

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Issue 6, June 2019

Traffic Management Study

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ABSTRACT: Traffic management study is a very crucial and important part of our system. We are facing problems in traffic congestions. Due to growing population density of vehicle is increasing day by day. In the present scenario traffic congestion is one of the main challenges for engineers, planners and policy makers in urban areas. The main focus of this study is aimed to collect the traffic volume data and analysis of traffic volume data. After collecting traffic volume data find the existing level of service (LOS). By using LOS ranges understand the traffic Problems, and provide the suitable measures to control the traffic congestion. such as widening the road, proper foot paths for pedestrians and also assigning the traffic signals in intersections to control the traffic flow, assigning proper place for parking and also assigning the traffic police in intersections for control the traffic congestion, changing lane width or by providing more public transport .

KEYWORDS: Level of service, peak hour, traffic flow.

I. INTRODUCTION

Traffic management with rapid urbanization cities face problems of congestion. Congestion occurs when demand for road space exceeds supply. Hence, not only to save resources but also to use available resources wisely it is necessary assess the existing traffic management and suggest measures to improve the same. In major urban areas traffic congestion is the major problem, so we need to check the traffic volume in the city and to provide suitable remedial measures. Traffic volume is defined as the number of vehicles crossing a section of road per unit time at any selected period. 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. The objective of classified traffic volume count survey is to estimate traffic intensity. The classified volume counts surveys at three strategic locations have been carried out. The traffic is counted in number of vehicles by vehicle category-wise in each direction.

II. LITERATURE REVIEW

KARTHICK ET AL (2012) proposed a system to analyse the live video camera recordings to handle the traffic automatically by allotting green time to the traffic by calculating the number of vehicles which gives the traffic density which acted as a input for the algorithm which was in place for allocating optimal time for the vehicles to pass the intersection.

REKHA & KARTHIKA (2013) presented a combination of inductive loop sensors and fuzzy logic technology in which inductive loop sensors were responsible for real-time traffic data and fuzzy logic technology was responsible for the allotment of green time to the traffic to clear off the intersection efficiently. This method was proved to be very effective in handling the traffic.

KING. SHILPA ET AL (2009) worked on a new technique "Intelligent traffic light controller" which was made by making use of GSM services as it included providing the information regarding traffic flow to users by sending SMSs

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in addition to the sensors provided on the intersection to allocate the timings to clear off the intersection. This system was compared with fixed traffic signals and found to be more efficient

HELLINGA, B ET AL., (2008) Through this paper, authors stated that the traffic signal timing plans are typically developed on the basis of turning movement traffic and pedestrian volume counts aggregated to 15-minute intervals and obtained over a 4 or 8-hour period on a single day. These data are used to identify the peak hour and to compute the peak hour turning movement traffic volumes. They may also be used to compute the peak hour factor (PHF). Result is to control the traffic congestion in intersection by using signals.

III. OBJECTIVES

- To Collect the Traffic Volume Data and analyse
- To calculate the existing Level of Service (LOS).
- To Determine the Traffic Problems and Provide Suitable Remedial Measures.

