TRAFFIC VOLUME STUDY OF RURAL MID BLOCK AND T-JUNTION

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Abstract : Traffic congestion in rural area is a serious problem and is increasing day by day with the increasing population/vehicular ownership due to uprising economic status of ruralisation.The traffic congestion not only raises the vehicle operating cost,travel time of trip makers but also is the prime reason of poor performance at the intersection.The disproportionate growth in the traffic vis-à-vis growth in road length,along with unathorised encroachment on road space,lack of traffic.congestion is travel time or delay in excess of that normally incurred under light or free flow travel conditions.

Present study is aimed to understand the mixed traffic characteristics of rural roads. The present study is an attempt to study different parameters such as capacity, level of service, vehicle to capacity ratio and Peak hour traffic at mid-block and Peak hour traffic, volume at an intersection. For this case study a **mid-block** is selected between two towns **MYDUKUR- KADAPA** and a **T-intersection** at **KOTHAPALLI** by pass road in **PRODDATUR** are selected for study purpose. Geometric details were collected by manually counting method survey from 8am to 6pm and the classified count of vehicles is done. The volume capacity ratio is found and to determination of peak hour traffic.

IndexTerms **- Component,formatting,style,styling,insert.**

I. INTRODUCTION

1.1. GENERAL

An efficient transportation system is the life line for economic development of any Metropolis. The transportation system of a country reflect its economic and social development. India being a developing country, it is natural that as the population increases the economy improves and the per capita income increases. Therefore purchasing power of people also increases. This leads on increase in personalized passenger vehicles, and other transportation vehicles. For these increasing percentage of vehicles, the roads and its geometric properties has not been modified. Hence, these are resulting in many traffic problems.

Mydukur and kadapa are one of the biggest and developing towns in andrapradesh. One of the special features of the traffic problem in two towns is a very poor hierarchy of roads. Shops and establishments open directly on to highways and ring roads the peculiar transportation problem of the town have been created mainly by the phenomenal growth of population. The stripping features of kadapa Urban Growth is concentration of multi-storeyed urban fringe and the negligence of basic civic amenipies and infrastructure facilities.

1.2UNPLANNED DEVELOPMENT

The present day town traffic problem is the cumulative effect of various factors such as high density of population is core areas, lack of efficient Public Transport System. Increasing number of personalised passenger vehicles and mainly due to un-planned expansion of two towns.

These all above mentioned factors causing various traffic problems such as frequent traffic jams and high incidences of road accidents

1.3NEED FOR TRAFFIC STUDY

In Mydukur and kadapa the present situation of congested roads is causing problems to road udders. It is mainly due to the increase in vehicular population andinadequate road facilities. And the result of this is frequent traffic jams, accidents and increase in noise and air pollution levels.

To find a solution to this problem, the present study was selected, as a preliminary study, so that based on the success achieved here, it could be used at different intersections in the city and help to reduce the traffic congestions, accidents and also to provide an orderly movement of traffic.

The object of study chosen is a highway intersection which which has lots of commercial and creational activity in and around. As a result of this, the traffic and human activity at the intersection has gone up and this has been, reflected in the traffic volume counts.

2.1Population and Sample

2.2.1.Volume/flow:

The total number of vehicles that pass over a given point or section of a lane or road way during a given time interval. It is the actual number of vehicles observed or predicted to passing point during a given interval.

2.2.2.Rate of flow:

The equivalent hourly rate at which vehicles pass over a given point or section of a lane or roadway during a time interval less than 1hr. Usually 15min.

