TRAFFIC CALMING IN HYDERABAD AND SECUNDERABAD CITY PERSPECTIVE

V Kranthi Naik[1], A.Naga Saibaba[2], Dr.M.Kameswara Rao[3]
[1]Research Scholar (M.Tech, T.E), [2]Assistant Professor, [3]Professor
Malla Reddy Engineering College (Autonomous), Kompally

Abstract---

Traffic calming has become one of the most popular subjects in the Transportation Engineering field over the last ten years. In India it is in nascent stage and held a lot of potential for future. The aim of the study is to see the various traffic calming measures in other countries, its relevancy and application in Indian condition. Cities and towns play a vital role in promoting economic growth and prosperity. Although less than one-third of India's people live in cities and towns, these areas generate over two-third of the country's income and account for 90% of government revenues. In the coming years, as India becomes more and more urbanized, urban areas will play a critical role in sustaining high rates of economic growth. Although Indian cities have lower vehicle ownership rate, number of vehicles per capita, than their counterparts in developed countries, they suffer from worse congestion, delay, pollution, and accidents than cities in the industrialized world. Traffic calming is coined as the best technique to overcome traffic congestions and accidents. Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users. The concept of traffic calming is fundamentally concerned with reducing the adverse impact of motor vehicles on built up areas. This usually involves reducing vehicle speeds, providing more space for pedestrians and cyclists, and improving the local environment It includes change in street alignment, installation of barrier and other physical measures to reduce traffic speed and /or volume in the interest of safety and liveability. The main objective of this study is to reduce the high frequency of collision and the need for police enforcement. It aims at achieving slow speeds for motor vehicles and enhancement of safety for non motorized users. A junction in Hyderabad which is subjected to congestion and high frequency of collision is considered for study and requirements of traffic calming in the junction have been analysed.

Key words: Traffic Calming; congestion; slow speeds

I.INTRODUCTION

The rapid growth of India's urban population has put enormous strains on all transport systems. Its urban population is growing at an average rate of around 3% per year.. Assuming decadal increase of around 32%, India's urban population is expected to increase from 377 million in 2011 to 500 million in 2021. In terms of percentage of total population, the urban population has gone up from 17% in 1951 to 31.8% in 2011 and is expected to increase up to around 35% by the year 2021. During the 2000s, 91 million people joined the ranks of urban dwellers – which implies that the growth rate in urban areas remains almost the same during the last twenty years; urban population increased by 31.5% from 1991 to 2001 and 31.8% from 2001 to 2011[1]. From 35 in 2001, the number of metropolitan cities rose to 50 according to the Census of India, 2011. Out of these 50, eight cities – Mumbai, Delhi, Kolkata, Chennai, Hyderabad, Bangalore, Ahmedabad, and Pune – have population more than 5 million. India's big cities now account for a larger share of total urban population – a trend that has been observed since independence. In 2011, the share of metropolitan cities was 42.3%, up from 37.8% in 2001 and 27.7% in 1991[6].

Hyderabad is well connected to many other locationsinIndia,suchas Bangalore, Mumbai, Delhi, Kolkata, Nagpur, Chennai, Pune, Vishakapatnam and Vijayawada , either through directly or through intermediary locations.

The highway (express way) network linking Hyderabad to various parts of the country is very good. Three National Highways (NH) pass through the city—NH-7, NH-9 and NH-202. Five state highways—SH-1, SH-2, SH-4, SH-5 and SH-6 begin from Hyderabad [7]. As a growing city, regular multiple development projects, around the city had made traffic congestion a common issue. In Hyderabad the roads occupy 10% of the total city area. Traffic calming is the name for road design strategies to reduce vehicle speeds and volumes[2]. Traffic calming encompasses a series of physical treatments that are meant to lower vehicle speeds and volumes by creating the visual impression that certain streets are not intended for high-speed or cut-through traffic [10]. Thus, traffic calming can improve safety for pedestrians and reduce noise and pollution levels. Examples of these measures include Bulbouts, speed humps, chicanes, and traffic circles.Traffic

Calming techniques have emerged primarily as a society's response to concern for safety. Traffic Calming in the Western Nations have been implemented in residential areas, neighbourhoods and cities because inter-city highways and freeways are relatively safer [10]. It is well accepted by the experts that differences and variations in the speed, direction, and/or mass of vehicles usually determine the severity of road accidents [10]. Traffic Calming Techniques have played an important role in achieving safety by ensuring low driving speeds and smaller speed differences between different road users [8]. Traffic calming is defined by Institute of Traffic Engineers as, "The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users." It involves physical alterations to a road or street which cause or invite motorists to decrease driving speed and increase his attention to driving task. It includes change in street alignment, installation of barrier and other physical measures to reduce traffic speed and /or volume in the interest of safety and liveability [3]. Traffic calming techniques can be classified based on speed control measures and volume control measures. Various speed control measures that are intended to reduce speed and improve the conditions for non-motorists are

