A Study and Analysis of Existing Road Junction

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Abstract - **Road junction is the point at which more than two roads are connecting at the point. The junction is analyzed by Volume Count Survey. The volume count survey is one of the methods of finding out the Traffic volume. The junction which is situated in Villupuram is taken as study area. In this junction, the volume count survey is taken for 15 days for determine the Passenger Car Unit and the Level Of Service for the junction is computed. To improve the junction, some suggestions are suggested.**

Keywords:- Volume count survey, Peak hour, Passenger car unit, Level of service

I.   INTRODUCTION

A junction, when discussed in the context of transport, is a location where Traffic can change between different routes, directions, or sometimes modes, of travel. The junction may be defined as the point of road at which two or more roads connecting at a point.

a.   *Types of junction*

The most basic distinction among junction types is whether or not the roads cross at the same or different elevations. More expensive, grade-separated interchanges generally offer higher throughput at higher cost. Single-grade intersections are lower cost and lower throughput. Each main type comes in many variants.

1.   *Interchange*

At interchanges, roads pass above or below each other, using grade separation and slip roads. The terms motorway junction and highway junction typically refer to this layout. They can be further subdivided into those with and without signal controls.

2.   *Intersection*

At intersections, roads cross at-grade. They also can be further subdivided into those with and without signal controls.

b.   *Study Area*

Viluppuram is the capital of Viluppuram district, the largest district in the state of Tamil Nadu, India. The town serves as a major railway junction, and National Highway 45 passes through it. With agriculture as its main source of income, Viluppuram's literacy rate has improved since the early 1980s to about 75%. In 2011, Viluppuram 's population stood at 96,253.
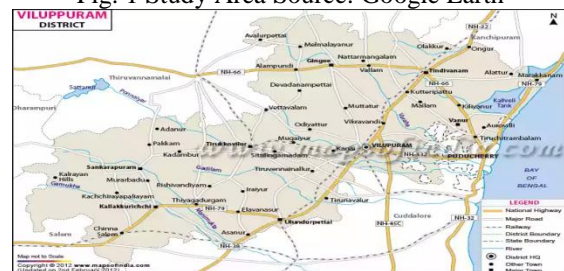
Viluppuram is located in the far southeast part of India, 40 kilometers (25 mi) west of the Bay of Bengal. The area contains metamorphic rocks formed by pressure and heat belonging to the granite-like gneiss family. There are also three major groups of sedimentary rocks, layers of particles that settled in different geological periods. Viluppuram's GPS location is 11° 56' N 79° 29' E.

Villupuram is the one of the most popular city in tamilnadu. In this project, an existing road junction is studied and analyzed by using volume count survey.. Some information are to be carried before the project has started.

The greener time of the Traffic flow from Chennai, Trichy, thirukovillur, Pondicherry are 20 sec, 25 sec, 15 sec, and 20 sec respectively. CCTV is provided from junction to junction near veeravaliamman temple. A police station was provided near junction. Electric circuit system doesn't properly maintain especially the covering of electric board. The figure 1 shows the study area.

Fig. 1 Study Area Source: Google Earth

II.   OBJECTIVES
The followings are the major objectives of this project
- To study and analyze the existing road junction by volume count survey,
- To assess the Traffic condition in the study area,
- To give suggestions to improve the junction,

To enhance the public transport by decreasing the private transport.

III.   OBSERVATION AND CALCULATION

The observations of volume count survey were done by tally sheets. Figure shows the plan view of road junction and location of surveyor in the road junction at Villupuram. This junction was situated between new bus stand and old bus stand. In this junction, signal system was provided on may 2014. After this provision, no accidents are done till now. It consists of four roads from Chennai, Pondicherry, Trichy and Thirukovillur.

The followings are the observations were to be taken in the junction for every 15 minutes intervals in the peak hour morning 07:30 to 09:30 and evening 16:00 to 18:00 for fifteen days. The maximum of the fifteen days

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survey data was taken but we add a single survey. This table 1 shows the traffic volume survey.