2.2.3.AverageDailyTraffic (ADT):
The volume during a given time period divided by the number of days in that time period and expressed in terms of vpd.
2.2.4. Average Annual Daily Traffic (AADT):
It is the total yearly volume divided by the number of days in a year and expressed in terms of vapid.
3 Data and Sources of Data
3.1.1Location:
Location of the spot for traffic volume survey was chosen toMydukur to Kadapa. And betweenmidblocksareKummariKotalu, Nandipadu, Patimedhapalle, Kothapalle, Chinamasapalle, Kothapeta T-juction near Proddutur. Vehicles were counted both up and down directions.
3.1.2. Date: Date for volume was collected on March 11, 2018 to march 19, 2018. It was Wednesday to Wednesday.**6.3. Time:**
Time of date collection for Volume study: 8:00 am to 11:00am and 4:00 pm to 8:00pm.
3.1.3. Whether condition: It was a humid day. Sky was parity cloudy. At the time of data collection it was drizzling for a while.
3.1.4. Observation: Classified vehicle counts.
3.1.5. Method: Direct manual method.
3.1.6. Duration: Every 15 minutes.
3.1.7. Equipment: Hand counter, Tally sheet, Clip board etc.
3.1.8. Number of enumerators:FOUR
4 Theoretical framework
Intersection is an area shared by two or more roads. This area is designated for the vehicles to turn to different directions to reach their desired destinations. Its main function is to guide vehicles to their respective directions. Traffic intersections are complex locations on any highway. This is because vehicles moving in different direction wan to occupy same space at the same time. In addition, the pedestrians also seek same space for crossing. Drivers have to make split second decision at an intersection by considering his route, intersection geometry, speed and direction of other vehicles etc. A small error in judgement can cause severe accidents. It also causes delay and it depends on type, geometry, and type of control. Overall traffic flow depends on the performance of the intersections. It also affects the capacity of the road. Therefore, both from the accident perspective and the capacity perspective, the study of intersections very important for the traffic engineers especially in the case of urban scenario.
4.1 Conflicts at an intersection:
Conflicts at an intersection are different for different types of intersection. Consider a typical four-legged intersection as shown in figure, the number of conflicts for competing through movements are 4, while competing right turn and through movement are 8. The conflicts between right turn traffics are 4, and between left turn and merging traffic is 4. The conflicts created by pedestrians will be 8 32taking into account all the four approaches. Diverging traffic also produces about 4 conflicts.

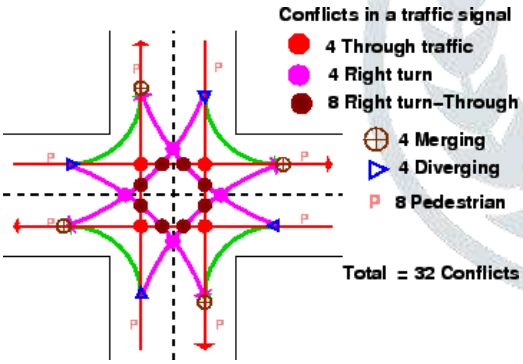

Fig 1: Conflicts at an intersection

4.2 Active control:
Active control implies that the road user will be forced to follow the path suggested by the traffic control agencies. He cannot manoeuvre according to his wish. Traffic signals and grade separated intersections come under this classification.
Traffic signals: control using traffic signal is based on time sharing approach. At given time, with the help of appropriate signals, certain traffic movements are restricted where as certain other movements are permitted to pass through the intersection. Two or more phases may be provided depending upon the traffic conditions of the intersection. When the vehicles traversing the intersection is very large, then the control is done with the help of signals. The phases provided for the signal may be two or more. If more than two phases are provided, then it is called multiphase signal. The signals can operate in several modes. Most common are fixed time signals and vehicle actuated signals. In fixed time signals, the cycle time, phases and interval of each signal is fixed. Each cycle of the fluctuating traffic.
4.3Grade separated intersections:
As we discussed earlier, grade-separated intersections are provided to separate the traffic in the vertical in the grade. But the traffic need not be those pertaining to road only. When a railway line crosses a road, then also grade separators are used. Different types of grade-separators are flyovers and interchange. Flyovers itself are subdivided into overpass and underpass. When two roads cross at a point, if the road having major traffic is elevated to a higher grade for further movement of traffic, then such structures are called overpass. Otherwise, if the major road is depressed to a lower level to cross another by means of an under bridge or tunnel, it is called under-pass. Interchange is a system where traffic between two or more roadways flows at different

levels in the grade separated junctions. Common types of interchange include trumpet interchange, diamond interchange and cloivereaf interchange.

4..4 Channelized intersection:

Vehicles approaching an intersection are directed definite paths islands, marking etc. and this method of control is called channelization. Channelized intersection provides more safety and efficiency. It reduces the number of possible conflicts by reducing the area of conflicts available in the carriageway. If no channelizing is provided the driver will have less tendency to reduce the speed while entering the intersection from the carriageway. The presence of traffic islands, markings etc. forces the driver to reduce the speed and becomes more cautious while maneuvering the intersection. A channelizing island also serves as a refuge for pedestrians and make pedestrian crossing safer. Channelization of track through a three-legged intersection (refer figure 5) and a four-legged intersection (refer figure 6) is shown in figure.

