

Effective Parking Management System

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Abstract— The project discusses about the parking issues faced by various cities in India and the remedies to overcome parking problems. Cities like Pune need attention and solution as soon as possible so as to maintain the actual growth in terms of basic development. Proper parking system is the remedy to avoid traffic jams due to unsatisfactory space management for vehicle parking. Traffic engineering is branch of civil engineering techniques to achieve the safe and efficient movement of people and goods on roadways. Traffic engineering is a method of optimizing the performance of a telecommunications network by dynamically analyzing, predicting and regulating the behavior of data transmitted over that network. Traffic engineering also includes parking management. Traffic engineering mainly focuses on research for safe and efficient traffic flow with optimum utilization of space provided for parking managements. The project focuses on underground parking system for efficient and economical parking system. In metropolitan cities, vehicle parking has become a major concern in all busy areas and a good traffic system needs a good parking system. Due to lack of land space underground parking system is essential. The aim of this research is to develop & implement an underground parking system that will increase convenience & security of parking system. The underground parking system will be able to have less interaction of humans. The economy analysis technique will help in analyzing the project feasibility. Thus an efficient, reliable & safe underground parking system will increase availability of space for car parking.

Keywords: Effective, Economical, Efficient

I. INTRODUCTION

Parking management refers to various policies and programs that result in more efficient use of parking resources. This guide describes and evaluates more than two-dozen such strategies. It investigates problems with current parking planning practices, discusses the costs of parking facilities and the savings that can result from improved management, describes specific parking management strategies and how they can be implemented, discusses parking management planning and evaluation, and describes how to develop the optimal parking management program in a particular situation. Cost-effective parking management programs can usually reduce parking requirements by 20-40% compared with conventional planning requirements, providing many economic, social and environmental benefits.

Management solutions tend to be better than expanding supply because they support more strategic planning objectives: Reduced development costs and increased affordability. More compact, multi-modal community planning (smart growth). Encourage use of alternative modes and reduce motor vehicle use (thereby reducing traffic congestion, accidents and

pollution).Improved user options and quality of service, particularly for non-drivers. Improved design flexibility, creating more functional and attractive communities. Ability to accommodate new uses and respond to new demands. Reduced impervious surface and related environmental and aesthetic benefits.

When appropriately applied parking management can significantly reduce the number of parking spaces required in a particular situation, providing a variety of economic, social and environmental benefits. When all impacts are considered, improved management is often the best solution to parking problems

II. METHOD

In this project we have selected populous and central area of pune city 'Jangli Maharaj' Road to provide underground parking system to overcome traffic issue and to provide efficient, economical parking system.

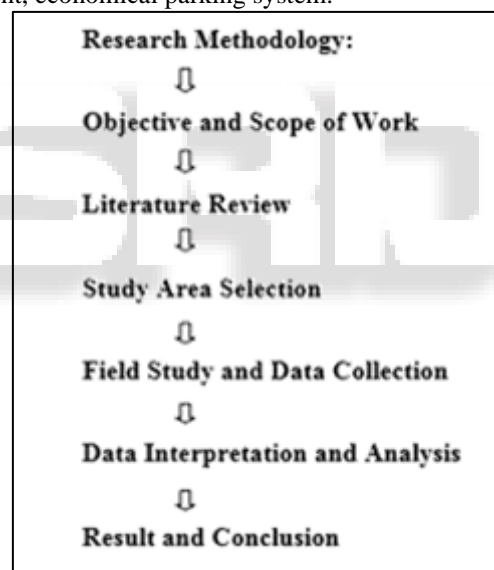


Fig. 1:



Fig. 2: Jangli Maharaj Road Pune (JM Road)

We have conducted Traffic Volume study on JM Road in order to design underground parking system and collected data from Pune Municipal corporation officials about traffic, drainage lines and pipelines. According to the study we have decided to provide the parking under the pedestal footpaths which are 40 foot in width. Length of JM Road is 800m. we have decided to design the underground parking structure in front of Chatrapati Sambhaji Maharaj Garden on JM Road where width of pedestal footpath is 40 foot and there are no pipeline and drainage lines under the road. Length of parking calculated is 243.84m and width of parking is 12.19m. since JM Road is one way it is to design underground parking system and easy circulation is possible without any traffic issue.

