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# A Study of Parking on Street Vehicle in Panipat City

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***Abstract:*** ***Street parking is a sort of public parking that is renowned for being effective in terms of land area usage and convenient for drivers since it enables them to leave their cars close to their destinations. Depending on the situation, there are a variety of benefits and drawbacks to on-street parking. Urban transport planners nowadays encounter challenges and are interested in learning where and when kerb parking should be offered while also considering its advantages and disadvantages. Once again, if the question is asked whether parallel parking or inclining is required. Before removing or restricting street parking, you should investigate many previously completed components. We came to the conclusion that on-street parking should be prohibited on several key streets following a thorough analysis. Minor roads should be used for its construction as they can offer a safe, amiable environment in this situation. The study's goal is to identify significant panipath city sites with a lot of on-street parking issues. For the entire survey, we visited four locations: Dada Bhature wala Restaurant, Gandhi Chowk Sector 14, Tulip Point, and Kache-Quarter. The research comprises of a fixed period sampling technique survey on parking lot use. We recommend that kerb street parking be parallel rather than tilted since the latter is risky in every way. The report also suggests several sites where on-street parking may be prohibited.***

***Keywords: Parking Profile, Parking Demand, Parking Duration, Parking Supply, And the Parking Demand Model***

## I. INTRODUCTION

The population of India is expanding rapidly, causing a wide range of parking problems around the country. Parking is a vital component of any transportation system. The implications for traffic control are substantial. These days, we strive to reduce parking issues by reducing the available space, since the shortage of space is the root source of the problem. Parking lots have proliferated in urban areas, especially shopping centres, public buildings, and office complexes, because of the scarcity of available land. It also influences the evolution of transportation systems. The parking situation in many cities has gotten out of hand due to the rising number of cars on the road. Lack of parking spaces forces cars to park on the curb, which slows traffic, increases the risk of accidents, and narrows the route. Town planners and town engineers may use the results of a study on parking demand and parking characteristics to improve the quality of parking facilities in their communities. Because of rising residential and commercial density, parking has become a growing issue in urban areas. Every motorist wants to find a parking spot as near to his or her destination as feasible. Therefore, there is a greater need for parking garages and lots in the CBD and other high-traffic areas. The demand for parking spots in major cities has skyrocketed over the last decade as a direct result of rising traffic volumes on the roads there. Because of this, on-street parking is limited in the business and shopping core of Communities during rush hours. Both the economy and the environment suffer when more people need somewhere to park.

## II. OBJECTIVE

The objectives of this study:

*1)* To get the parking demand model and
*2)* Calculate the parking demand and do comparison of demand with the present supply.

## III.LITERATURE SURVEY

Priyanka Kolhar (2012), has examined the study in On street parking management plan for Dharwad city, Karnatka, INDIA. She studied many available reports, plans of Dharwad city and compiled to one and Review them. The survey was done in 2011 in Dharwad city. “This study was conducted in the CBD and amp areas; covering around 750m radius for the city bus station where traffic congestion is very high due to the many commercial activities carried out in this area.” The majority of parking lots were over capacity, as determined by data gathered in 20 sites chosen independently for each session, such as morning and evening. Finally, they determined in a few spots that. She proposes imposing a steep fine on drivers whose cars are seen parked in high-traffic zones to discourage this behavior.

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Er. Sandeep Singh et al. (2012) was examined the Application of APMS Technique in Chandigarh city sector 17, known as (Heart of Chandigarh). The study was involved the physical inspection of parking lot and observe the activity how the parking lot was used by the vehicle driver. Data was collected from normal days. The maximum peak in all the parking lot should be 12-14% of parking accumulation. At last they give some suggestion like: Implementation of advance parking management system which having the following uses and advantages in future parking: Saving of time, saving of operating cost, very less accident chance, proper utilization of available space.

Yan Wang et al. (2013) was conduct a survey to find the parking characteristics in shanghai china. It was found that the market area has higher parking demand than the other 2 areas. The data of the survey was collected in September and October month in 2013 till 2 weekdays.The surveyors record the entry as well as exit time & note license plate number of vehicle which are available in parking at each 15 minutes interval. To enhance and development of parking area government should give more land area and taxes comfort to promote the investors.By using integrated public transport system which will reduce the traffic congestion problem in the city.

