

Study of Parking Accumulation in Major On-Street Parking Spots in Rajshahi City, Bangladesh

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Abstract

Rajshahi is a metropolitan city in Bangladesh and a major industrial centre of North Bengal. Parking is one of the major problems. The availability of less space has increased the demand for parking space especially in major roads. On-street car parking is now creating severe transportation problems in major roads of Rajshahi city. In order to accommodate the large volume of vehicle, small cities and towns must develop to affect their infrastructures- roads, flyovers, car parks and other facilities. This paper aims to explicate the parking scenario of the major roads of Rajshahi city through analysing the parking accumulation rate. The study tried to explore the possibilities of moderating the present parking problems of the roads. Required data has been collected from eight parking spots from 9am-7pm. The study found that the highest parking accumulation rate is 2167 at 12am-1pm at Railgate parking spot and the lowest is at Vodra parking spot which is 606 at 9-10am. The analysis shows parking accumulation value of other study area lies between the value of Railgate and Vodra parking point. As the traffic on the existing road system increases, congestion becomes serious problems. Thus there could be medium and long term solution measures.

Keywords: Parking, Accumulation, Parking Spot, Vehicles, On-Street Parking, Traffic Jam

INTRODUCTION

Bangladesh is the poorest development country in south Asia. It has an area of 147570 square km which contains a higher population density of 1033.5 square km

[1]. Rajshahi is an important and divisional city of Bangladesh. Rajshahi city has well organized internal communication as well as connection to other parts of the country. There are 96

metalled roads with a total length of about 1270 km, 108 semi-metalled roads of about 506 km length and 6 railways of about 63 km total length [2]. Parking is an essential component of the transportation system. The growing population of Bangladesh has created many problems-one of the challenging ones being car parking of the commercial areas which we confront almost every day. Parking is one of the major problems that are created by the increasing road track and other vehicles. The availability of less space in urban areas has increased the demand for parking space. It is becoming a crucial issue in managing the transportation system since it affects the overall accessibility of a city [3]. Inadequate parking provisions in these shopping centers contribute to the problems in traffic movement [4]. Parking study investigated the evidence about the impact of different types of parking measures and policies on road traffic, congestion and transport safety, car parking etc. The amount of two, three, four wheeler vehicles are increasing day by day. On-street parking is the most common parking in Rajshahi city. But the maximum street is narrow. As a result road capacity is reduced as well as traffic jam occurs. Moreover, illegal parking is one of the main reasons of road congestion in

Rajshahi city. In order to accommodate the larger volume of vehicle, parking study in Rajshahi area is needed. Although, parking problem in Rajshahi is at nascent stage, it can be a major hindrance for the transportation system in near future. That is why, this complete parking study is implemented to investigate the situation of existing parking system as well as to suggest for improvement.

SCOPE OF THE STUDY

Rajshahi is one of the major city in Bangladesh with lots of important office, schools, colleges, universities. So parking is an important factor to ensure the safe and comfortable movement of the inhabitants of this area. If the actual demand and the existing scenario of the parking system are determined, it can help to ensure an effective parking and sustainable management system for the inhabitants. By this way Rajshahi can be converted to a well parking facilitated as well as transportation management system.

OBJECTIVES

1. To study existing parking conditions.
2. To identify the current parking problems.
3. Rank the problems and solutions according to their impacts and importance.

