studies explicitly examined the effect of parking maneuvers as a cause of congestion.

(Yousif & Purnawan, 1999)The types of parking observed are divided into legal and illegal street parking. Legal street parking includes parallel street parking and corner parking. Unauthorized parking on the street means that vehicles must not be parked at legally designated parking spots on the road(Yousif & Purnawan, 1999).

(Chauhan, Kansagra, & Prajapati, 2017).In urban areas, traffic congestion is a big problem. Dense vehicle traffic on highways, when interspersed with local traffic at level crossings, easily leads to traffic jams. This leads to many negative problems such as pollution, delays, accidents and congestion at intersections. Traffic congestion in inner-city and suburban areas has grown from a mere annoyance to a serious one. Traffic jams are widespread, the movement of goods and people is slowing down, and transportation costs are rising.

(Tiwari & Rabbani, 2018)Raipur is a growing city but road developments in Raipur are still lagging in many respects leading to traffic congestion problems. This issue is a global problem and needs to be properly addressed as it directly affects road users. Some of the main reasons for traffic jams are lack of public transport, poor road planning, lack of discipline, safety issues, etc. These problems also affect our economy. Traffic congestion in Raipur city has reached an alarming level. People from all walks of life face this serious problem on a daily basis. It is the uncertainty, anxiety and frustration that one has to endure when stuck in traffic.

(Wijayarathna, 2015)Congestion in modern urban transport networks is a major social, economic and environmental problem. A study by the Australian Department of Transport and Regional Economics estimated that the total avoidable costs of congestion in 2005 for Australian cities were \$9.4 billion. There are several factors that lead to congestion including: lack of road capacity during peak times, road disruptions and breakdowns in the network, and traffic disruptions at intersections. In addition, an important factor that has not been specifically studied quantitatively, which affects road capacity and contributes to congestion, is the provision of on-street parking.This study attempts to fill the knowledge gap by providing a better understanding of traffic congestion caused by on-street parking and its related impacts on road capacity. The study used field surveys to measure the time it takes to complete parking maneuvers and resulting queuing on Sydney's urban roads. A statistical analysis of these surveys was then performed and a relationship was drawn to measure the impact of these disruptions on road capacity.

((BTRE), 2007) The estimates do not take into account the cost of taking appropriate measures to reduce traffic congestion. Traffic congestion can be managed by controlling travel demand or by increasing road capacity. Travel demand management is the use of policies and strategies to limit travel, especially during peak times, to ease traffic congestion. However, implementing effective travel demand management measures is difficult, unpopular and politically sensitive(Gärling & Schuitema, 2007). This approach has become expensive, time consuming and impractical in most cities due to lack of space for road works and potential environmental factors. In addition, some studies have also suggested that an increase in road capacity can create a greater degree of congestion (Mogridge, 1997)

(Shiftan & Burd-Eden, 2001) Some of these policies require effort and cost to implement; such as restricting peak parking, restricting turns and imposing access restrictions on new traffic generate land-use developments. The aim of this study is to explore possible congestion management strategies and policies related to traffic-generating land-use developments and to quantify the potential benefits and

harms of traffic-generating land use. Specifically, the study aims to understand the impact of street parking on the capacity of neighboring roads and to develop a mathematical model to quantify these effects.

Street parking is a common feature in most urban areas around the world. Street parking improves the economic viability of commercial developments along transport corridors by providing easy and convenient access to customers, delivery vehicles and employees of this development. However, providing on-street parking along traffic corridors can negatively impact the capacity and achievable driving speed of neighboring roads. Road safety is another important factor that must be considered when considering the provision of on-street parking along the traffic corridor. The debate over the benefits and disadvantages of street parking stems from the lack of research on the topic over the past two to three decades (Marshall, Garrick, & Hansen, 2008).

The use of street parking is considered a more efficient use of land, as it limits the need for off-street parking and access points to land adjacent to major roads (Litman, 2013).

This aspect of street parking also reduces costs for businesses, maximizes land use, and creates a pedestrian-friendly environment for the community by zoning vehicles and using land. Based on this concept, it is believed that it will improve pedestrian safety by creating a barrier between the flow of traffic and the sidewalk, as well as reducing the speed of vehicles on the road. (Byrd & Sisiopiku, 2006) Although there are some benefits of providing parking on the street, there are negative impacts, especially on traffic volume.

Street parking can affect road capacity in two ways. Reducing the available lanes of a road for on-street parking is a major factor in reducing road capacity. In addition, maneuvering on-street parking can cause significant delays, especially on busy roads. This creates stop-start traffic separation behavior for lanes adjacent to the parking lane, thereby affecting the traffic capacity of the road section (Yousif & Purnawan, 1999) implemented a Research in detail to understand the entry and exit times of street parking spaces. The study explored ways to improve the design and provision of street parking vehicles, in order to reduce the time required for parking maneuvers. In addition, the study looked at the time it took to park as well as leave parallel parking spaces on the street and parking spaces in the corner. The results show that the counter-parallel parking maneuver is the longest and is positively correlated with vehicle height.