Sudipta Chowdhary et al. (2014) was examined and did analysis on the parking system of Chittagong which is the capital of Bangladesh to find out the supply & demand and it is one of the most commercial activity centre of Bangladesh. Chittagong is home to numerous commercial establishments, and a parking survey of its drivers has yielded the data summarised below. Questions asked in the survey include: where the driver is coming from, where they are going, why they are making the trip, when they arrive at the parking lot, and when they leave. We analyse parking needs, parking turnover, and the parking demand-supply ratio. Street parking has an average hourly demand of 350 vehicles, but can only accommodate 216 vehicles. There is a 1.62 to 1 ratio between accumulation and supply. There is a high risk of traffic jams and car accidents at this crossroads because of all the unlawful parking that takes place there.

Saurabh kumar Nirala (2014), has examined a survey in Kurukshetra city and anaylse the demand and supply of on street parking in various destination. They cover almost ten location in city where demand of parking is very high as compare to supply. In the survey they found that, Maximum parking utilization is 308 82 on Kacha Gher Road and the minimum parking usage is 126.04 in kurukshetra University 2$^{nd}$ gate. The Average utilization found is 213.80 in all the ten location which indicate that demand of parking is more than double as compare to existing parking supply.The driver of two wheelers should be encouraged with the help of media that they park their vehicle in proper sense so that we avoid congestion on Roads.

Saptarshi Sen et al (2016) was examine for location of urban CBD in Kolkata and estimate the Curb parking demand for 4- wheelers, India. One of the districts that was chosen for this research was Gariahat, which is known for its vast number of retail centres, and the other was Dalhousie (large office area). The model of the parking application may be obtained via the use of SPSS. Study parameters included things like the average number of vehicles owned, the average amount of time spent parking, and the primary factors that influence people's decisions to choose private transportation over public transportation. The regression equation that was shown before was constructed with the help of the data that came from the survey. In closing, I would remark that the demand for automobiles will be quite high in the years to come, and because of this, we are taking preventative measures to manage the peak demand.

Janak Parmar et al. (2017) worked on a case study of Delhi in which he evaluate the parking characteristics. This survey was carried out by 5 members in 2017 in different districts of Delhi. The survey was conducted in commercial, business-oriented areas, market place of Delhi region. All of them find that in commercial area where large number of offices are there, so that each vehicle can occupy large no of space and for long time, because if vehicle driver go in office they will park their vehicle at 8-9 hrs mostly and occupy long time spacing. At last, data was collected on the basis of in out survey, License plate number method. The survey was carried out at regular intervals of thirty minutes, and the number of cars that were counted in the parking lot was taken note of.

Dr. Sunil Sugandhi et al. (2017) conduct a on street parking management survey in Khargone city, Madhya Pardesh, India. The survey was conducted at four place Jhanda Chowk to Chouraha, Chouraha to Sabjimandi, Old Radha From the market to the Chouraha and from the bus station to the Gour service station, to find out the supply & demand of parking in that area. As a result survey show that, we obtained the mean duration of a two-wheeler in area we choose.Parking demand model was created. The daily traffic volume in a specific area was calculated. The amount of parking space available at various locations were find out.

Sanjay Kumar M. Dave et al. (2018) doing study in CBD areas of four major cities of Gujarat, the sites which are covered is very busy site of Gujarat. Primarily, with the help of license method, on street parking data was determined at each 1 hour interval upto12h for normal working days. Max parking demand is observed in evening between 4 to 8 P:M. in different sites. The short duration of vehicle parking is very high, which creates huge traffic jams on the roads.

Nilesh Pawar et al. (2018) conduct a study and survey of feasibility on street parking to get better outcomes on already available parking related issues in Patna city. In this poll, around 40 routes are chosen because they have a high amount of people parking on the street. During the course of their investigation, they primarily carried out three distinct types of surveys, namely: reconnaissance surveys, demand and supply graphs, and parking surveys. The number of vehicles that are now parked along the curb is counted, together with the amount of time they have been there, as well as an estimate of the amount of space that each kind of car needs. The ultimate finding demonstrates that there is a greater demand for parking spaces than there are available spaces. If we raise the cost of parking in the city, then more people will choose to use public transportation instead of driving their own cars, which will help us escape this predicament.