4. To formulate strategies for better management for parking.

BACKGROUND

According to the Bangladesh Road Transport Authority (BRTA), the number of registered cars in Dhaka up to May 2013 was 185,619 [5]. These cars had been used only for private purpose and constituted almost 25% of all motorized vehicles registered within Dhaka city. Among all other vehicles, private cars create nuisance in various aspects. It has been found that for 95% of their time on road, cars remain stationary which means that most of the time they are parked which consumes large amount of road space [6]. A study conducted by Rahman K.N. (2007) revealed that 60% of the vehicles parked in Motijheel, the busiest commercial area of the city, are private cars [7]. Thus, the viability of these commercial areas depends on the availability of convenient parking facilities adjacent to or easily accessible to desired destinations, especially off-street parking facilities. As pointed out by Mahmud et al. (2012), the problem is worsened by the absence of any effective parking policy for Dhaka where illegal on-street parking is a common scenario in every busy street [8]. This constricts the available carriageway for traffic, thus

posing as one of the major contributor to traffic jam. Studies show that the vehicles cruising for on-street parking create 8-74% of the traffic congestion [9]. He also found that under-pricing of on-street parking is the main cause behind increased tendency to cruise rather than parking on a vacant off-street parking. To ameliorate the parking problems of Dhaka city, Mahmood et al. (2009) suggested identifying available parking spaces and introducing metered parking or monthly-parking permits to control parking tendency [10]. There are around 3,000 roadside shopping centers in Dhaka, and most of them do not have adequate provisions for parking (Rahman M. S., 2010) [11]. Prskawetz, Leiwen and O'Neill (2004) has observed that demographic characteristics of the households can produce important effects to the overall demand of the automobiles, through the combined effects of differences of the automobile demands (based on the household type) and changes of the population composition in the future (also based on the household type) [12]. Recently there is a study in Brazil of environmental impact due to automobiles (Fioravante et al., 2009). Due to demographic changes that have been occurred, the article projects the number and composition of households of Belo

Horizonte (Brazil) by household size and marital status and age of reference person, using a multidimensional model developed by Yi (1991) that considers the interdependence between demographic events. However, the ambient impact did not occur with the same intensity, because some old vehicles were substituted by new ones that have lower emission of pollutants [13, 14]. So, according to the knowledge reviews that we have covered here, actually are showing that due to lack of effective planning and proper focusing on the issues of parking in Rajshahi city, parking has become a mammoth problem now a days. Adequate research and some alternative solutions might give us some hope and light to solve the parking problem in Rajshahi city.

METHODOLOGY

The major traffic conflicted parking areas of Rajshahi city are taken into

consideration for our study. We have selected eight parking points based on huge traffic volume for the case study which are Shaheb bazar parking point, Bornali parking point, Court parking point, Laxmipur parking point, Talaimari parking point, Station parking point, Railgate parking point, Vodra parking point. Parking accumulation rate have been calculated on those parking point.

Parking accumulation data were collected from 9 am to 7 pm from our selected eight parking spots. All the data and information were collected by visiting the study area. The data included location of the parking spot, time, types of vehicle, number of different vehicle passing the parking spot, PCU factor etc. Google-earth map was used to digitalize the shape-file of the study area. After analysing the data from the study area graphical representation are shown.



Fig. 1: Satellite View of the Study Area.

ANALYSIS AND DISCUSSION

Study Area 1 (Shaheb Bazar Parking Point)

