Minimizing Traffic Congestion Through Parking System

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Abstract *This report presents the traffic congestion at Indore which is one of the fastest growing city of India. Indore is a rapid growing city suffering from traffic congestion, vehicular pollution and accidents due to traffic. The aim of this report is to investigate problems and to suggest necessary solutions.*

I. INTRODUCTION

1.1 About Indore

Today the population of the world is more than 7 billion and it is increasing rapidly day by day. With the increasing in population the number of vehicles is also increasing. Development in technology and the increase in the advancement of life is also one of the factors. Due to the surge of urbanization, the usage of automobiles has increased which in turn has led to traffic and parking difficulties. A typical automobile is parked 23 hour each day, and uses several parking spaces each week. Parking plays an important role in mobility access and economic development of cities. Vehicles have become a fundamental element of the journey and in consequence parking as well, With the increase in population and economic activities, the number of motor vehicle is growing at a faster rate than the proportion of urban space devoted to roads. Due to this increment in road traffic, a lot of problems start occurring. Traffic congestion is a serious problem in the present era which adversely effect on both the quality of life and economy. It results in unnecessary fuel consumption, causes additional wear and tear of vehicles, increasing harmful emissions lowering air quality and it also increase the cost of transport.

It is estimated that about 30 percent of the vehicles circling a city at any given time are doing so as drivers look for parking. Aside from the frustration factor, those vehicles are creating traffic congestion, viewed by survey respondents as being the single most significant societal change affecting the parking industry.

Congestion and parking are also interrelated since looking for a parking space (called "cruising") creates additional delays and impairs local circulation. In central areas of large cities, cruising may account for more than 10% of the local circulation as drivers can spend 20 minutes looking for a parking spot.

1.2 Literature Review

Dr. Kirti Mohan Sharma et. al. [2017] had drawn attention towards the various problems and causes of parking and their solution too. Kota is the fastest growing city. In 2001, population of the city was 6, 94,316 that later became 1,001,365 as per 2011 census report. In Kota, there are some densely crowded areas where they have found some problematic situations which are given as follow. In this research they have proposed their ideas of effective parking system in densely populated areas of city. These are -[1] Fruit vendors and shopkeepers keep their goods and items on roads which covers the major area of road and carriageway width due to which space for road users reduces and it creates congestion and blockage of road.Lack of parking spaces near market area due to which road users park their vehicle wherever they find place.Peoples or road users park their vehicle infront of shops on road which reduces carriageway width and thus causing congestions and possibilities of accidents.

Narrow roads due to which less parking spaces are available and thus it creates traffic jam.Their focus was the solution of parking problem, strong economy and healthy environment of the city. In Kota, special authority called as Traffic and Transportation authority is required at city level Kota. There are lots of solutions, some are short term and some are long term basis but we need to work on the basis of long-term plan and at the same time take care of discomforts or problems. We need the authority that can look after the construction and development of roads, flyovers, intersections, pedestrian facilities etc. The authority should

make master plans for inner, middle and outer roads which will help us in reducing the traffic congestion and accidents in the central areas. Promoting the use of bicycles in the city, we can comfortably use the bicycle in travelling. So, this mode needs to be promoted in the city

T. Subramani et. al. [2012] had drawn attention towards the problems of parking, its ill effects and some measures to solve these problems. Less space availability is the main cause. Salem is the fifth largest city with a population of 7.54 lakhs (2011) in Tamil Nadu. Parking is one of the major problems that are created by the increasing vehicle traffic. It has an impact on transport development. The availability of less space in urban areas has increased demand for parking space especially in central business area. This affects the mode choice also. This has a great economical impact. In order to accommodate the large volume of vehicle, small cities and towns must develop the affect their infrastructures – roads, flyovers, car parks and other facilities. Otherwise their arteries are most likely to get clogged like it happens in big and mini metros. The solution for this is systemic survey and management of traffic and pedestrian, although at a nascent stage in India, it the one of the options to decongest roads and solve parking and pedestrian problems. Before taking any measures for betterment of conditioned, data regarding availability of parking space, extent of its usage and parking surveys are intended to all this information. Since the duration of parking varies with different vehicles, the data has to be analyzed to access the parking need. As the traffic on the existing road system in the cities increases, congestion becomes serious problem. Thus, there could