- Speed humps
- Speed tables
- Raised crosswalks
- Raised intersection
- Traffic circles
- Roundabouts

Various volume control measures that are intended to reduce the cut-through traffic by obstructing traffic movements in one or more directions are (1) Full closures (2) Half closures (3) Diagonal closures (4) Median barriers [4]. The main advantage of traffic calming is speed and volume control can be obtained at an effective cost but measures when implemented leads to rough drive for huge vehicles and impact to drainage needs have to be considered. The definition of Traffic Calming varies but the aim of it is to reduce the speed and in some cases the volume of traffic, providing a safer environment for non-motorized road users. The definitions obtained are as follows:

a) ITE's (Institute of Transportation Engineers): "Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes."

b)NYSDOT Design Definition (New York State Department of Transportation): "The combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non motorized street users"

c) Municipal Government of City of Vancouver, Canada: The practice of using physical techniques to influence traffic movements in neighborhoods. Objectives of traffic calming vary from improving safety through speed reduction measures such as traffic circles to discouraging traffic from entering an area through diversion measures such as "right-in, right-out" intersections.

To summarize we can say that traffic calming is a mean of designing roads using physical measures to encourage people to drive slowly and carefully and enhance the safety of walking and bicycling. The main advantage of traffic calming is that it is self enforcing and does not normally require any complication traffic control devices and is usually highly cost-effective; achieving benefits with a value far greater than the costs.

II. STUDY AREA

The study area for understanding traffic calming in Hyderabad city is Begumpet stretch. The reasons behind selecting this stretch for study are poor road condition and regular traffic congestion in Begumpet stretch. The study area is shown in fig 1.

Fig 1: Begumpet Stretch

Fig 2 :Bowenpally-Balanagar Stretch

Observed problems

Fig 3: Footpath at Bowenpally

Fig 3: Footpath occupied by local vendors

III. METHODOLOGY

The methodology followed to understand traffic calming in Hyderabad city is as shown in fig 2

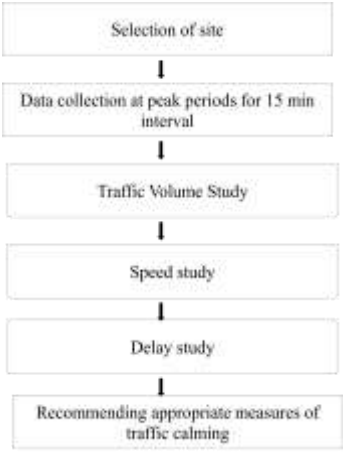

Fig 2: Methodology involved

A. Data Collection

Traffic flow study which includes study of movement of all types of vehicles through particular junction for a period of 15 min was made at regular interval of one hour from 8:00 am to 11:00 am in the morning and 4:00pm to 7:00pm in the evening. Signal timing was also noted down in these areas [10]

B. Traffic Volume Count

Traffic volume studies are conducted to collect data on the number of vehicles and/or pedestrians that pass a point on a highway facility during a specified time period. This time period varies from as little as 15 minutes to as much as a year depending on the anticipated use of the data [5]. Traffic volume studies are usually conducted when certain volume characteristics are needed, some of which follow[10]:

1. Average Annual Daily Traffic (AADT) is the average of 24-hour counts collected every day of the year.

2. Average Daily Traffic (ADT) is the average of 24-hour counts collected over a number of days greater than one but less than a year.

3. Peak Hour Volume (PHV) is the maximum number of vehicles that pass a point on a highway during a period of 60 consecutive minutes.

4. Vehicle Classification (VC) records volume with respect to the type of vehicles.

5. Vehicle Miles of Travel (VMT) is a measure of travel along a section of road. It is the product of the traffic volume (that is, average weekday volume or ADT) and the length of roadway in miles to which the volume is applicable.

C Speed Studies

Speed studies are conducted to estimate the distribution of speeds of vehicles in a stream of traffic at a particular location on a highway [5]. The speed of a vehicle is defined as the rate of movement of the vehicle; it is usually expressed in miles per hour (mi/h) or kilometres per hour (km/h). A spot speed study is carried out by recording the speeds of a sample of vehicles at a specified location. Speed characteristics identified by such a study will be valid only for the traffic and environmental conditions that exist at the time of the study [12].

D Delay Studies

A travel time study determines the amount of time required to travel from one point to another on a given route. In conducting such a study, information may also be collected on the locations, durations, and causes of delays [5]. When this is done, the study is known as a travel time and delay study. Data obtained from travel time and delay studies give a good indication of the level of service on the study section. These data also aid the traffic engineer in identifying problem locations, which may require special attention in order to improve the overall flow of traffic on the route [13].

IV. RESULTS

From table 1 and 2 it is evident that traffic flow at Paradise junction is more during 9:00am to 10:00am in the morning. Number of two wheelers crossing the junction is more in both the cases. On an average traffic flow during 9:00am to 10:00 am is 36% of total traffic flow. Nearly 50% of traffic flow occurs during 5.00pm to 6.00pm.