Table 1 Traffic volume survey

TRAFFIC VOLUME SURVEY									
Intersection : Villupuram (signal)			Shift : morning			Date : 06/02/16			
Direction: from Trichy			Weather : Sunny			Sheet No : 1/1			
	No. of Fast Moving Vehicles					**No. of Slow Moving Vehicles**			
Time	Buses	Trucks & Delivery Vans, Lorry	Container Trailers	Car, Jeep, Vans	Auto Rickshaw	Motor Cycle, Scooter, Mopeds	Cycles	Cycle Rickshaw	BD/HD Carts
07:30 to 07:45	36	1	1	30	22	195	8		1
07:45 to 08:00	30	6	0	26	31	160	7	1	1
08:00 to 08:15	34	5	0	36	47	235	10	1	0
08:15 to 08:30	25	7	2	37	44	218	15	1	0
08:30 to 08:45	40	14	0	57	65	293	17	0	0
08:45 to 09:00	23	13	0	47	45	229	26	0	1
09:00 to 09:15	29	10	0	51	50	292	21	1	2
09:15 to 09:30	36	20	0	51	53	276	15	1	0

a. Peak Hour

An hour whose PCU is higher is taken as peak hour of the existing road junction. By this way, 08:30 to 09:30 is taken as peak hour. The vehicle travelled on the peak hour is shown below on table 2 and figure 2.
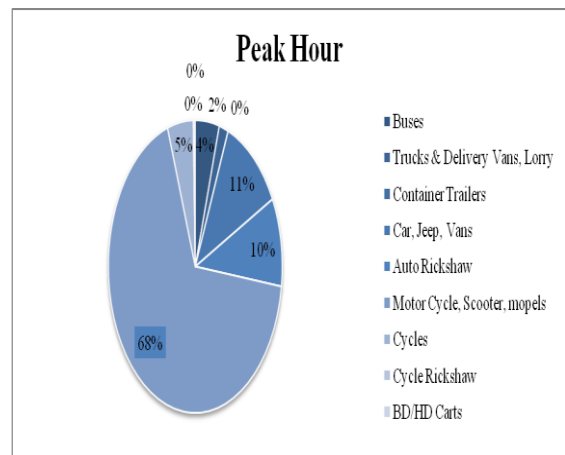
Table 2 Vehicle travelled on peak hour

Peak Hour (08:30 to 09:30)	Buses	Trucks & Delivery Vans, Lorry	Container Trailers	Car, Jeep, Vans	Auto Rickshaw	Motor Cycle, Scooter, mopets	Cycles	Cycle Rickshaw	BD/HD Carts
Total	360	138	1	909	795	5481	389	8	22

b. Peak Hour Factor

✓ It measures the relationship between the peak 15 minutes of Traffic compared to total vehicle volume over the entire peak hour

✓ It is the Ratio of total hourly Traffic volume against the busiest 15 minute interval

✓ Peak Hour Factor = Peak volume/(4 times of the Maximum of 15 minutes Value) = 4658/(4*1232)

$$= 0.9452$$

Fig 2 vehicle travelled on peak hour

c. Volume / Capacity Ratio

Volume/capacity = 4658/1000

=4.658

The capacity of the road junction is taken from the table of Traffic engineering and transport planning by L.R. Kadiyali.

Based on the volume/capacity ratio, the junction comes under Level Of Service F

IV. RESULT AND DISCUSSION

Initially, the study area has been chosen in Villupuram. Then the inventory survey has taken for gathering some details of that junction. Then Traffic volume survey has conducted in this junction. In this project, PCU value for junction Traffic flow is computed by the using Traffic volume count survey data. The peak hour is held from 08:30 am to 09:30 am which is also obtained by survey. The peak volume per hour is computed, that will be taken from hourly peak hours. The peak hour factor is calculated as 0.9452. Then the volume/capacity ratio is found as 4.658 based on this value, the level of service of this junction is computed as "F". To improve this, some suggestions are suggested.

V. CONCLUSION

In this project, the existing road junction which was located at Villupuram has studied and analyzed. This junction has been analyzed by volume count survey (manual method). Based on the survey, Passenger Car Unit has found and the Level Of Service has found by volume/capacity ratio. Then the junction has come under Level Of Service F, based on volume/capacity ratio. To improve this junction, some suggestions have suggested.

VI. SUGGESTIONS

Followings are the some suggestions have granted to improve that existing road junction.

- ✓ Increase the width of the road – by increasing the width of the road, increase the capacity of the junction. And the volume / capacity ratio is decreased. Hence the LOS is improved
- ✓ Improve the lateral clearance – by improve the lateral clearance, the visibility of the user is improved. Hence it will increase the free flow of the junction which results in decrease the accident rate.
- ✓ By providing effective public transport system, the private transport will be diverted with the public transports which enhance the free flow with high capacity.

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