be medium- and long-term solution measures. Some ill effects are: Congestion: Road blockage and reduced road capacity.Accidents: Due to parking on roads the chances of accident increase.Environment Pollution: High traffic density and increase in delay cause environment pollution.Speed Reduces and Delay time increases.Parking takes considerable street space leading to the lowering of the road capacity. Hence, speed will be reduced, Journey time and delay will also subsequently increase. The operational cost of the vehicle increases leading great economical loss to the community. According to the parking study on existing traffic condition on the road network it is must and required to remove on-street parking system for efficient transportation system. Careless maneuvering of parking and un-parking leads to accidents which are referred to as accidents. Common type of parking accidents occurs while driving out a car from the parked area, careless opening of doors of parked cars, and while bringing in the vehicle to the parking lot.

1.3 Parking difficulties in Indore

1.4 Indore is the most populous and the largest city in the Indian state of Madhya Pradesh. The city is distributed over a land area of just 530 square kilometres making Indore the most densely populated major city. Indore has been selected as one of the 100 Indian cities to be developed as a smart city under the Smart Cities Mission. But this mission is facing major challenges. There are many areas in which congestion, traffic jam, inefficient parking takes place which creates a huge problem for daily road users, authorities and other officials. Highly traffic prone area in Indore Includes Rajwada, MG Road, Kothari Market, Cloth Market, Anand Bazar, LIG, Jawahar Marg etc. Parking is a serious issue in the study area and its management needs topmost priority. Some of the significant problems associated with parking are: • Parking demand is high in central area primarily due to concentrated commercial activities. • There is an absence of adequate off-street parking facilities as a result of which parkers are forced to park their vehicles on the streets. • On street parking phenomena reduces the effective road width available for movement of traffic. • There is an absence of a comprehensive parking policy for the study area, involving components such as organization of circulation system and on street parking, identification of possible off street parking sites, intensive utilization of existing parking areas including air rights exploitation, levy of parking fee, municipalization of parking spaces, parking norms and standards and travel demand management measures. In this project, we have studied the parking problem of the area near Kothari market. This area includes important markets which attracts huge number of peoples. The problem is that this market contains narrow roads. Some more factors additional to this problem to make it worse. These factors include inefficient parking, parking anywhere on roads, no parking regulations, less parking space. Road users park their vehicle on road in front of the shops which they are visiting and since there are many shops, the vehicles parked on the road are creating problems for the moving traffic. Due to the vehicle parking onWeekly volume count survey of vehicular traffic & pedestrian.

2 Detailed Survey

2.1 Detailed traffic surveys aim to capture data that accurately reflects the real-world traffic situation in the area. Kothari Market at present facing a huge problem of traffic congestion through on-street parking occurred and for the solution of problem a detailed survey has been carried out at Kothari Market and nearby area located in central portion of Indore. It consists of main markets and shops which attracts a lot of public on the daily basis. useful for this busy location. Preferred by locals for the great variety of options for clothing and

accessories, this is the place to be where peoples bargain hard. Showrooms of various sizes stock colourful and fashionable items. and its nearby area known as Novelty Market famous as mobile & accessories hub of Indore Traffic lane of this market throughout day and evening heavily congested. Since there are number of narrow roads in the Kothari market where vehicles are parked (especially two-wheeler) affecting the carriage width of the road. These vehicles are becoming problematic for the daily road users because vehicles are cover major part of the road and leave very narrow space for the ongoing traffic. In detailed survey vehicle data analysis divided in three main routes of the going through selected location where congestion is high. Division of traffic lane for survey are as follow   Route A = Chikmagalur Square, Chiman Bagh to Khatipura Square Route B = Vinayak Marketing to MTH compound Route C = MG Road Police Station to Cafe 9 Problems without divider on the road –