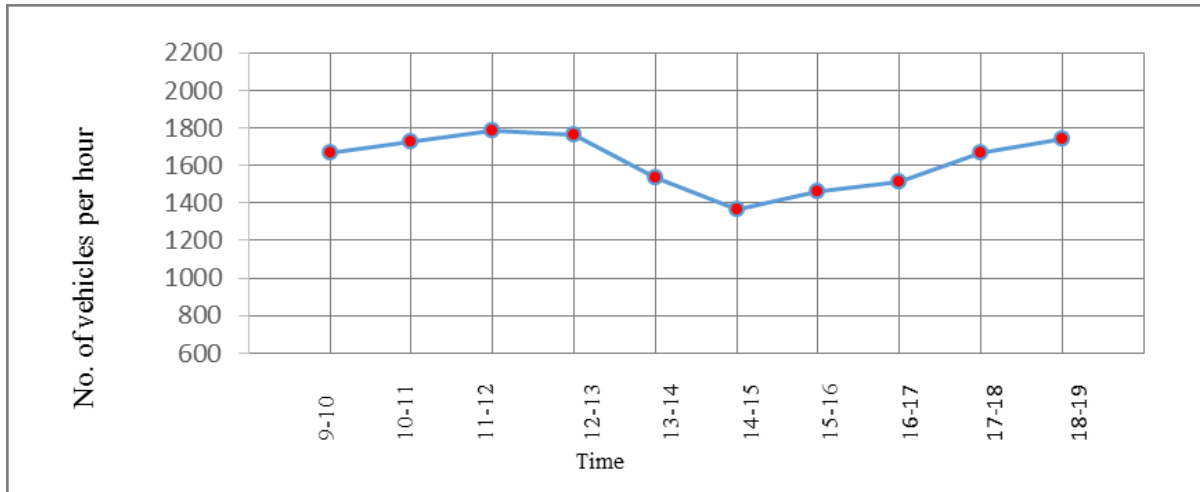


Fig. 2: Satellite View of Shaheb Bazar Parking Point.



Fig. 3: Illegal Parking causes Risk of Accident at Shaheb Bazar Parking Spot.

Graph 1: Graphical Representation of Parking Accumulation at Shaheb Bazar Parking Point.



From the graphical representation of parking accumulation at Shaheb bazar parking point, it can be observed the peak value of PCU is at time 11-12, the

minimum value is at time 14-15. Rest are intermediate value which are wavy or fluctuate type.

Study Area 2 (Bornali Parking Point)

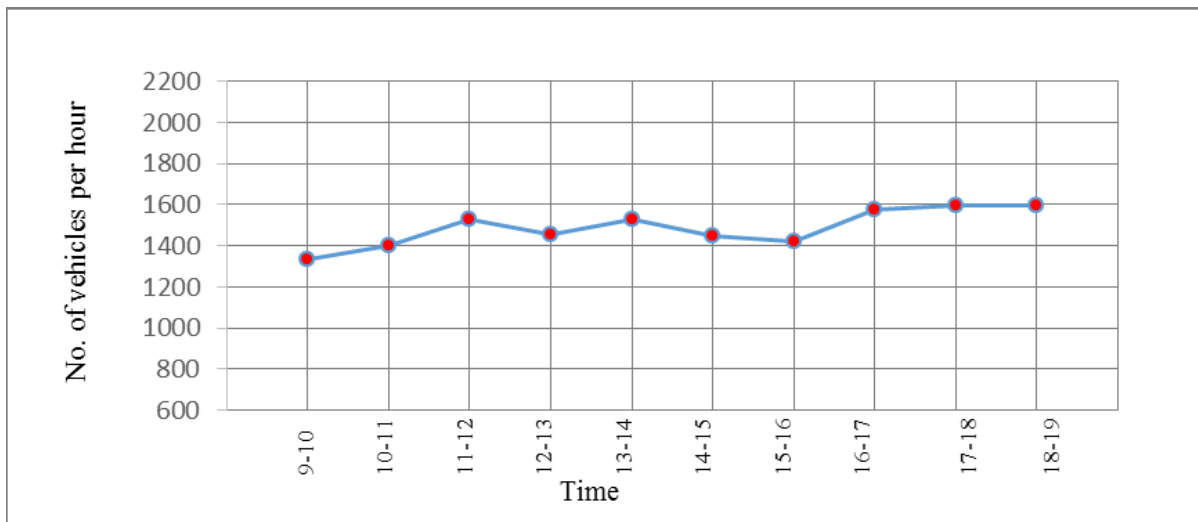


Fig. 4: Satellite View of Accident at Bornali Parking Spot



Fig. 5: *Illegal Parking Effects on Road Capacity at Bornali Parking Spot.*

Graph 2: *Graphical Representation of Parking Accumulation at Bornali Parking Point*



From the graphical representation of parking accumulation at Bornali, it can be observed the peak value of PCU is at time 18-19, the minimum value is at time 9-10.