IV. METHODOLOGY

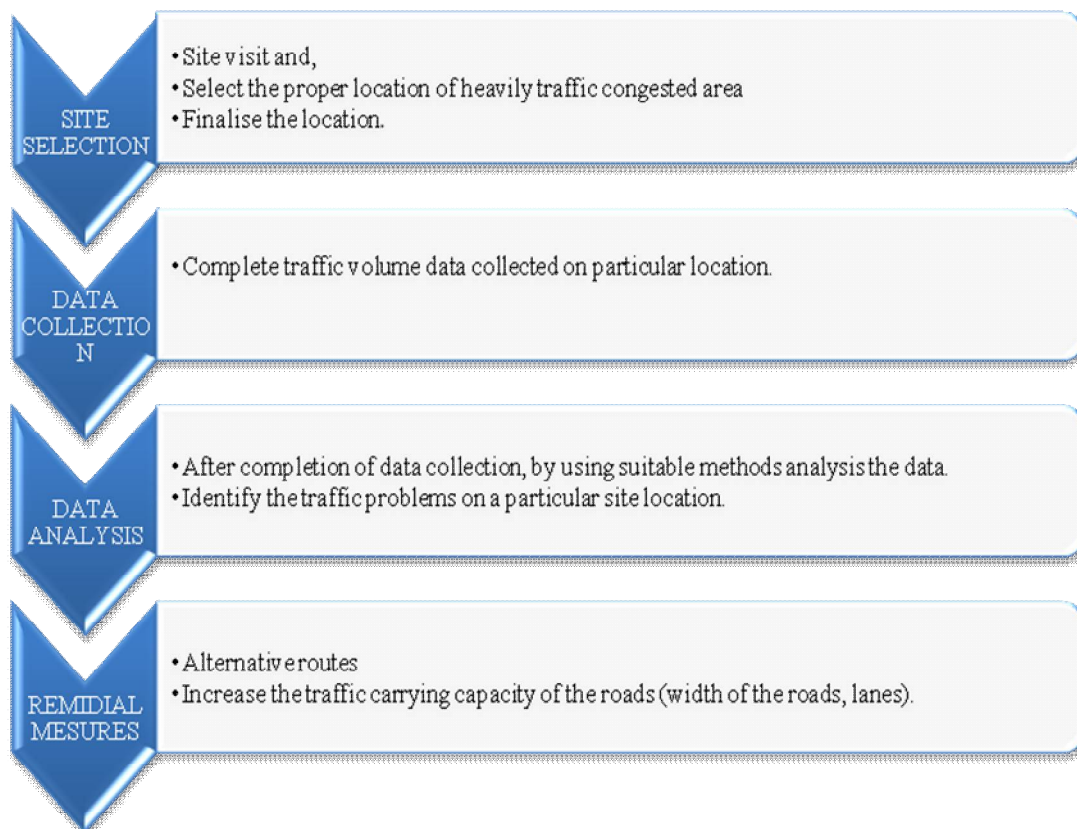


Fig 1 Methodology

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V. DATA COLLECTION AND ANALYSIS

- **ROAD INVENTORY SURVEY**
- **TRAFFIC VOLUME DATA COLLECTION by manual methods:** One of the fundamental measure of traffic on a road system is “The volume of traffic using the road in a given time interval” which is also termed as flow and it is expressed in vehicles per hour or vehicles per day. Usually, the traffic is composed of a number of types of vehicle each type having an influence the performance of the road in its own way.
- **SPOT SPEED STUDY:** For speed analysis in each circle by measuring 50m length on the road, at the starting point stop clock is turned on and when the vehicle reaches the 50m length at that time stopping the stop clock. This results in knowing the time taken by each vehicle to pass 50m length. By using this data the speed for approaching lane is obtained. From this available data we can plot S-curve to find out the speed of each vehicle at the intersections. The selected stretch is of 15m and 20 numbers of vehicles are selected by using random sampling technique.

TABLE 1: SPEED DATA COLLECTION

SPEED IN Kmph	10-20	20-30	30-40	40-50
Mid Speed	15	25	35	45
No Of Vehicles	9	7	4	0
% Of Frequency	45	35	20	0
Cum. Frequency	45	80	100	100