Rusul Rahman Muzhar et al. (2019) has worked on kerb street parking characteristics in Al-Najaf city urban street, Italy (2019) in two cities like Al-Rawan and Al- Iskan where traffic congestion problem is very high. The survey was conducted with using of Drone camera, manual counting, & video camera.At last, stop on street parking system in the area and promote off street parking system, use intelligent transportation system like smart parking.

S.Thirupathi et al. (2019) was examined a scenario of on street parking demand in Kolkata, The survey was done at nine major locations, where six are intersections points which are fully busy with heavy traffic problem and remaining three are the shopping mall.

*1)* The city provide Curb parking but 1/4$^{th}$ of the road surface consume by vehicle which is responsible for slow movement of vehicle.

*2)* If on street meter parking provision is there then it is beneficial to both parkers and KMC. Mostly seen in the city the parking space for 4 wheeler illegally utilized by two wheelers which are wrong & Strictly action should be taken on two wheelers. Long term parking of vehicle in front of shop should be restricted and short term parking should be allowed. If possible separate multi-storey parking lot should be introduced in the city for relief of traffic congestion problems.

Rakesh j Prajapatil et al. (2017), was examined the Curb parking problem in urban streets and they review about the parking research in the world. To come out from the Curb parking problem, the global exposure says that paid parking policy is the best decision in the on street parking problem. To identify the problem of parking in various cities and what are its affects on different visitors. John Golias et al. in the article "Sensitivity to the choice of off-road parking" published in the journal Planning of transport and Technology (2002) carried out a survey questionnaire and developed a utility model equation.

Finally he found out that if parking charges increases, then some affects were shown like driver either change their parking location, change their destination or even they cancel their journey. Proper Curb parking managements need to be push up in the visitors and digital parking management should be introduce. Park and ride facility is the best option to reduce the on street parking problem in any city.

Rutul M. Diyora et al. (2020) conduct a survey of on street parking problem in Vadodara City, Gujarat. Vehicle growth is increasing day by day in the city which effect the parking problem. In this study 3 locations are selected which having highest no of parking problem and also uses the fuzzy Rule Based Model.The final result outcomes show that illegal parking is found is more in numbers. To come out this problem paid parking policy should be encouraged in the whole city. Overall accuracy found form fuzzy model is 66% and found to be very accurate for change Curb parking to off street parking.

## IV. METHODOLOGY

### *A. Proposed Methodology*

In addition to determining the demand for and supply of parking in Panipat city, which has a population of 2.78 lacs, the purpose of this research is to provide recommendations about how the parking issue in Panipat city might be solved. The location of the research would most easily be carried out in the city of Panipat, which is located in the Indian state of Haryana. 4

#### *1) Study Area Definition*

To ascertain the number of designated parking space in Panipat city and the preexisting difficulties connected with parking there, it is necessary to first select the study area, location, and parking inventory. One way to do this is to count up all of the available garages or parking lots.

#### *2) Collection of Data*

Data of parking is collected in two types such as:

*a)* Fixed period sampling

*b)* Parking Supply for parking space availability

3) *Fixed Period Sampling:* This approach involves counting the number of parked vehicles at a particular location at the beginning of the survey. Then, at regular intervals of a quarter of an hour afterwards, we continue to count the number of vehicles for a period of up to three or four hours, depending on the location. By multiplying the PCU factor by the parked vehicle data, the data are then transformed into the value of passenger cars. The highest possible PCU number represents the greatest demand at a certain location.
4) *Parking Supply for Parking Space Availability:* During peak parking hours, the number of cars that can be accommodated in the roadside parking places at each study site is taken into account to calculate the parking supply. After the vehicle data has been multiplied by the PCU factor from IRC: 106-1990, it is then transformed to PCU, which stands for passenger car units, and the parking supply in passenger car spaces is computed.