Rest are intermediate value which are wavy or fluctuate type.

Study Area 3 (Court Parking Point)

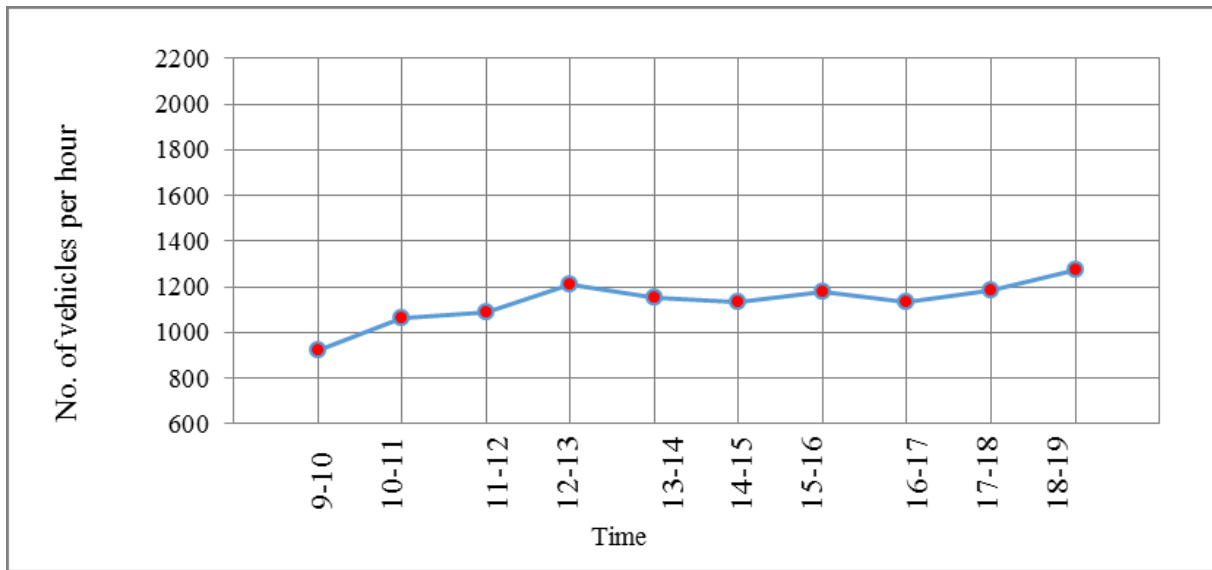


Fig. 6: Satellite View of Court Parking Point.



Fig. 7: Illegal Parking Causes Risk of Accident at Court Parking Point.

Graph 3: Graphical Representation of Parking Accumulation at Court Parking Point.



From the graphical representation of parking accumulation at Court, it can be observed the peak value of PCU is at time 12-13, the minimum value is at time 9-10. Rest are intermediate value which are wavy or fluctuate type.

Study Area 4 (Laxmipur Parking Point)

