



Parking Management System at S.S.C.E.T Campus

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ABSTRACT

In our Previous research we have discussed a Literature Review on Parking Management Systems at the SSCET campus in which we studied to Reduce congestion in the parking area of the SSCET Campus i.e., the total area used for parking is 1577 Sq. mt. As there is a huge need for Parking at the SSCET campus, The Proposed campus parking area has buses, Four-Wheeler as well as two-wheeler which can be experiencing challenges in the recent past. This can be due to an increase in the use of own Bikes on Campus. However, increased traffic on campus has also been observed. The parking area should be divided to allow for appropriate parking of Vehicles. This proposed Parking System will reduce efforts in the searching slot for parking of an individual. Also, the use of less own vehicles may reduce vehicle pollution (Barde et al., 2022)

In this Research paper, we will be discussing Data Collection methodology while calculating Parking volume at Peak hours as well as non-peak hours. Manually Methodology will be adopted and the total area is to be calculated. After this Auto Cad plan is Drafted for the Proposed Parking layout for the College Campus which is having a total of 200 vehicles that can be parked.

Keywords: Parking Management System, Survey, Traffic Count, Questionnaire Survey

1. Introduction

The parking area is available for various categories such as faculty parking, general students parking and visitors parking areas on campus it has been noted that some students are not using the parking space. The parking area should be divided into two categories one part for the girl's section and the other for boys. Due to increased traffic on the campus.

It has been noted that the parking spaces are not enough, especially during the cultural event any other multi-programs etc. The campus is almost at capacity normally students and teaching staff would wish to park their vehicles at a sufficient distance. However, at times the available parking spaces are often occupied by outsiders. In this case, students and staff members are searching for parking spaces on the campus so we are improving the parking facility, which will great relief to students and all members. The parking area is available for various categories such as faculty parking, general students parking and visitors parking areas on campus it has been noted that some students are not using the parking space. The parking area should be divided into two categories one part for the girl's section and the other for boys. Due to increased traffic on the campus. It has been noted that the parking spaces are not enough, especially during the cultural events any other multi-programs etc. The campus is almost at capacity normally students and teaching staff would wish to park their vehicles at a sufficient distance. However, at the time the available parking spaces are often occupied by outsiders. In this case, students and staff members are searching for parking spaces on the campus so we are improving the parking facility, and we will great relief to students and all members.

On college campus traffic congestion also having its resultant ill effects and frustration have become the order of the day. The necessitate for traffic evaluation and assessment is likely to improve for future development of the Road Transport Network. (Bhorkar et al., 2016)

1.1. Objectives of Research

The aim of implementing a parking management system is to reduce time and increase the efficiency of the current parking management system. We can park our vehicles in our slot because of that there is no towing problem and our vehicles have as been parked in a secure condition.

Following are the aim and objectives of a design and analysis of parking facilities for SSCET. (Barde et al., 2022)

- To improve parking facilities on campus.
- To make safe, convenient and of parking and transport facilities for all stakeholders.

- To provide a parking system that is efficient and easy to use.

1.2 Traffic Congestion

Traffic is generally defined as the interchange of people, goods or vehicles between spatially separated points, and thus includes pedestrians and all types of vehicles mechanized, motorized or non-motorized. Today man and his transport vehicles occupy a large share of the urban space. Alternatively, for an existing road network traffic analysis provides a means of assessing the traffic conditions. Traffic analysis can therefore help further in the evaluation of investment needed for future road constructions and improvements. Such traffic surveys are a valuable source of data for planning highways, flyovers, roads etc. As such, these should be a regular feature in all the traffic departments. (Bhorkar et al., 2016)

1.3 Necessity of parking

The number of cars and other vehicles has increased on roads of all cities of the world. The rural road construction in the past in an old new way has proved competent to accommodate an increased number of vehicles. (S Jumde, Marve et al., 2020)

That there are more and more vehicles parking on campus and this leads to a shortage of campus parking capacity. Because sometimes students and employees have not enough parking area. For students and faculty members who are new to your campus, offer visible signage that makes it crystal clear where to park. Campus signs are not intended to double as weather to promote head-on collisions and stamp out ambiguity.