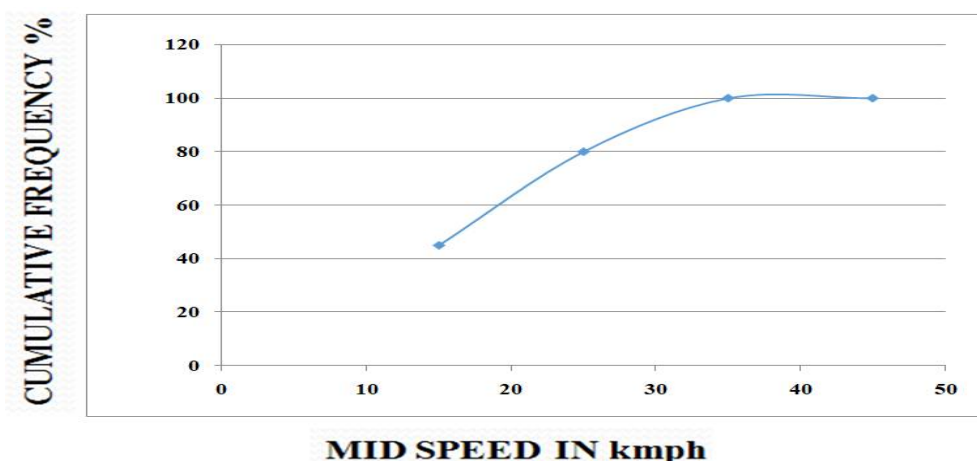


Fig 2 Plot between mid speed v/s cumulative frequency for N R circle

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CALCULATION OF THEORITICAL CAPACITY

$$\text{Theoretical capacity (C)} = \frac{1000V}{S}$$

Here 1000 represents capacity derived for 1 km length

V= design speed of the vehicle (85th %)

S= the spacing between c/c of the vehicle is calculated using the relation

$$= S_g + L$$

Where S_g represents the gap distance= $0.278 \cdot V \cdot t$

L=5m t=2.5sec

TRAFFIC VOLUME DATA COLLECTION: The data should be collected at 3 study location in 5 days of the week and analysis is done for the worst situation.

TABLE 2: TUESDAY PEAK HOURS AT N R CIRCLE

	Turning	Morning 8.30-9.30am	Afternoon 1-2pm	Evening 4-5pm
NORTH (towards old bus stand)	Left	293	259	378
	Straight	469	518	487
	Right	411	260	216
SOUTH (towards new bus stand)	Left	589	671	467
	Straight	-	-	-
	Right	317	223	466
EAST (towards dairy circle)	Left	-	-	-
	Straight	313	200	342
	Right	383	453	450
WEST (towards Santhepete circle)	Left	471	596	453
	Straight	608	590	470
	Right	-	-	-

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TABLE 3: TUESDAY AT SANTHEPETE CIRCLE

	Turning	Morning 8.30-9.30am	Afternoon 1-2pm	Evening 4-5pm
NORTH (towards Hosaline road)	Left	-	-	-
	Straight	-	-	-
	Right	-	-	-
SOUTH (towards Gorur road)	Left	958	923	847
	Straight	239	231	282
	Right	399	385	283
EAST (towards N R circle)	Left	194	264	195
	Straight	774	793	584
	Right	322	265	194
WEST (towards Tanneruhalla circle)	Left	202	230	206
	Straight	504	576	515
	Right	302	345	308

TABLE 4: MONDAY AT TANNERUHALLA CIRCLE

	Turning	Morning 8.30-9.30am	Afternoon 1-2pm	Evening 4-5pm
NORTH (towards Belur road)	Left	600	726	589
	Straight	-	-	-
	Right	606	438	603
SOUTH	Left	-	-	-
	Straight	-	-	-
	Right	-	-	-
EAST (towards Santhepete circle)	Left	387	592	537
	Straight	650	706	853
	Right	-	-	-
WEST (towards Sakaleshpura road)	Left	-	-	-
	Straight	609	602	582
	Right	460	471	471

TRAFFIC VOLUME DATA ANALYSIS: In this analysis we have collected the data of number of vehicles in peak hour flow and half peak hour flow and it is converted to PCU. We consider each direction from which the vehicle is passing and also the turning of vehicle with respect to the direction that is left straight. The collected traffic volume data is analysed in the below tables which gives a traffic movement in the peak hours from all the directions by using above IRC recommendations equivalent factors for different category of vehicles.