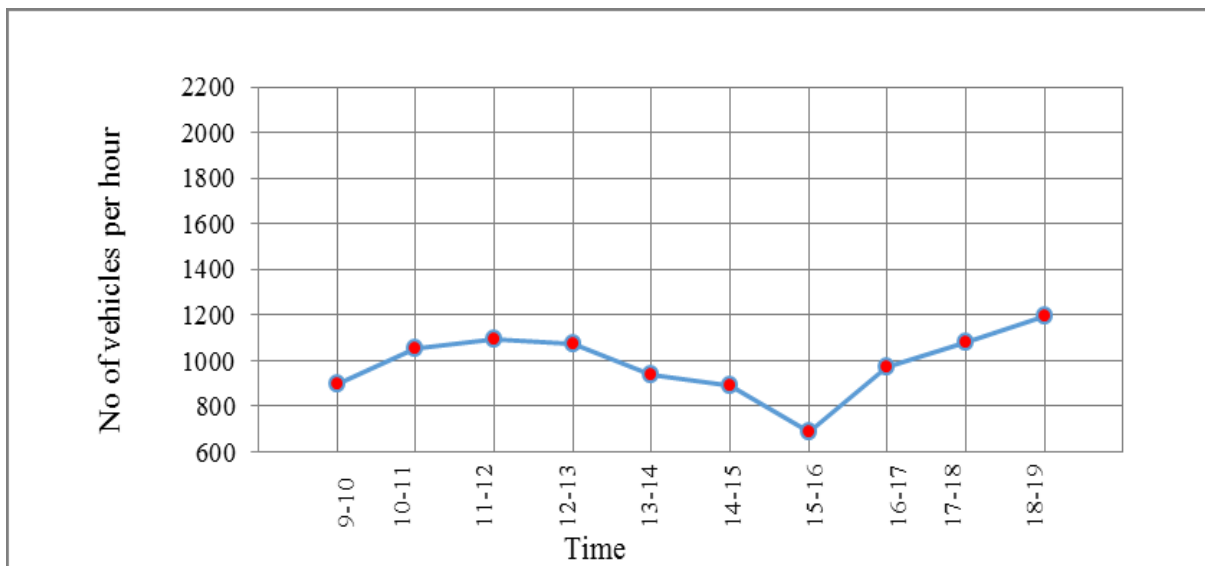


Fig. 8: Satellite View of Laxmipur Parking Point.



Fig. 9: Parking Effects on Road Capacity at Laxmipur Parking Point.

Graph 4: Graphical Representation of Parking Accumulation at Laxmipur Parking



It can be observed the peak value of PCU is at time 18-19, the minimum value is at

time 15-16. Rest are intermediate value which are wavy or fluctuate type.

Study Area 5 (Railgate Parking Point)

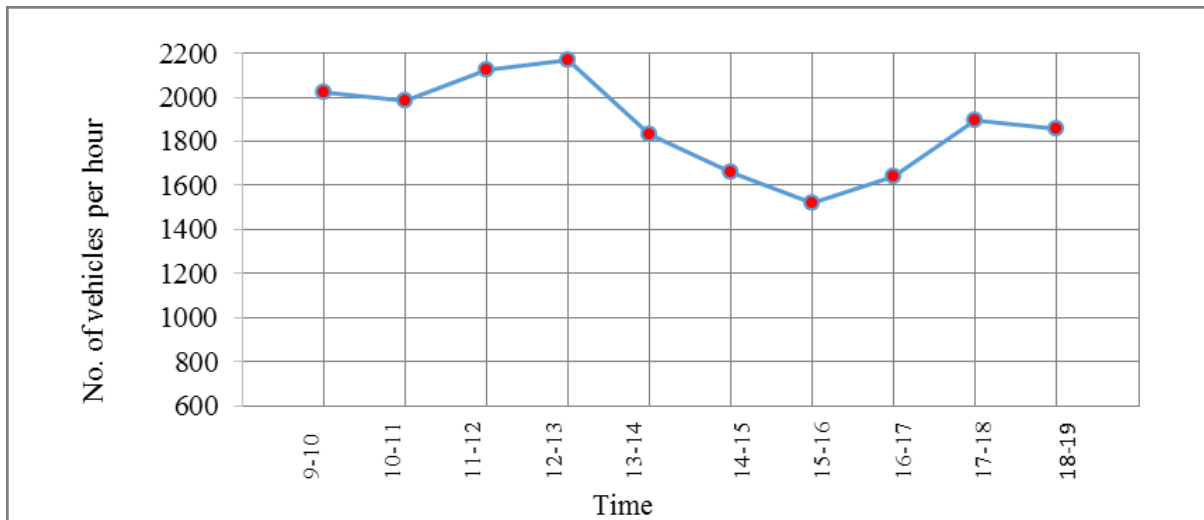


Fig. 10: Satellite View of Railgate Parking Point.