(O'Flaherty, 1986) The study suggests designs that will minimize the need for a reverse parallel parking mechanism and thus reduce the delay incurred in the flow of traffic. While both of these studies provide evidence of the adverse effects of street parking as well as potential solutions to reduce the impact, neither of the studies quantified the effects of these conditions this delay to the traffic capacity of the road.

There have also been a few studies inside the past that have used information evaluation strategies to assess the effect of on-road parking on road capacity. The American Association of State Highway and Transportation Officials (AASHTO), 2011 claims that the street capability of four to 6 lane arterial roads can be multiplied through 50% to eighty% by disposing of curb aspect on-road parking. moreover, (Weant & Levinson, Parking, 1990) claim that the removal of on-street parking on a 4-lane avenue doubles the potential, at the same time as getting rid of on-avenue parking on a six-lane street achieves a sixty seven% potential benefit. This result is the direct effect of on-street parking due to loss of traffic lanes when on-street parking is permitted. Hence the spot has no longer considered the ability effect of

on-road parking on the adjacent visitor's lanes. but, a more latest observe undertaken with the aid of (Portilla, Orena, Berodia, & Diaz, 2009) used micro-simulation modelling to reveal that the street potential of the closing lanes decreased appreciably, through as much as 16% because of 30 parking maneuvers according to hour. These research offer brilliant insight into the issues, but are case particular and do not provide a generalized method to assessing the impacts of on-avenue parking.

Moreover some of research have found out that on-avenue parking contributes to traffic collisions and thereby affects the traffic float. A observe within the city of Hamilton in Ontario, Canada offered that non-intersection crash costs reduced by way of a mean of 37% after on-road parking become eliminated alongside 6 principal arterial road segments in the city centre(Desjardins, 1977)

A study undertaken via US Highway Research Board (Board, 1971) expected that on-road parking affected 20% of all road traffic collisions in urban regions. Moreover, (Weant & Levinson, Parking, , 1990) located that 15% of crashes inside city areas are as a result of on-road parking and 5% of pedestrian mortalities involved human beings getting into the roadway among parked vehicles. Interactions with on-avenue parked motors contributed to six% of all crashes within London (Centre, 1995) those figures may be tons higher as maximum minor road traffic injuries in which a parked car is worried might not be recorded or may be recorded without acknowledging a parked car as the primary contributory component of the twist of fate. However, there have also been conflicting research which suggest that the prohibition of on-road parking improved the range of crashes and the severity of the injuries. A examine in Copenhagen on the provision of bicycle lanes as a substitute for on-street parking cautioned that parking shifted to aspect streets, elevated turning visitors moves which in flip elevated the wide variety of conflicts and injuries.

The literature review makes clear that the effects of on-street parking have been studied. However, there haven't been any comprehensive studies that measure the effects on road capacity that are specifically connected to the driving maneuvers required for parking a car. This study looks into this knowledge gap in more detail. Application of this quantification inside traffic management rules and guidelines is what gives the project its worth. As a result, the next section addresses the methods currently used to take into consideration the effects of on-street parking on road capacity.

5. Suggestions for parking facilities in urban areas:

(PERSONNEL OF THE HIGHWAYS SPECIFICATIONS AND STAND, 2015)The HSS Committee accredited the draft revision in its assembly hung on 12th January, 2015. The government Committee in its assembly held on 18th January, 2015 authorized the draft revision for setting it earlier than the Council. The Council in its 204th meeting held at Bhubaneswar, Odishaon 19th January, 2015 permitted the draft IRC: SP: 12-2015 "hints for Parking facilitiesin urban areas" (First Revision) for publishing.

- Annual city population growth charge in final a long time has been above nationalcommon growth by means of greater than 1% urban populace constitutes extra than 30% of generalpopulace out of which forty one% resides in metropolitan towns. In Metropolitan towns to 3a long time earlier, the percentage of wheelers became as excessive as 75%, whereas four wheelers(automobiles) have been 2% - three%. The scenario has modified and now wheelers are 60% and fourwheelers (automobiles) are 15% - 20% requiring more parking region towards

decadal upward thrust of 3 to 9% in number of two wheelers, upward thrust in 4 wheelers is 10 to 12% in Metropolitan cities.

- The provisions of parking spaces want to be developed periodically due to fast pace of urbanization and rapid motorization, that's making the towns denser and congested. A well-organized planning and implementation will eliminate the bottlenecks which may be found due to destiny high density development in future related to excessive land value in city areas.
- When dealt definitely, parking can shape a treasured financial asset for the neighborhood community. With right parking management underneath properly founded parking policies, the parking centers can generate financial possibilities and true revenue, apart from improving the livability of any town, at the same time as additionally assisting sustainable delivery and the parking business itself. In city situations, meeting parking needs turns out to be tough and might transfer into a trouble but whilst controlled nicely and beneath well based parking policy, parking will be an asset. Provision of insufficient parking inside the towns in the absence of mass transit facilities bears a sizable effect main to high degree of traffic congestion and excessive level of noise and air pollutants within the towns. Even the occurrence of street rage has come to be a commonplace characteristic because of scarcity of parking deliver in a town of Delhi.