III. TRAFFIC VOLUME STUDY

A. Traffic Volume Study of JM ROAD PUNE

The Survey for Traffic Volume Count was conducted for Pune traffic and parking management Plan on Jangli Maharaj Road Pune.

The Traffic Volume Count survey helps us understand the Modal share of each vehicle type in the city. It is specifically designed to understand the share of various vehicles on the JM road. Jangli Maharaj road is an one way road.

The surveys was carried out on 30th January 2020. Survey was conducted on JM Road Pune Road in the city. At a given location, counts were taken for 4 hours, 2 times a day, from 7 a.m. to 11 a.m. in the morning and 5p.m. to 9 p.m. in the evening.

The survey was conducted on both sides of the road simultaneously in the same time bracket, and as per the durations mentioned above.

IV. METHODOLOGY

The survey was specifically designed to capture the peak hour of traffic, thus enabling us to observe the actual number of vehicles on the streets, in contrast to the peak hours of motorized vehicles.

The form consists of 4 hours of counts at a given time (Morning / Evening), which is divided into 8 slots of 15 mins, with a buffer period of 15 mins, between 2 slots.

Following categories were considered for the survey, Pedestrians, Bicycles, 2-Wheelers, 4-Wheelers, Cars, Trucks, Buses and Auto-Rickshaws. Each person was assigned a Category, except where Truck / Bus and Auto – Rickshaw were grouped together. Refer Figure for a sample filled form on-site.

V. OBSERVATIONS

As can be observed from the survey data, the modal share for two wheeler vehicles are higher on JM Road.

It has also been observed that the density of traffic is maximum from 8 am to 11 am and from 5pm to 9 pm and also demand for parking is maximum from 8 am to 5 pm. It is observed that there is no provision for parking of either two wheeler or four wheeler.

The overall data from the survey suggests that there are a significant number of on the road and hence demands

the need to create and provide proper infrastructure in order to ensure safety of passengers and to avoid traffic and solve the problem of parking.

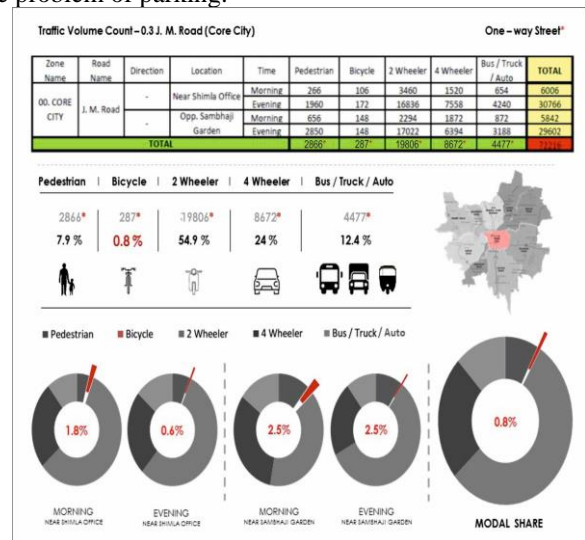


Fig. 3: Traffic Volume Count



Fig. 4: JM Road Traffic Volume Count

According to the traffic volume study it is observed that there is large number of two wheelers, cars, trucks, rickshaw, travelling on the road. According to the study it is observed that demand of parking is maximum from 9 am to 5 pm and there is no provision for parking throughout the road.

From the calculations we have to decide to provide underground parking system in front of Chatrapati Sambhaji Maharaj Garden on JM Road under the footpaths. Size of parking will be 243.38 m in length and 12.19 m.

VI. DESIGN



Fig. 5:

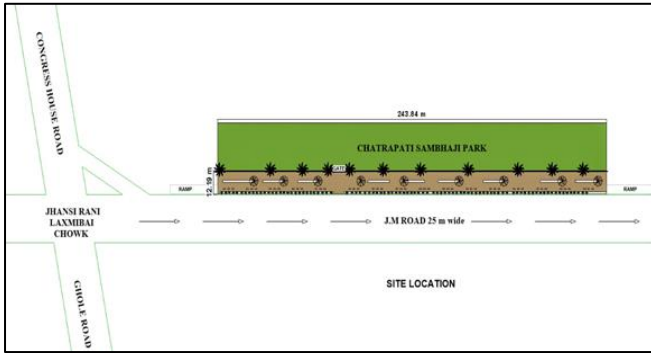


Fig. 6: Location Plan

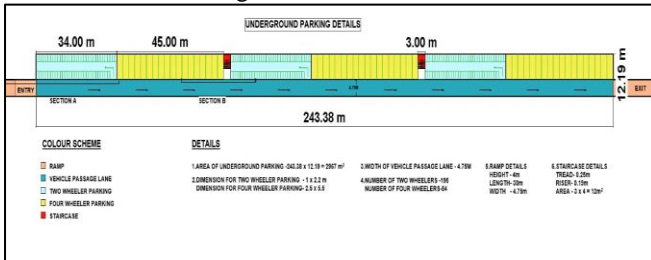


Fig. 7: Dimension Details of Parking Structure

We have design the underground parking system using “Rivet 3D” and also prepared the 3D model of underground parking with its section, elevation and location plans.

VII. DIMENSIONS OF UNDERGROUND PARKING STRUCTURE

Length – 243.38 m

Width – 12.9 m

VIII. RAMP HEIGHT – 4 M

Ramp Length – 30 m

Ramp Width – 4.75 m

Staircase Tread – 0.25 m

Staircase Riser – 0.19 m

Area Of Staircase – 3*4= 12 sqm

Width Of Vehicle Passage Lane – 4.75 m

Dimension For Two Wheeler Parking – 1*2.2 m

Dimension For Four Wheeler Parking – 2.5*5.5 m

Total Area Of Underground Parking – 243.38*12.19 = 2967 sqm

Width Of Road – 25 m

Number of Two Wheelers can be Parked – 195

Number Of Four Wheelers can be Parked – 54

IX. WORK PROCEDURE

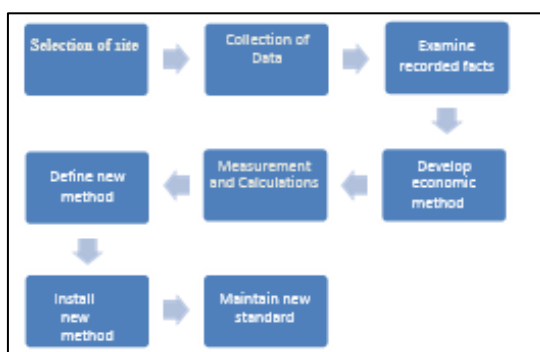


Fig. 8:

X. RESULT

According to the above design we can provide underground parking for 195 two wheeler and 54 four wheeler at one time. By using Rivet 3D model it is easy to understand the design, elevation, section, dimensions and location plan of the underground parking system. Traffic issues and parking issues can be solved by using this system. Parking charges can be applied of Rs 10 for two wheeler and Rs 20 for four wheeler upto 8 hours which is quite economical for both parties.

XI. CONCLUSION

By using this parking system traffic on JM Road can be controlled and efficient, economical and effective parking system can be provided to solve problems regarding vehicle parking. By applying charges municipal corporation can generate revenue for maintenance of parking. To overcome problems regarding lack of land spaces construction of underground parking is necessary and it also avoids the cost and acquisition of land hence underground parking system is economical and efficient as compare to conventional parking methods.

REFERENCE

- [1] Prof.S.S.Thorat, AshwiniM ,Akanksha Kelshikar , Sneha Londhe,Mamta Choudhary (2017)IoT Based Smart Parking System Using RFID
- [2] Chun Hsiung Chen, Chan Wei Hsu and Chi Chun Yao
- [3] (Research & Development Division Automotive Research & Testing Center,Changhua, Taiwan).Faheem, S.A. Mahmud, G.M. Khan, M. Rahman and H. Zafar (Vol. 11, October 2013)A Survey of Intelligent Car Parking System
- [4] M. M. Rashid, A. Musa, M. Ataur Rahman, and N. Farahana, A. Farhana (International Journal of Machine Learning and Computing, Vol. 2, No. 2, April 2012) Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition
- [5] MuftahFraifer,Mikael Fernstrom,(Thirty Seventh International Conference on Information Systems, Dublin 2016)Investigation of Smart Parking Systems and their technologies
- [6] Reference Book – L.R.Kadiyali
- [7] www.wikipidea.com