**Table 4.8 The Ratio of Maximum Accumulation to Parking Supply percentage**

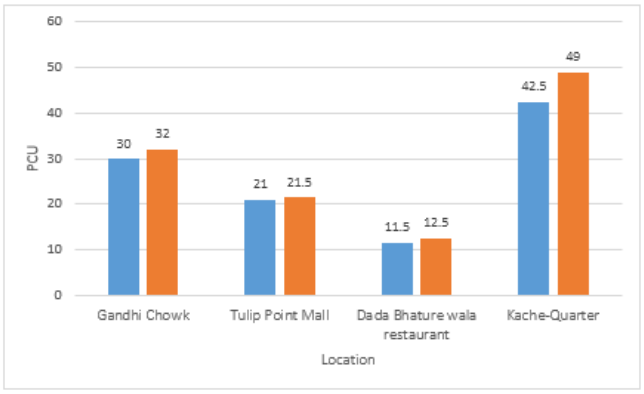



Fig. 1 SURVEY LOCATION




## V. SURVEY AND DATA COLLECTION

### *A. Sites For Data Collection*

The data was gathered from a variety of locations around the city of Panipat, and it was gathered in such a way as to ensure that all of the main-2 locations of the city, which are the ones with the most demand for on-street parking but the lowest availability, were covered. The following is a list of the “places that were chosen:

*B. Site along Sector 14 Main Market Panipat city*

*1)* Gandhi Chowk
*2)* Tulip point
*3)* Dada Bhature wala Restaurant
*4)* Kache quarter Road( Famous Shopping Market of Panipat city )

*All the selected Site are shown in photo" 4.1:*

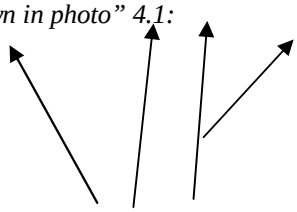


Fig 4.1 Layout Plan of Panipat City

*B. Data Collection and analysis*

*1)* *Fixed Period Sampling:* In this method, we first count the number of vehicles parked at the chosen site (cars, bikes, or any other type of vehicle) at the beginning of the survey. Then, after a fixed interval of 30 minutes, we count the number of vehicles once more for up to 2 to 3 hours during the chosen site's peak hour. The data for the parked vehicles is multiplied by the PCU factor to get the passenger car unit value. The maximum PCU number represents the site's maximum demand.
*2)* *Gandhi Chowk Sector 14:* **"**Parked vehicle data of Gandhi Chowk in given in tabular form below. Peak Parking demand value obtained from this site is 30 PCU (Passenger car unit) per quarter an hour interval in the time period of 9:30-9:45 am. The graphically representation is also shown of this site.

## VI. CONCLUSIONS

The research leads to the following conclusions: None of the areas chosen for analysis had enough curb and off-street facilities.
Each of the sites that were chosen had a significant issue with curb parking for cars and motorcycles.
Each of the sites that were chosen has a roadway width of 9.3 metres, after which it takes a motorbike around 2-4 metres before congestion becomes an issue.
When parking is full, Reliance Mall provides off-street parking. Panipat Station parking clogs the entry and exit gate, whereas Tulip Point Mall parking is for personnel only.
People are prepared to pay parking fees for pleasure activities like viewing a movie at a mall, but for business activities like short-term office work or shopping, they strive to avoid it.
Even in places with correct curb parking, there is still a strong demand for parking, and there is very little space available during peak hours, suggesting that the parking issue should be solved by building separate parking lots on the open lots near to the examined areas.