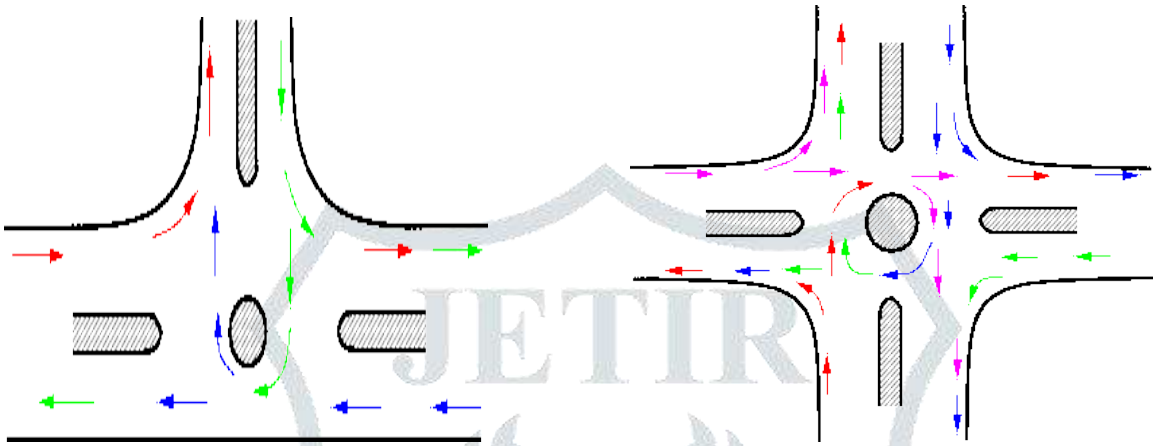

Fig. Channelization of traffic through a three-legged and four-legged intersection

4.5ROTARY INTERSECTION

A rotary intersection or traffic rotary is an enlarged road intersection where all converging vehicles are forced to move round a large central island in one direction clock wise directional they can weave out of traffic.

4.6TRAFFIC LIGHTS

The traffic light, also known as traffic signal, stoplight, traffic lamp, stop and go-lights, robot or semaphore, is a signaling device positioned at a road intersection, pedestrian crossing, or other location. Its purpose is to indicate using a series of colors (Red-Amber-Green) specific movement to drive, ride or walk, using a universal color code.

4.7FLYOVERS

A high-level overpass, a bride, road, railway or similar structure that crosses over another road is called a flyover.

5.RESEARCH METHODOLOGY

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample of the study,Data and Sources of Data, study's variables and analytical framework. The detailsare as follows;

Mehods for volume survey:

There are two major methods of counting vehicle for volume survey.

They are – I) Manual Counting Method, and II) Automatic Counting Method.

5.1 Manual Counting Method:

In this method, Vehicles are counted manually. There are two methods of a) DirectMethod, and b) Indirect Method

5.1.1) DirectMethod: Data is counted by using hand tally and manual counters/enumerators.

Advantages:

1) By this method traffic volume as well as vehicle classification and turning proportions can be obtained.

2) Data can be used immediately after collection.

Disadvantages:

1) This method is not practicable for long duration count and when flow is high.

2) Error is common especially when volume is high.

3) Count cannot be cross checked.

4) Count cannot be done in bad weather.

5.1.2) Indirect method: In this method, data is collected using video camera. Video is captured for long time and data is collected later by rewinding.

Advantages:

1) Besides traffic volume, several traffic parameters can be obtained from recorded film.

2) Data can be cross checked and quality can be assured

3) This method is applicable when volume is high.

4) It is suitable for non-lane based traffic operation.

Disadvantages:

1) A suitable elevated place is required for filming operation.

2) Datacannot be used immediately after collection.
3) Data must be manually transcript of recorded film.
4) This process is time consuming and tedious. Because of limitation of capacity of film, it is not suitable I overcast days.

5.2. Automatic Counting Method:

In this method, vehicles are counted automatically without any human involvement. There are two techniques of automatic counting:

A) Contact system based on pneumatic, mechanical, magnetic or piezo-electric method and
b) Contactless system based on electrical/optical, ultra sound/infra-red radar, micro wave, CCTV/video image processing method etc.

Advantages:
1) This method is suitable for long duration or count
2) It is used as permanent counting station.
3) It does not need manpower and is free from human error.

Disadvantages:
1) Itrequires strict lane discipline.
2) Non motorized vehicles are hard to detect by this method.
3) Detailed classification of vehicle is not possible.

5.2. Counting Periods:

Vehicles can be counted for any duration. Duration of count depends on the objective of data collection. For traffic control and management or operational studies short duration count at peak period is conducted. For planning and design purpose, long duration count is conducted.

The above two methods we are selected Manual method in Direct method.

