Transport Option and Traffic Management in CBD: A Case of Surat City

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Abstract

Central Business Districts (CBD) are certain areas of traffic attraction due to the rapid urbanization, growing population, and increasing commercial and economic activities. More population generate a large number of vehicles, leading to conflict with vehicles and congestion. It in turn adversely affects the ultimate goal of efficient mobility of the citizens. The CBD is likely to offer high accessibility with the provision of transportation infrastructures; it is also threatened by mobility challenges resulting in low productivity and loss of man-hours, thus adversely affecting the overall wellbeing of residents. This research observes the challenges of traffic congestion and management problems within Surat CBD, on a major arterial known as, 'Rajmarg' having a 2.4 km of length. Researchers obtained data through identification of land use (ground truthing), cross-section road inventory, and observing major traffic activity. For addressing the traffic congestion, classified volume count survey and pedestrian count of 3 days i.e. Saturday, Sunday, and Monday (videography), speed and delay survey (using android based mobile application "My Tracks"). Findings exposed an irregular land use pattern, resulting in traffic and transportation bottleneck, vehicular conflicts and unnecessary traffic congestion, longer travel time and loss of human hours during a day-time. The paper deliberates the need for a review of CBD -Surat by the execution of the planning and regulatory rules for effective traffic management.
Keyword- CBD, PCU, Rajmarg, Speed and delay survey, Surat, Vehicle volume count

I. INTRODUCTION

Urban population growth, land-use, and urbanization are some major factors that affect the sustainability of a Central Business Districts (CBD). Due to increase in vehicular growth rate of Surat city, the demand has outstripped the road width capacity which leads to bottleneck, conflict points, an increase in vehicle-vehicle and vehicle-pedestrian conflicts along with a delay in travel time. The public transport system in Surat is also not capable of pacing with the increasing demand for last few decades, so passengers are turned with their choice of personalized modes and rely much on the intermediate public transport (i.e. auto rickshaw). As present and in future, the demand is fulfilled by providing new infrastructure regarding new roads, new transportation facility; it will attract the new users and eventually that new development will also become saturated. Thus, the need arises for the justification for the expansion of old infrastructure facility.

Hence, the modification of the existing situation of infrastructure in CBD is among the fundamental needs of planning fraternity.

II. STUDY AREA- RAJMARG, SURAT

In the Surat city, Chowk area evolved with an organic growth and had high population density showing a higher FSI consumption. Rajmarg is having a length of 2.4 km, and carriageway of Study area is varying from 9 – 20 m. The stretch is passing from within the center of CBD and connects railway station to other parts within the CBD. It acts as a primary link between the city and Rander area (another bank of Tapi River). The study area is as shown in the figure below:

Fig.   2 1: Study area (Chowk to Railway station road length)

For the land-use, a 50 m wide belt is considered from the either sides of the path for ground truthing. The survey revealed that the stretch has mixed land-use of residential, commercial, public and recreational as shown in below figure.
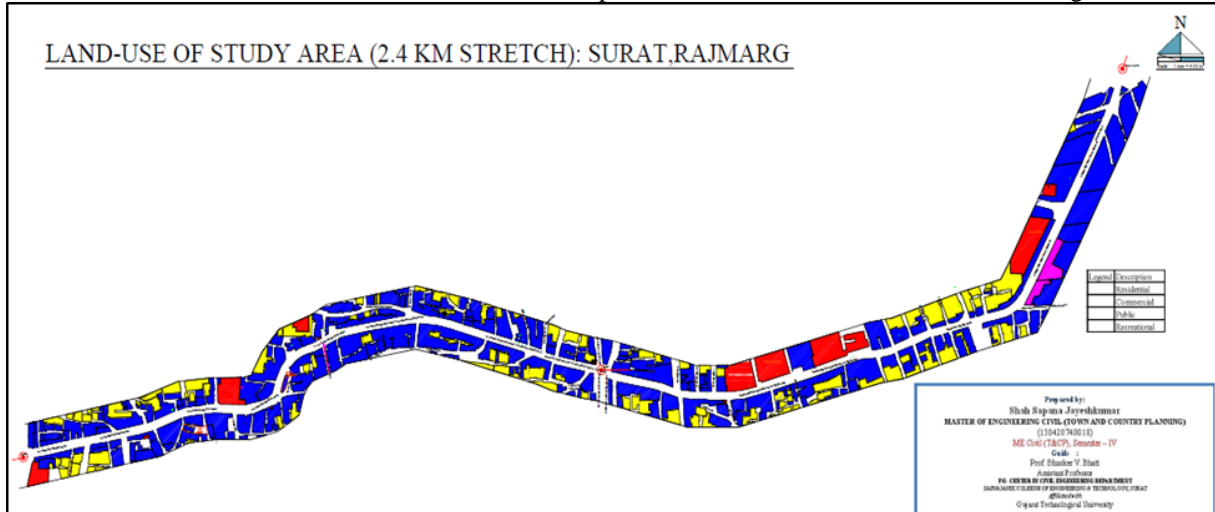

Fig. 2 2: Land use of study stretch of the Rajmarg
(Source: Authors)

III. VOLUME COUNT

Classified volume count and pedestrian count of Rajmarg were observed using a video recording of Surat CCTV control room. Data extracted was for the Monday, Saturday, and Sunday. In a way, it included a weekday and a weekend for the time duration of 16 hours i.e. from morning 6:00 to midnight 12:00. The locations of data-extraction are as in the figure below.