1.4 Methodology in Counting vehicles

As per research works, we have applied a manually count method for collecting vehicle amounts in a particular region, vehicle moving i.e., two-wheeler, four-wheeler etc. further data is collected in such a manner that a graph is to be drawn with the help of this collection from data. Traffic volume was calculated by the Interval of 30 minutes at Peak hours i.e. from 09: 00 AM to 11:00 AM & 05:00 PM to 7:00 PM as well as Non-Peak Hours remaining hours (Marve&Baitule, 2016)

1.5 Population

As per the study, the pollution in Chandrapur city has increased in last the few years to a very extreme level. The survey done by Maharashtra Pollution Control Board shows that the various types of Pollution are affecting our city, namely Water Pollution, Air Pollution & Land Pollution. Various Industries which have started earlier have an impact on air. In recent years the pollution has been under control due to measures taken into consideration. But still, Vehicular Pollution which comes under Air Pollution has a bad impact on transportation in Chandrapur. Due to large numbers of automobiles plying on the road in the city vehicular pollution has become a source of air pollution. (Shende et al., 2018)

As we know the population of Chandrapur City has increased so far in these years and with that has increased the vehicles causing high traffic volume & rise in pollution. But the transportation system in Chandrapur City is still the same. To reduce the traffic volume & pollution, we have to study & design the new transportation system in Chandrapur City. (Marve et al., 2018)

Year	Population	Growth
2022	3,60,777	4,798
2021	3,55,979	4,110
2020	3,51,869	3,556

Source Google for Population Sensex

2. Literature Review

2.1 Design & Analysis of Parking-

The Author Explains that the traffic survey was carried out from the Patch of Gandhi Chowk to MEL, Mul Road in Chandrapur District. The most congested area from that Survey is to be justified as the Bus Stand Area where the most no vehicular congestion is observed. So, the author decided to make such a Multi-Storied Car parking Building Near Bus Stand Area so that the Traffic Congestion in this area may be reduced. As this Site lies in the Centre of the City and can be reduced much traffic. This research presents the design of a multi-storied car park for the mitigation of traffic challenges in public areas using various case studies. various design aspects which are considered are arrangements of deck and ramp, planning the dimensions, the bay width, aisle width, ramp dimensions, planning grid, alignment paths to exit barriers, means of escape distances, travel distances from the car to the destination, security, visibility, space allowances and lift provision. (S Jumde, Marve et al., 2020)

2.2 Methods in Counting

Two methods are available for conducting traffic volume count

- Manual Method: These are mainly visual counts carried out by the operator. It is time-consuming.
- Automatic Method: There are various devices and software available, which enable easy and accurate traffic count.

Manual counts are typically used to gather data for the determination of vehicle classification, turning movements, the direction of travel, pedestrian movements or vehicle occupancy.

Automatic counts are typically used to gather data for the determination of vehicle hourly patterns, daily or seasonal variation and growth trends or annual traffic estimates (Marve&Baitule, 2016).

Manual counts are typically used to collect data for purpose of vehicle identification, turning, travel in which direction, pedestrian on the road or vehicle usage by a particular person. Manually count is to be done on the seven intersections by getting the number of vehicles i.e., HMTV, LMV, Cycles Auto, and

Pedestrians on different days in peak hours time i.e., from 9 am to 11 am on every day. Further, the collection of data is given as up and down represents adding and getting out at the particular intersection. (Marve&Bhorkar, 2016)

3. Methodology

Flow Chart for Parking Area –



3.1 Introduction

The first task undertaken to address this project was to identify the framework within which the problem is posed and solutions must be found. This was supplemented by an extensive review of the relevant guiding documents (such as the Master Plan) and other literature. Once this was complete and the problem defined, the issue was then considered in detail to identify possible solutions that warranted further investigation. The next step was to

consult with student, staff, and faculty stakeholders to determine the scope and ramifications of the problem. At this time comments about the possible solutions identified above were solicited. Stakeholders were also asked for their suggestions for other possible solutions. Transportation planners at the two relevant transit agencies were consulted to establish the feasibility of various concepts. The technical aspects of potential solutions were investigated.

3.2 Methodology

1. Site Selection: - First of all for our parking project we selected the site for parking, there will be different sites for parking for bikes, cars & buses.