3.3. Design of Parking Facility

After vehicle data collection taking into consideration the survey data. Evaluated daily average number of vehicles parked on-street are 280 (two wheelers) and 10 (four wheelers). At Kothari Market an existing parking available having capacity of 70 two wheelers on a land of 6561 square feet on only ground level. For the solution of traffic congestion, its required to extend the existing parking facility vertically in the manner of multiple floor and convert on-street parking system to off-street parking system. To meet the demand of parking capacity in this project a multilevel parking system designed the for 300 two wheelers and 14 four wheelers to park separately at existing parking area located at Mahatma Gandhi Road to provide parking facility for the vehicle of Kothari market and Novelty Market which will reduce traffic congestion which occurred in present condition.Alternate Route

3.4. Conclusion

Since Parking is becoming a major challenge for the whole country day by day. It is obvious to say that with the increase in population and the vehicles, the need of parking will also rise. Indore city is also facing the same problem in most of the markets. There are following conclusion are - • One the basis of traffic survey observes that the main cause of traffic congestion on the roads of consumable market like Kothari Market is the unwanted on-street parked vehicles which affect the carriage width of the road these results traffic congestion is too high at street during the peak hours. • Survey of the main routes of the market carried out number of vehicles inefficiently or wrongly parked which affect traffic. Which is resolve by making off-street parking nearby area. • Extension of parking system of capacity 70 two wheelers vehicles the capacity of nearly 300 two wheelers and 14 four wheelers through design plan layout of a multilevel parking on the basis of evaluated data. • This parking will provide a separate space for parking of those vehicles which are becoming a challenge for the whole market. This will provide a better access and free movement to the moving traffic. This will also reduce delay time, long hours congestion on the roads, pollution and various other problems.

3.5. Future Scope

These types of Multilevel Vehicular Parking lots should be converted into smart parking with the help of IOT based technologies. For consumers, the most significant benefit of smart parking system is the decrease in the uncertainty of finding spots. Traditionally parking lots require motorists to drive around in the search of vacant spots leading to a waste of time particularly during peak hours. An IOT enabled system, with its three essential components; sensors, real time monitoring and automated pavement system allows one to find an empty parking spot even before entering the parking.

REFERENCES

[1]. Dr. Kirti Mohan Sharma, Parmesh Prjapati and Mridul Jain [2017] Problem of Parking and their Possible Solutions with Special Reference to Kota City.
[2]. A. Zeenab (2010) Parking Space in Kochi: Issues and Solutions, Centre for Public Policy Research.
[3]. K. Mahmud, K. Gope, S. Mustafizur & R. Chowdhury (2012) Possible Causes & Solutions of Traffic Jam and Their Impact on the Economy of Dhaka City. Journal of Management and Sustainability 2(2): 112-135.
[4]. Vatsala Daur, Prerit Bhandari, Laxay Jain, Nalini N (2016) Smart Car Parking System.
[5]. V. Padiachy, J. Kumar, A. Chandra, K. Prakash, P. Prasad, H. Prasad (2015) Development of an Automated Multilevel Parking System.
[6]. T. Subramani (2012) Parking Study on Main Corridors in Major Urban Centre.
[7]. Meyer M.d. Miller E.J (1984), `Urban Transportation Planning', Mcgraw – Hill series, New Delhi.
[8]. DTCP (1999), 'Comprehensive Traffic and Transportation Study for Salem`, Pallavan Transport Consultancy Services Ltd., Chennai, Tamil Nadu.
[9]. Guidelines on regulation and control mixed traffic in urban areas, IRC: 70-1977.
[10]. Riddhima (2011) Management of Parking Spaces in the Walled City of Jaipur - Sample study of Jauhari Bazaar and Bapu Bazaar.

[11]. Vatsala Daur, Prerit Bhandari, Laxay Jain, Nalini N (2016) International Journal of Advanced Research in Computer Science and Software Engineering Smart Car Parking System.

[12]. Research in Engineering and Technology ad, Vol.3, issue 8,76-91. 14. Madhya Pradesh Bhumi Vikas Adhiniyam, 2012, Government of Madhya Pradesh, India.