Fig. 11: Illegal Parking Causes Traffic Congestion at Railgate Parking Point.

Graph 5: Graphical Representation of Parking Accumulation at Railgate.



It can be observed the peak value of PCU is at time 12-13, the minimum value is at

time 15-16. Rest are intermediate value which are wavy or fluctuate type.

Study Area 6 (Station Parking Point)

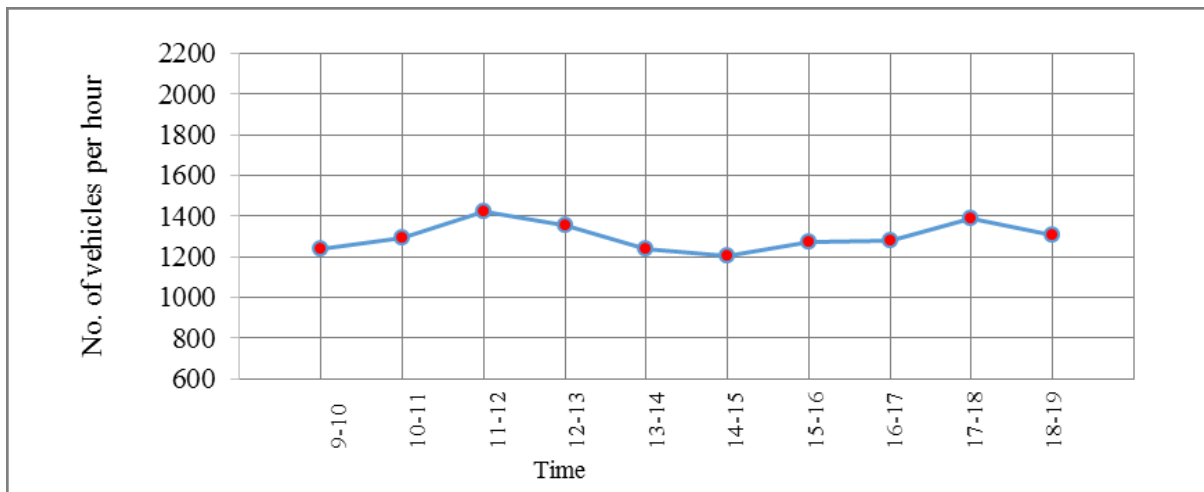


Fig. 12: Satellite View of Station Parking Point



Fig. 13: Illegal Parking Reduces Capacity of Road at Station Parking Point.

Graph 6: Graphical Representation of Parking Accumulation at Station Parking Point.



From the graphical representation of parking accumulation at Station, it can be observed the peak value of PCU is at time

12, the minimum value is at time 14-15. Rest are intermediate value which are wavy or fluctuate type.

Study Area 7 (Talaimari Parking Point)