As we have analysed the parking condition by studying the collected data from the college area. In this segment, we have to finalize a suitable site for the college parking area.

After analysing the condition in various areas of our college we have finally decided on the suitable area for the proposal of bikes, cars, buses parking.



Map No.1: Site selection at SSCET campus.



Map No.2: parking location at SSCET campus

2. Parking location: - After the selection of a site for parking we located the parking location, we choose a location for our project on the old parking location because of a sufficient place for parking.

3. Parking data collection: - After the location was selected for parking, then we collected data which includes several bikes & cars concerning the 30-minute time interval tables.

4. Investigate the area where parking congestion is high:- After the data is collected for the parking table investigated the whole parking location where parking congestion is high. And we found this location is suitable for our project. So, we investigated the traffic conditions and time of traffic, we observed that at many places in our college vehicles are parked in no parking areas, and there were no proper management in our college.

5. Questionnaire survey:- Questionnaire survey was circulated and arranged for people to know the problems of parking that they are facing out of which ____ response was recorded.

The questionnaire circulated the following question.

1. Are you a student, faculty or staff?

- A] Student
- B] Faculty
- C] Staff
- D] Other

2. Do you face parking problems on the SSCET campus?

- A] Yes
- B] No
- C] Maybe

3. What is your mode of transportation?

- A] 2-Wheeler
- B] 4-Wheeler
- C] By Bus
- D] By cycle

4. Do you share your ride or prefer commuting alone?

- A] Ride sharing

5. At What time do you come to college?

- A] 9:45 – 10:00AM
- B] 10:00 – 10:15AM
- C] 10:15 – 10:30AM
- D] More than above

6. Do you face problems while taking out their vehicles due to improper parking?

- A] Yes
- B] No

7. Are you interested in reducing co2 emissions within the campus?

- A] Yes
- B] No

8. How easy is it to find a parking space on campus?

- A] Easy
- B] Hard
- C] Neutral

9. How much time do you spend looking for a parking spot?

B] Alone

- 1] 1-3 Min
- 2] 3-5 Min
- 3] 5-10 Min
- 4] More than above

6. Plan in draw Auto Cad:- when we investigated the whole site then we first drew a freehand sketch for the suitable site and then we import the same plan in auto cad by measuring all the dimensions properly and making layout marking on the parking location and after that drawn layout plan with the help of Auto cad software.

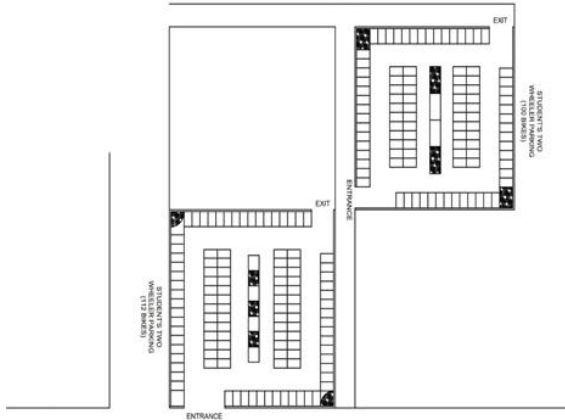


Figure No.3.2: Plan Auto cad for bikes Parking

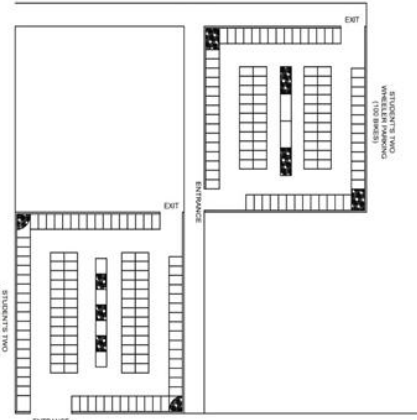


Figure No.3.3: plan drawing in auto cad for car parking

7. Execution of plan:- When we made the layout plan of parking. as per the layout of parking which is done on auto cad software, and finally we executed the plan as we wanted to do.

4. Data Representation

4.1. Time of survey

As per the data collection, the traffic volume survey is done while the peak hour refers to time of morning high traffic volume and the same for evening i.e., 9.43 AM to 4.45 PM were taken into attention for getting the maximum traffic moving on the seven instructions. The term peak hours are defined by the number of bikes, cars, and buses. Peak hours are the time at which traffic volume is maximum.