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PEAK HOURS TRAFFIC VOLUME DATA ON TUESDAY AT N R CIRCLE

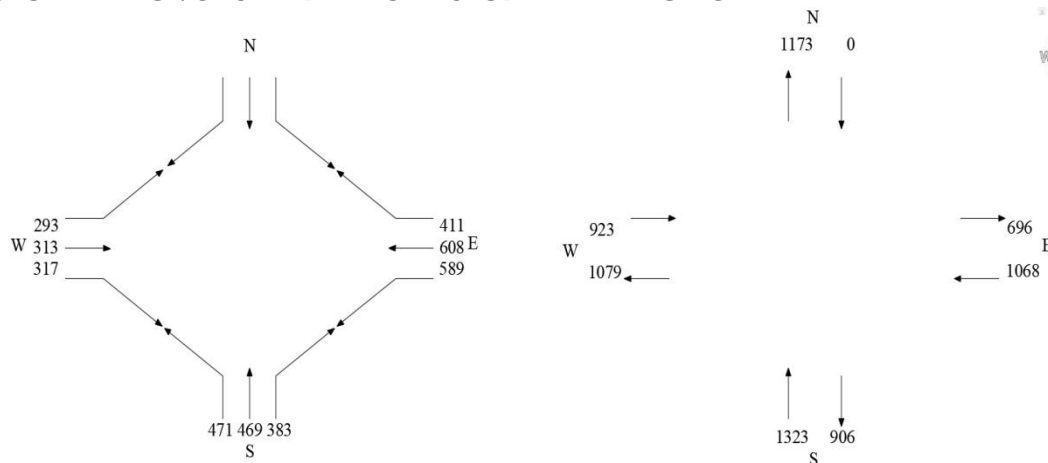


Fig 3 Showing the directional distribution peak flow at N R circle and the details of approaching and existing volume at N R circle

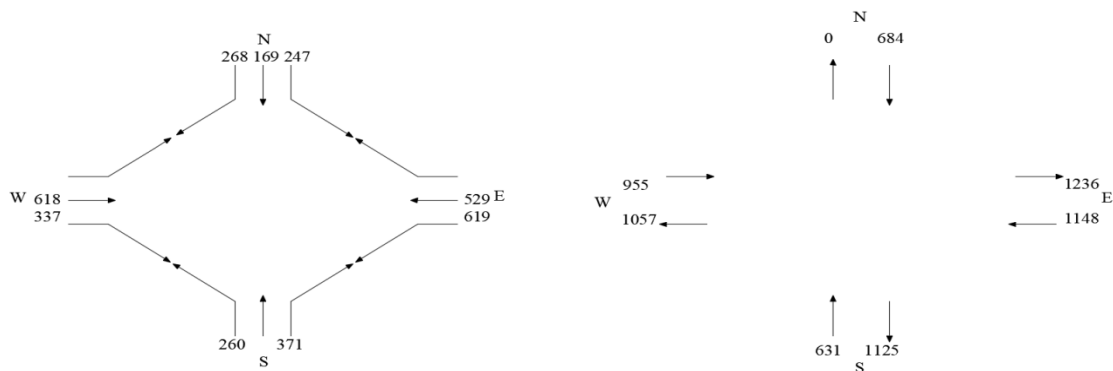


Fig 4 showing the directional distribution peak flow at Santhepete circle and the details of approaching and existing volume at Santhepete circle