6. Types of Parking Options to be utilized based on the required area.

6.1 Free parking

Those centers particularly incorporate of organization or public administrations for vehicle parks. Parking spaces in car parks or commercial garages can also belong to, or rented by using non-public businesses or public administrations that offer free parking to their personnel all through work time, to site visitors for commercial enterprise journeys, or for business motors.

6.2 Paid parking

Parking areas can be made to be had by using non-public businesses or public government on charge of parking prices. Automobile parks may be available in open-air or positioned in homes. For short or medium-period parking, users pay with the aid of the hour, the charge being determined upon by way of the operator of the automobile park. Pricing may be strategic to encourage brief time period and medium-term parking, innovative to dissuade it, free for first hour to inspire quick time period parking, contain repayment of parking charge by means of keep owners to inspire purchases and finally, range in accordance with the motive of parking within the given area. As regards long-time period parking linked with work or house, the car park operators let spaces or advise subscriptions. Within the case of vehicle parks with concessions, customers can, avail if they want, purchase an area with guarantee of use at some point of concession.

6.3 On Road Parking Facility

On-road parking facility is commonly at the cut back facet at the threshold of the carriageway, at the lateral strips parallel to the street manner, or on particular road regions consisting of squares, or different floor, forming a part of the publically owned avenue area. This facility is located in

shopping regions on the door step of buying gadgets where turnover is excessive and speedy access to the customer.

6.4 Off-Road Parking

Those are surface parking plenty and vehicle park systems both underground or increased. Underground parking or roof top parking can be used to provide a 100% usage of the land. Access to those facilities can be made for either public or personal use. They can be controlled by means of the municipality or with the aid of non-public or semi-public establishments. Off-Road is the parking of motors at locations aside from the on-the-street sorts of Off-road parking typically taken into consideration are:

6.4.1. Floor vehicle parking

Typically these are provided on the floor and at far from the interest location to be catered. Those are known as 'floor masses' preparations are made for the systematic access and go out of the cars. Stalls are designated by vehicle kinds and proper circulate regions designed for swifter moves of the parking or un-parking automobiles. Protection provisions want to be considered for the drivers and passengers close to parking spaces and in move regions those can be developed on personal or public land and the investment is minimal. This is the first alternative relying at the availability and size of vacant land. Private land owners also can be accredited for developing parking facility in vacant lands until everlasting structure of their own is positioned-up.

6.4.2 Underground parking

It is also known as basement parking. Underground parking spaces are ordinarily positioned in city centers or under play grounds or at comparable places, wherein there isn't a whole lot space available to build a parking facility, however there is a right away want to build one. This may be supplied beneath residences and also commercial buildings to provide parking facility to inmates & also for public, journeying the industrial building. Underground parking involves large portions of excavation, production of keeping partitions, air flow and lighting fixtures. These can also be single stage or multilevel depending at the need and based totally on kind of soil, presence of water desk but the underground parking includes good sized investment.

6.4.3 Multi-level parking

Parking comprising of greater than one level should be provided in respect of apartments & business establishments consisting of malls, Multiplex for parking of vehicles. This calls for significant investment and additionally availability of land and funding by city local frame and/or private participation. In some instances, in which city local our bodies have invested, they are not able to get returns because of reluctance of the car owners now not preferring parking in multi-degree automobile parking.

7. Conclusions:

Recent environmental, economic and energy concerns have re-emphasized the use of parking management strategies to reduce vehicle traffic and increase public transport usage. Based on a review of the literature the following conclusions can be drawn.

1. Parking space management strategy is not fully used.

2. Parking strategies in the area include

- (a) Providing short-term parking,
- (b) Eliminating blanket parking, and
- (c) Strictly enforcing parking regulations.

Most other strategies can have dramatic effects in urban areas and are carefully implemented over long periods of time. Thus, some parking strategies are short-range in nature, others A good part of the long range element.

3. In general, parking strategies have multiple implications in urban areas. For example, promoting short-term street parking can help attract shoppers and revitalize central business districts. However, this increases the overall mileage of the vehicle and thwarts attempts to reduce air pollution and save energy.

4. There have been few attempts to evaluate the effectiveness of parking management, and little is known about the interrelationship between parking management strategies and support services.

5. There are few legal issues associated with implementing parking controls. But public, political, and business resistance act as a deterrent to their implementation.

6. The use of parking policies to improve air quality, conserve energy, or meet other national goals may not yield beneficial results in many urban areas, but it will provoke strong opposition and It can cause the city's economic decline.

7. In most cities, there are no local issues that would warrant widespread use of parking rules to restrict vehicle traffic.

8. Parking management policies can have a positive impact on urban communities when applied step by step to alleviate local problems and facilitate the achievement of local planning objectives.

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