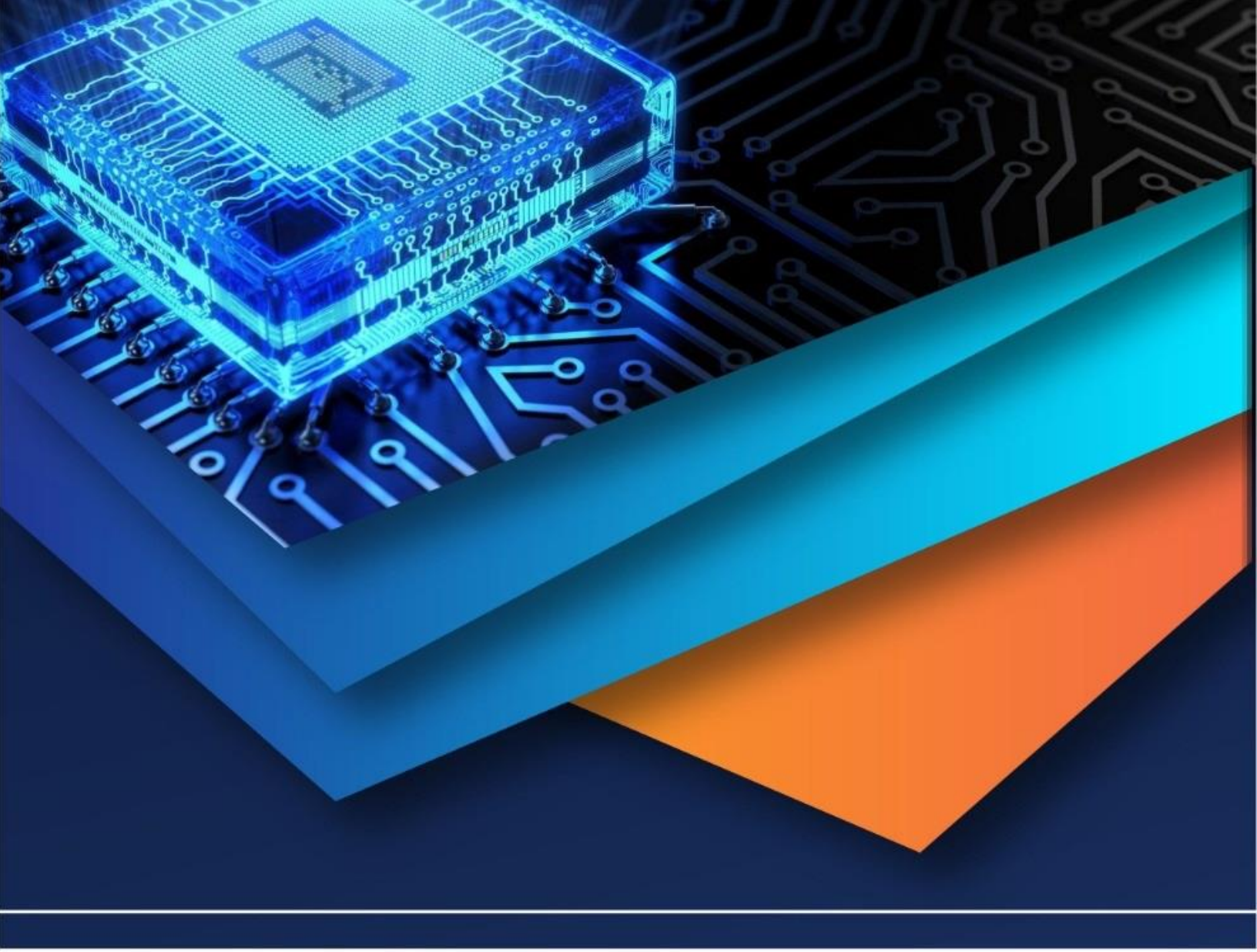
## VII. ACKNOWLEDGMENT

The research leads to the following conclusions

*1)* None of the areas chosen for analysis had enough curb and off-street facilities.
*2)* Each of the sites that were chosen had a significant issue with curb parking for cars and motorcycles.
*3)* Each of the sites that were chosen has a roadway width of 9.3 metres, after which it takes a motorbike around 2-4 metres before congestion becomes an issue.
*4)* Reliance Mall has plenty of off-street parking. Panipat Station parking causes access and exit issues, whereas Tulip Point Mall parking is for staff only.
*5)* People are ready to pay for parking while travelling for enjoyment, such viewing a movie at a mall, but when travelling for business, like short-term office work or shopping, they avoid it.
*6)* Even in places with correct curb parking, there is still a strong demand for parking, and there is very little space available during peak hours, suggesting that the parking issue should be solved by building separate parking lots on the open lots near to the examined areas.

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