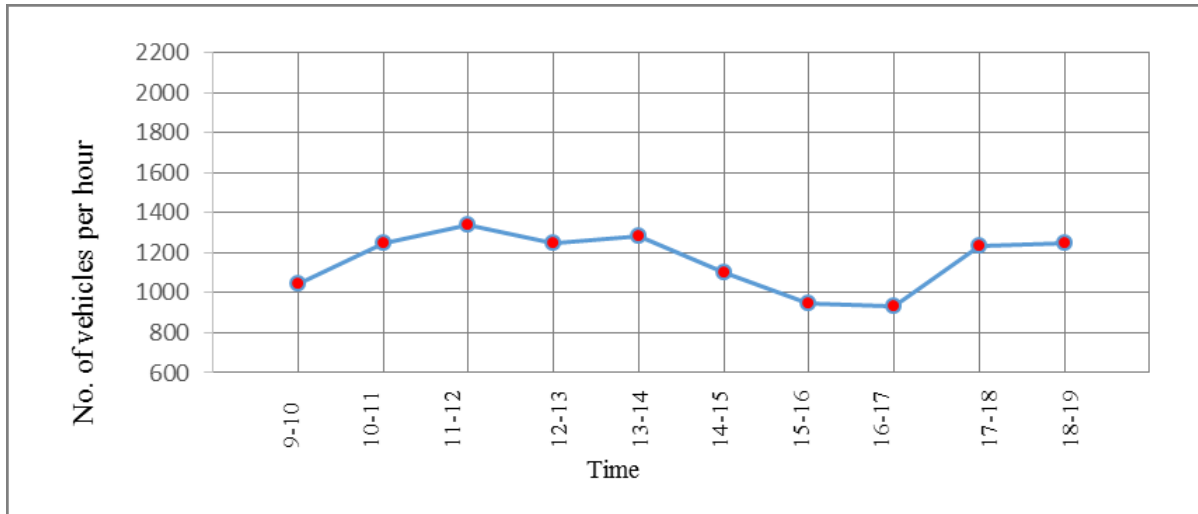


Fig. 14: Satellite View of Talaimari Parking Point.



Fig. 15: No Proper Parking Bays at Talaimari Parking Point.

Graph 7: Graphical Representation of Parking Accumulation at Talaimari Parking Spot.



From the graphical representation of parking accumulation at Talaimari, it can be observed the peak value of PCU is at

time 11-12, the minimum value is at time 16-17. Rest are intermediate value which are wavy or fluctuate type.

Study Area-8 (Vodra Parking Point)

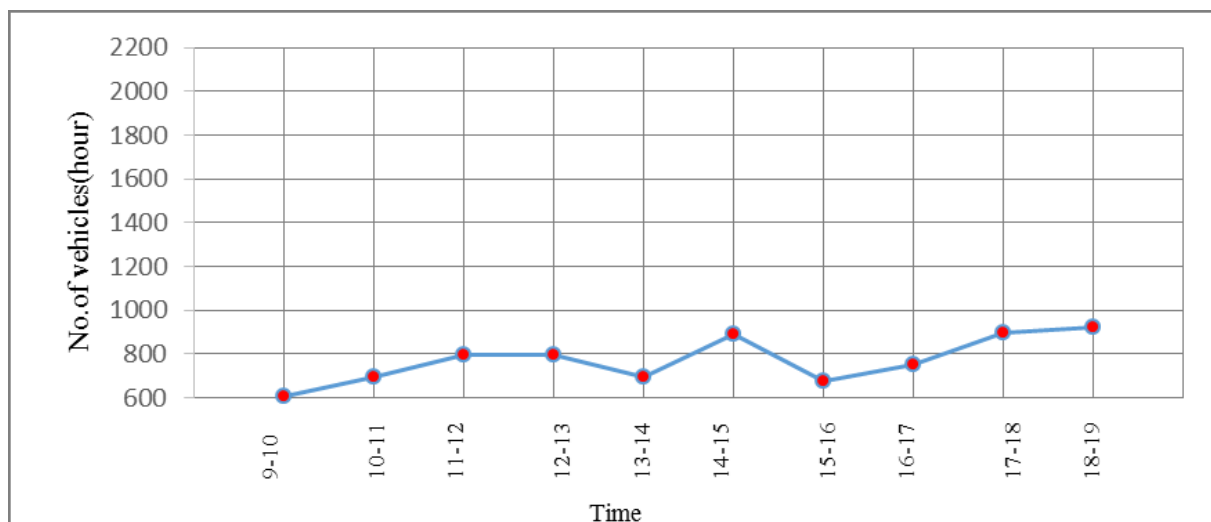


Fig. 16: Satellite View of Vodra Parking Point.



Fig. 17: Illegal Parking Reduces Road Capacity at Vodra Parking Point.