Fig. 3 1: Volume count locations

The average PCU per hour and average pedestrian per hour at every location are shown in below graph.
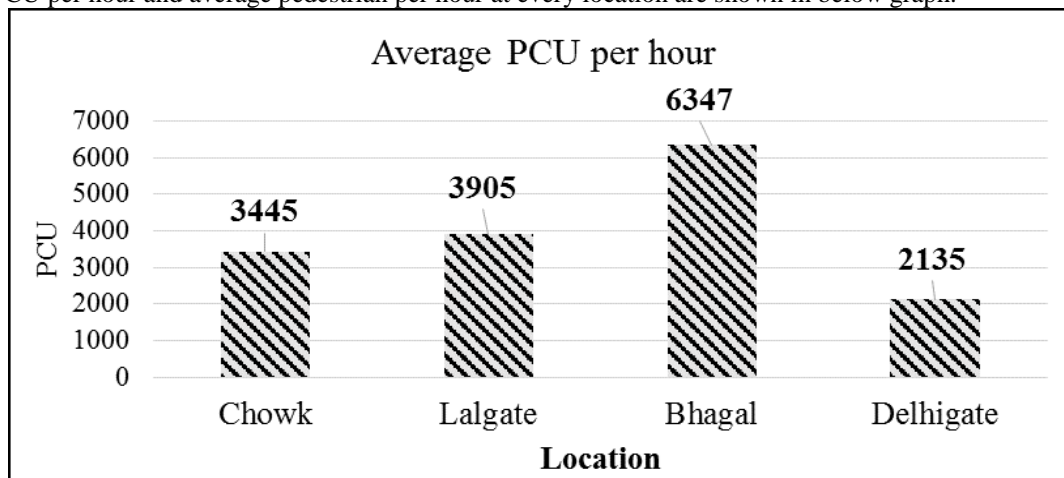

Fig. 3 2: Average PCU per hour

From above graph, derived observation is that maximum PCU count is at Bhagal that reflects the fact of being a major intersection with various attraction spots in the nearby area. The Delhi gate is showing lowest PCU count.
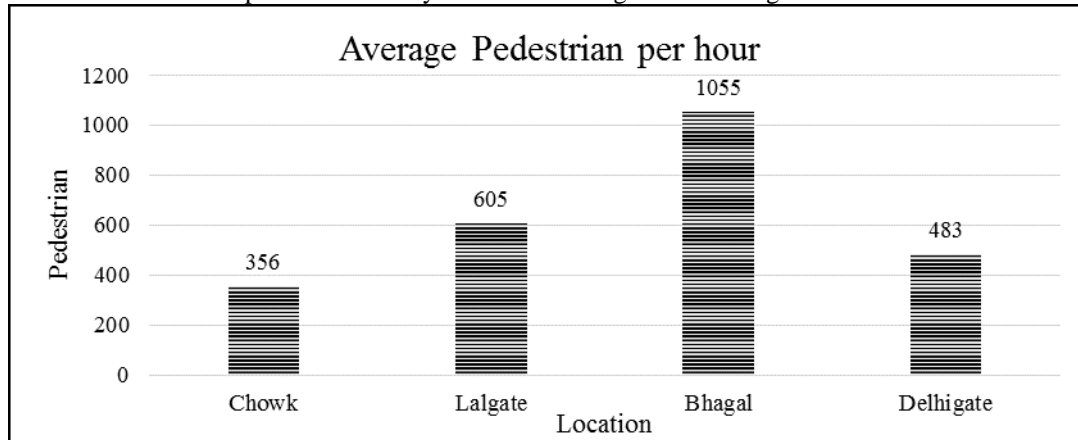

Fig. 3 3: Average Pedestrian per hour

From above graph, maximum Pedestrian count is observed at Bhagal because it is the major intersection with various attraction spots in nearer and Chowk having lowest PCU count.

The observations make the intersection of Bhagal be the most crowded flushing with vehicles and pedestrian movements.

A. Modal Share

An attempt to identify the proportion of vehicles, a distribution of observation is shown in the table below.