4.2 Up Flow / Down Flow

The up flow and the down flow of the seven instructions were recorded by manual count so that the total number of vehicles count on that road on that particular peak hour were done respectively

4.3 Traffic Volume

Nagpur-Chandrapur Road highway road width is increased because of the traffic bike, and the car is so many travelling. Traffic intensity of roadway is in maintenance for the traffic volume. It is the number of vehicles crossing a section of road per unit time at any selected period. It is the number of vehicles crossing a section of road per unit time at any selected period. It is used as a quantitative measure of flow the common units are vehicles per day.

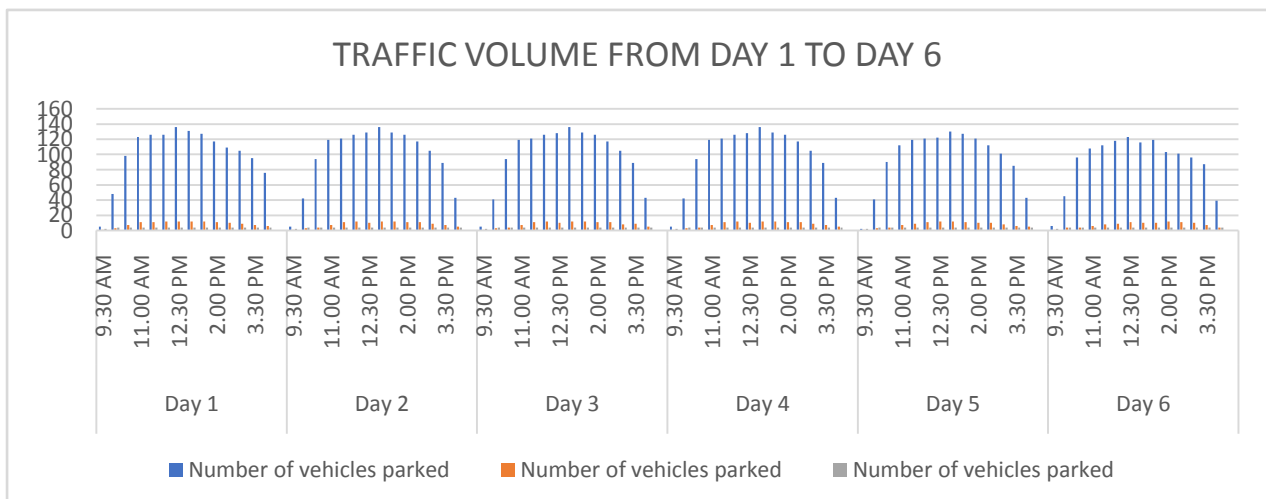


Table no.2 Traffic Volume from Day 1 to Day 6

Day	Time	Number of vehicles parked			Day	Time	Number of vehicles parked			Day	Time	Number of vehicles parked		
		Two-wheeler	4-wheeler	Bus			Two-wheeler	4-wheeler	Bus			Two-wheeler	4-wheeler	Bus
Day 1	9.30 AM	5	1	2	Day 2	9.30 AM	5	1	2	Day 3	9.30 AM	5	1	2
	10.00 AM	48	3	4		10.00 AM	42	3	4		10.00 AM	41	3	4
	10.30 AM	98	7	4		10.30 AM	94	4	4		10.30 AM	94	4	4
	11.00 AM	123	11	4		11.00 AM	119	7	4		11.00 AM	119	7	4
	11.30 AM	126	11	4		11.30 AM	121	11	4		11.30 AM	121	11	4
	12.00 P M	126	12	4		12.00 P M	126	12	4		12.00 P M	126	12	4
	12.30 PM	136	12	4		12.30 PM	129	10	4		12.30 PM	128	10	4
	1.00 PM	131	12	4		1.00 PM	136	12	4		1.00 PM	136	12	4
	1.30 PM	127	12	4		1.30 PM	129	12	4		1.30 PM	129	12	4
	2.00 PM	117	11	4		2.00 PM	126	11	4		2.00 PM	126	11	4
	2.30 PM	109	10	4		2.30 PM	117	11	4		2.30 PM	117	11	4
	3.00 PM	105	9	4		3.00 PM	105	9	4		3.00 PM	105	8	4
	3.30 PM	95	7	4		3.30 PM	89	7	4		3.30 PM	89	9	4
	4.00 PM	76	6	4		4.00 PM	43	5	4		4.00 PM	43	5	4
4.30 PM	0	0	0	4.30 PM	0	0	0	4.30 PM	0	0	0			
Day 4	9.30 AM	5	1	2	Day 5	9.30 AM	2	1	2	Day 6	9.30 AM	6	1	2
	10.00 AM	42	3	4		10.00 AM	41	3	4		10.00 AM	45	4	4
	10.30 AM	94	4	4		10.30 AM	90	4	4		10.30 AM	96	4	4
	11.00 AM	119	7	4		11.00 AM	112	7	4		11.00 AM	108	6	4
	11.30 AM	121	11	4		11.30 AM	119	9	4		11.30 AM	112	8	4
	12.00 P M	126	12	4		12.00 P M	121	11	4		12.00 P M	118	9	4
	12.30 PM	128	10	4		12.30 PM	122	12	4		12.30 PM	123	11	4
	1.00 PM	136	12	4		1.00 PM	130	12	4		1.00 PM	116	10	4
	1.30 PM	129	12	4		1.30 PM	127	11	4		1.30 PM	119	10	4
	2.00 PM	126	11	4		2.00 PM	121	10	4		2.00 PM	103	12	4
	2.30 PM	117	11	4		2.30 PM	112	10	4		2.30 PM	101	11	4
	3.00 PM	105	9	4		3.00 PM	101	8	4		3.00 PM	96	10	4
	3.30 PM	89	7	4		3.30 PM	85	6	4		3.30 PM	87	7	4
	4.00 PM	43	5	4		4.00 PM	43	5	4		4.00 PM	39	4	4
4.30 PM	0	0	0	4.30 PM	0	0	0	4.30 PM	0	0	0			

5. Results & Conclusion

5.1 Result