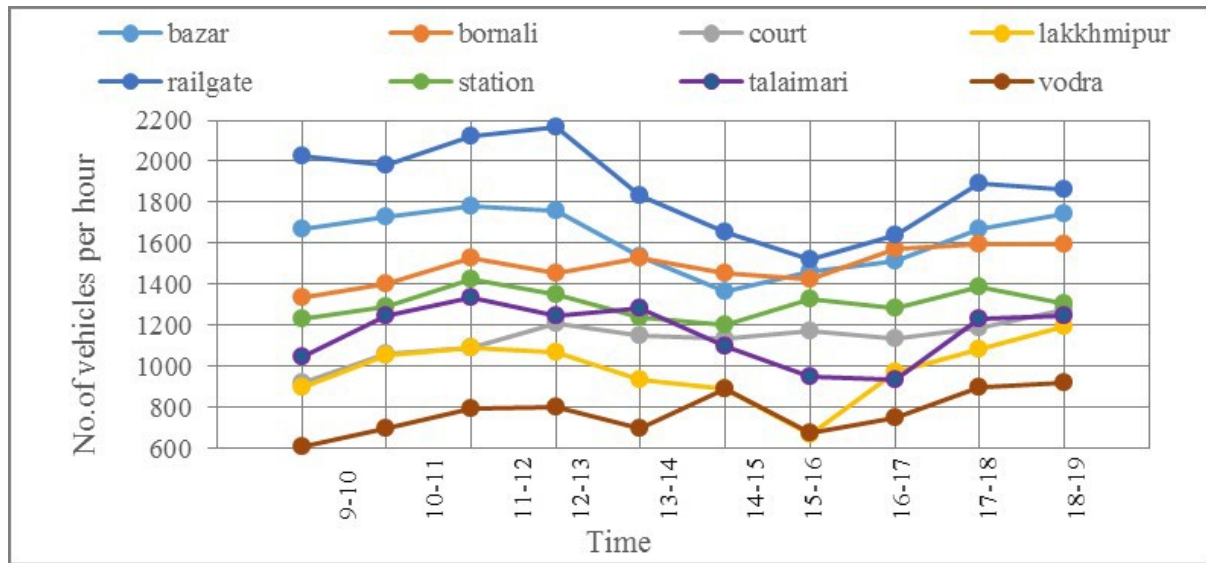
Graph 8: Graphical Representation of Parking Accumulation at Vodra.



From the graphical representation of parking accumulation at Vodra, it can be observed the peak value of PCU is at time 18-19, the minimum value is at time 9-10.

Rest are intermediate value which are wavy or fluctuate type.

Graph 9: Overall Graphical Representation of PCU of all Study Area.



CONCLUSION

Based on the following data, the analysis can be concluded as:

1. The highest parking accumulation rate is 2167 at 12am-1pm which is found at Railgate parking point.
2. The lowest parking accumulation rate is 606 at 9-10 am that is found at Vodra parking point.
3. Parking accumulation value of other study area lies between the value of Railgate and Vodra parking point.
4. From 9-12 am parking accumulation rate gradually increases at most of the parking spot except Railgate.

5. From 12 am to 3 pm parking accumulation rate gradually decreases at Railgate, Shaheb bazar, Station, Laxmipur parking spot.
6. From 4-7 pm parking accumulation rate gradually increases at most of the parking spot except Station.

RECOMMENDATIONS

To reduce the parking of vehicles we can implement to the followings.

- i. For short term measures pay and park method will be done at peak hours to control and regulate the parking.

- ii. For the long term measures off street parking have to be provided near CBD areas, within the radius of 1 km.
- iii. Angle parking seems to be better than parallel parking which is usually involves a backing motion; delay of traffic is minimized with angle parking.
- iv. Regulation of parking by charging fees has the desirable effect of curbing long term parking, while encouraging short term parking.
- v. One method of collecting the charges is by installing parking meters.

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