From table 5 it can be said that speed of two wheelers at Bowenpally-Balanagar and Begumpet stretch is 13 Km/hr and 10 Km/hr respectively. According to IRC speed on district roads is 18-20 Km/hr. Reduction in speed is due to poor road condition and increased traffic volume count. From table 5 it can be said that speed of three wheelers at Bowenpally-Balanagar and Begumpet stretch is 11 Km/hr and 9 Km/hr respectively. According to IRC speed of three wheelers on district roads is 12-15 Km/hr. Reduction in speed is due to and increased traffic volume count at Begumpet. From table 5 it can be said that speed of four wheelers at Bowenpally-Balanagar and Begumpet stretch is 9 Km/hr and 8 Km/hr respectively. According to IRC speed of four wheelers on district roads is 8-10 Km/hr. Speed of four wheelers is in IRC standards.

V. RECCOMMENDATIONS

- Speed has been reduced at both the locations because of damaged overlays. Removal of the existing road and laying new road would improvise the speed at the junctions.
- From the tables it can be observed that traffic volume count has drastically increased in the past 5 years. Best way to reduce traffic volume count is to provide traffic circles at places where vehicles move with low speed.
- Level separated intersection at Begumpet area would help in easy movement of traffic.
- Median barrier if provided at Bowenpally-Balanagar junction would reduce traffic congestion because of movement of different type of vehicles at a time.
- Fly over also would serve the purpose of reducing the traffic volume count and would help to provide faster travel for multi axle vehicles.
- Separate lanes for heavy vehicles and multi axle vehicles help to reduce traffic volume count and increase in speed.
- Speed humps have to be provided on the path from Begumpet to NTR circle to reduce abrupt speed of two wheelers.
- From the pictures shown above, it can be said that there is misuse of foot paths at various places of study. This problem can be solved by providing raised crosswalks. Raised crosswalks can give elegant appearance as well as reduce traffic congestion.
- Footpaths have to be raised so that vehicles won't pass on footpath and cause inconvenience to pedestrians.
- Another problem that can be observed from the pictures is poor maintenance of roads which leads to storage of water during rainy reason. Proper camber has to be provided in roadways.

TABLE 1 Vehicular Statistics of Begumpet Stretch

	Number of vehicles that cross the junction in an interval of one hour		
Time / Type of vehicle	8:00 to 9:00	9:00 to 10:00	10:00 to 11:00
2- wheelers	8012	12686	8925
3-wheelers	1237	1949	1300
4-wheelers	3074	4781	3242
Heavy vehicles	480	712	507

TABLE 2 Speed Study

Type of vehicle	Begumpet Stretch (Speed in Km/hr)
2- wheelers	10.28
3-wheelers	9.48
4-wheelers	8.89
Heavy vehicles	6.26

REFERENCES

[1] Reid Ewing, PH.D., Steven J. Brown, P.E. and Aaron Hoyt, "*Traffic Calming Practice Revisited*", ITE Journal, November 2005.

[2]C. Edward Walter, "*Sub urban Residential Traffic Calming*", ITE Journal, September 1995.

[3] Doug Brown, "Effective Application of Traffic Calming Techniques**",** Preliminary Investigation Caltrans Division of Research and Innovation, September 2011.

[4] Joseph E.Womble, P.E. and W.Martin Bretherton Jr., P.E., "*Traffic Calming Design Standards for New Residential Streets: A Proactive Approach*", ITE Journal, March 2003.

[5] Saad Yousif, Mohammed Alterawi and Ralph R. Henson, "*Effect of Road Narrowing on Junction Capacity Using Micro simulation",* Journal of Transportation Engineering, Vol. 139, No. 6, June 1, 2013.

[6] Jeff Gulden, P.E. and Reid Ewing, PH.D.,"*New Traffic Calming Device of Choice",* ITE Journal, December 2009.

[7] Jing and Glen Koorey, "*Investigating And Modeling The Effects Of Traffic Calming Devices*", IPENZ Transportation Group Conference Christchurch March, 2010

[8] John D.Leonard 11 and W.Jeffrey Davis, "*Urban Traffic Calming Treatments: Performance Measures and Design Conformance",* ITE Journal, August 1997.

[9] Michael Skene, "*Traffic Calming on arterial roadways*", ITE Journal, August 2000.

[10] P.Teja Abhilash, K.Jaya Sunder, K.Tharani, "Traffic Calming in Hyderabad City", *International Journal on Engineering Research and Management*, Vol.2 (06), pp: 152-155

[11] Todd Litman, "*Traffic Calming Benefits, Costs and Equity Impacts*", Victoria Transport Policy Institute, December 1999.

[12] Tolley, R., *Calming Traffic in Residential Areas*, Brefi Press, Brefi, England, 1990.

[13] Topp, H.H., "Traffic Safety, Usability, and Streetscape Effects of New Design Principles for Major Urban Roads," *Transportation,* Vol. 16, 1990, pp. 297–310.