Earlier that used to board traffic on our college campus. Therefore, the vehicles parking system is not sufficient to park a vehicle so that main problem of the college campus is a lot of traffic congestion in our campus. Our project created a capacity for 200 vehicles whose length is 2.5mX1.5m for bikes. It is a standard measurement for the bike. We arranged 200 bikes, 8-10 cars, and 4-5 Bus parking available in the college. We calculate and note down the traffic volume for 7 days measure the vehicles entering and exist, when college starts & college end timing with 30 min. time interval. We are found a mainly common point within 7days there is 12:00 PM To 1:00 PM that's timing traffic congestion is very high and when college starting and ending time that is 9:30 AM to 4:30 PM traffic congestion is low as compare to other time. So, we are found when traffic congestion is high & low. We

manage and develop staff car parking management car parking and visitor's car parking with separate all parking and providing shed for the car parking. We solve traffic congestion problem by all information. We also made a plan in Auto Cad to arrange the more vehicles for a suitable parking area. So, there is not any traffic congestion problem. This was the result of our project and solve the major problem of the SSCET campus. As per the earlier college vehicle parking arrangement nearby 100-110 bikes. So, therefore, our college campus traffic congestion is high. So, our project developing the space to park a vehicle nearby 200 bike parking spaces providing, so there is no traffic congestion on our college campus.

5.2 Conclusion

The above analysis depicts that there is scarce parking space for 200 vehicles on our college campus. So, there is a great need for the management of the parking system in Shri Sai College of Engg. & Tech. Bhadrawati. The proposed parking plan at main parking accommodates 200 bikes separate management, staff, visitor car parking buses proper parking spaces providing, for traffic congestion problem on campus. This proposed parking will also reduce air pollution to some extent as the vehicles will reach the parking suitable space for parking on campus.

5.3 FUTURE SCOPE

- [1]. These projects can be very useful for accommodating bikes on parking site. The amount of proper space utilization is very important.
- [2]. When electric vehicles will be completely used for transportation, there will charging station that needs to be developed.
- [3]. These charging sites will require a parking structure so that they can park the vehicles on site for charging the vehicle.
- [4]. We will be designing a parking shed so that we can consume solar energy.

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