Location	Motorised						Pedestrian	NMT	
	2 W	Car	Rickshaw	Bus	Truck	Tempo		Cycle	Hawkers
Chowk	41236	5690	25553	338	115	645	5693	1240	107
Lalgate	43120	7532	28754	300	129	977	9675	1863	240
Bhagal	81088	11388	42288	527	265	1626	16881	2831	320
Delhigate	22596	2639	17489	214	83	543	7727	1432	97
Total	188040	27249	114084	1379	592	3791	39977	7366	764

Table 3 1: Modal share on Rajmarg

In the above table, modal share of 2-wheelers and 3-wheelers (Rickshaw) is maximum. There is a subtle share of the buses that depicts the absence of public transport facility.

B. Speed and Delay Survey

Researchers made observations on speed and delay using and Android based application - "My tracks". The records fetched were for the travel time, travel date, route elevation, travels' mode and moving speed. Based on that delay time is analyzed and shown in below graph.

Here, it is observed that travel speed stands below a rate of 30 kmph along the study stretch. Maximum delay in travel time exists during the time duration of 12:00 p.m. - 7:30 p.m. where average travel speed is dropped down to 20-12 kmph.

So, to reduce all above problems, there should be some efficient transportation option and traffic management tools to counteract its effect.
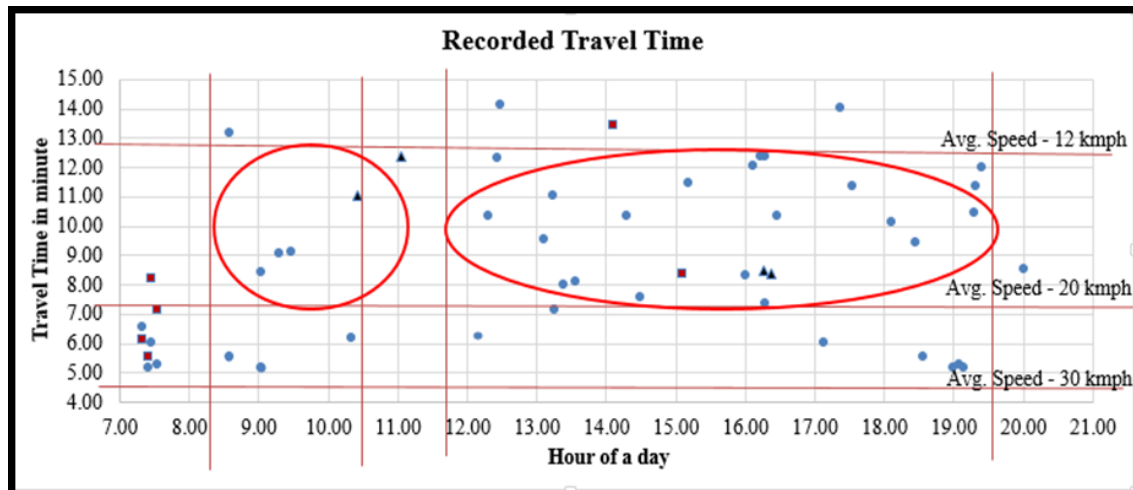

Fig. 3.4: Graph 3 1 Average travel time, average speed during day (using different vehicles: 2W, 3W and 4W)

IV. TRANSPORT OPTION AND TRAFFIC MANAGEMENT

As the study area-Rajmarg is located showing the CBD characteristics, it should be dealt with a proper care that maintain its original character and culture. There can be the following alternative remedial measures to reduce the vehicular congestion.

A. Temporary, Costly and Time-Consuming Solution
–   Expansion of existing road
–   Provide grade-separated and elevated roads at intersections

B. Traffic Management Plans
–   Road use must be as per their functional use
–   Restrict the movement of traffic on the congested spots
–   Parking lots provision to avoid street parking and congestion due to parked vehicles
–   Parking management plan

C. Give Preference to the Mass Transportation System
–   Limiting the movement of auto rickshaw on stretch of the Rajmarg and,
–   Provide mass transportation system- Bus with the high frequency over the stretch of Rajmarg

D. Planning Measures
–   Identification of the congestion spots and treatment in line to reduce the traffic congestion
–   Restrict the permission of new development in the CBD area of Surat
By above measures, the effect of traffic congestion can be counteracted, and smooth transportation can run in a city like Surat.

V. CONCLUDING REMARKS

From the discussions, major points to conclude that the CBD being a most important part of an urban area like Surat, it is suffering traffic congestion and consuming much time, energy, and resources of citizens. Citizens need to cross the intersections as Bhagal, and there are many vehicles and pedestrian crossing each other, giving a rise to conflicting. Certain remedial measures need to be considered, and rigorous planning efforts are needed to imply sensibly to overcome the congestion and restrict the same. Mass transportation is a need of the hour and awaiting an introduction along with restriction of auto rickshaw movement on the stretch of Rajmarg.

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