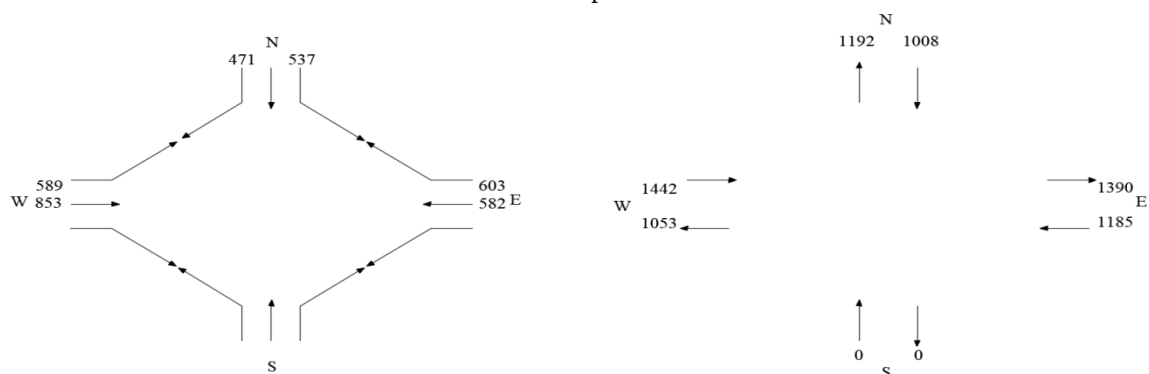


Fig 5 showing the directional distribution peak flow at Tanneruhalla circle and the details of approaching and existing volume at Tanneruhalla circle

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LEVEL OF SERVICE:

By using capacity and traffic volume data find out the LOS ranges.

TABLE 5: LEVEL OF SERVICE (LOS) FOR TUESDAY

DISCRIPTION	NORTH		SOUTH		EAST		WEST	
	N-S	S-N	S-N	N-S	E-W	W-E	W-E	E-W
Morning 8.30-9.30am	-	B	C	B	B	A	B	B
Afternoon 1-2pm	--	B	C	B	C	A	A	B
Evening 4-5pm	-	B	C	B	B	A	B	B

TABLE 6: LEVEL OF SERVICE (LOS) RANGES FOR TUESDAY

DISCRIPTION	NORTH		SOUTH		EAST		WEST	
	N-S	S-N	S-N	N-S	E-W	W-E	W-E	E-W
Morning 8.30-9.30am	-	A	A	C	C	C	B	B
Afternoon 1-2pm	-	B	A	C	C	C	B	B
Evening 4-5pm	-	A	A	C	C	B	B	B

TABLE 7: LEVEL OF SERVICE (LOS) RANGES FOR MONDAY

DISCRIPTION	NORTH		SOUTH		EAST		WEST	
	N-S	S-N	S-N	N-S	E-W	W-E	W-E	E-W
Morning 8.30-9.30am	B	B	-	-	B	B	B	B
Afternoon 1-2pm	B	B	-	-	B	C	C	B
Evening 4-5pm	B	B	-	-	B	C	C	B

VI. PROBLEMS AND MITIGATIONS

- Encroachment of footpath by shopkeepers and owners
- Onstreet parking
- Violation of traffic rules
- Bus stops in the intersection zone
- Absence of traffic signals to regulate the traffic movement
- Absence of traffic police to regulate the traffic flow
- Parking or auto stand on the foothpaths

MITIGATIONS MEASURES

- Footpath clearance so that pedestrian walk on the footpaths efficiently
- Strict enforcement measures have to be taken to follow to traffic rules
- Provision on ofstreet parking
- Provision of bus stops away from the intersection zone
- Installation of traffic signals
- Design of designated location for parking
- Shifting of auto stand to some other location so that footpaths are utilised properly
- Assign the traffic police to regulate the traffic flow
- Road markings for parking and pedestrians.

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VII. CONCLUSION

The level of service for the existing condition reflects very poor operating condition. Important issue in the existing condition are related to traffic congestion and pedestrians safety. Traffic congestion due high vehicular volume, saturated signals and conflicting movement between pedestrians and vehicles. To improve the existing condition and to provide better service to both vehicles and pedestrian several mitigations measures were suggested. The suggested measures are include:

- Redesign of signals
- Design of designated location for parking
- Shifting of auto stand to some other location so that footpaths are utilised properly
- Assign the traffic police to regulate the traffic flow
- Provision of bus stops away from the intersection zone

PROPOSED PROJECT

Adopting short term mitigations like redesign of signals, Assign the traffic police to regulate the traffic flow, Provision of busstops away from the intersection zone, Design of designated location for parking.

ENFORCEMENT AND CONTROLL

- Unregulated pedestrian crossing to be discouraged
- Stopping of vehicles after the stop line to be controlled effectively as it reduces the manoeuvre width for vehicles coming from adjacent directions.

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