VI. RESULTS AND DISCUSSION

6.1 Results of Descriptive Statics of Study Variables

Table 6.1: Descriptive Statics

Time		Motorized passenger vehicles					Motorized Goods vehicles				Human powered		JCB	Tractors	PCUs
From	To	2 Wheelers	3 Wheelers	Cars/ jeeps	vans/Mini buses	Buses	LCVs	MAVs	Trucks	2 axle trucks	cycles	Animal drive			
8:00	10:00	105	20	34	7	9	17	14	13	10	0	0	0	5	288
10:00	12:00	66	22	26	8	8	10	12	12	8	0	0	0	1	223
12:00	15:00	42	15	29	1	9	6	12	13	11	0	0	0	1	205
15:00	16:00	54	14	28	7	13	7	4	5	5	0	0	1	0	168
16:00	17:00	55	27	58	6	9	8	11	12	9	0	0	0	0	244
17:00	18:00	70	17	26	5	12	8	10	9	4	0	0	0	0	193
18:00	19:00	76	19	30	8	11	6	9	8	7	0	0	0	0	201

Table:percentage of vehicles location : kumarakotalla date :15-03-2018

S.NO	CLASS OF VEHICLES	PERCENTAGE
1	2 wheelers	38.04
2	3 wheelers	11.18
3	Cars/jeeps	19.19
4	Vans/Minibuses	3.39
5	Buses	6.88
6	LCVs	4.36
7	MAVs	5.44
8	Trucks	6.09
9	2 axle trucks	4.80
10	Cycles	0.12

11	JCB	0.04
12	Animal drive	0.02
13	Tractors	0.44

SATURATION FLOW RATE

Saturation flow is very important road traffic performance measure of the maximum rate of flow of traffic.

S = 990+288TL+8.5SL-26.8G

Where

S=saturation flow rate (vehicle/h/lane)

TL=Number of through lanes (1 or 2)

SL=Speed limit (60 or 80)

G = Gradient(%)

When applying theideal conditions (TL = 2,SL = 80 and G = 0),a base rate of 2246 is suggested. If, however, the general speed limit of urban areas of 60km/h is used a value of 2076 will apply.

The effects of speed limit,gradient and number of though lanes on the saturated flow rate are much greater.

ANNUAL AVERAGE DAILY TRAFFIC (AADT):

	8:00 - 9:00	9:00 -10;00	10:00 – 11:00	11:00 - 12:00	12:00-13:00	16:00 -17:00	17:00 – 18:00	18:00 – 19:00
1) HOURLY	18.8	17.11	18.52	18.71	16.71	14.84	14.52	
2) DAILY	7.012	7.012	7.012	7.012	7.012	7.012	7.012	
3) MONTHLY	0.578	0.578	0.578	0.578	0.578	0.578	0.578	
ADDT	23746	23401	22917	25521	27618	25804	25048	

AVG AADT = 24423

FiguresandTables

"**Figure 1**" **Kothapali circle intersection**

"**Figure 2**" **kumarakotala mid block**

Table : Shows suggested PCU factors for rural intersection equivalents.

S.NO	VEHICLES CLASS	PCU VALUES
1	TWO WHEELER AUTO MOBLILE	0.4
2	AUTO RICKSHAW	0.5
3	CAR AND JEEP	1
4	BUS	3
5	MINI BUSES	2.2
6	LCVs	1.5
7	MAVs	2.2
8	TRUCKS	4.5
9	PEDAL CYCLE	0.5
10	BULLOCK CART	4.6
11	TRACTOR	4.5

Table 2: PCU EQUIVALENTS FACTORS SUGESTED BY THE IRC.

S.NO	VEHICLE CLASS	EQUIVALENCY FACTORS
1	CAR,TEMPO,AUTORICKSHAW	1.0
2	BUS AND TRUCK	3.0
3	MOTOR CYCLE,PEDAL CYCLE	0.5
4	CYCLE RICKSHAW	1.5
5	SMALL BULLOCK CART	6.0
6	HORSE DRAW CART	4.0
7	LARGE BULLOCK CART	8.0

Table 3: WIDTH OF PAVEMENT OR CARRIAGE WAY

S..no	Class of road	Width of pavement OR carriage way
1	Single lane	3.75m for all roads and may be decreased to 3m for village roads
2	Two lanes without raised kerbs	7m
3	Two lanes with raised kerbs	7.50m
4	Intermediate carriageway	5.50m
5	Multi-lane pavements	3.50m per lane

Table 4:CAPACITY OF DIFFERENT TYPES OF ROADS

S.no	Capacity expressed in P.C.U In both directions	Suitable carriageway
1	1000	Single lane road with earthen shoulders
2	2500	Single lane road with at least 1m wide all-weather shoulders
3	5000	Roads with intermediate lanes of width 5.50m earth shoulders
4	10000	Two lanes road with 7m wide carriageway and earthen shoulders
5	20000 to 30000	Four lanes divided highway

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