

Level of Service Analysis for Signalized Intersection and Unsignalized Intersection by using PTV VISSIM Software

Rakshitha S¹, Dr P Prakash² Dr Vivek R Das³

¹P.G. Scholar, Department of CTM & Highway Technology, DSCE, Karnataka, India

² Professor & Head, Department of CTM & Highway Technology, DSCE, Karnataka, India

³ Professor of CTM & Highway Technology, DSCE, Karnataka, India

ABSTRACT

Road networks are design for elimination traffic congestion, decrease in vehicle delays, increase in the level of service, increasing in traffic queue at intersections and increasing in the road safety are subjected to smooth traffic flow. In the city like Bangalore increase in the vehicle numbers leads to congestion in the road network in certain places, resulting in the decrease in the Level of service and increase in the vehicle operation cost. These problems should get solved by providing better infrastructure planning in a particular intersection to improve Level of service. PTV VISSIM traffic modeling helps in simulating real city traffic, which can manage traffic, design of intersections and suggesting alternative routes. In order to improve the Level of service PTV Vissim software is used.

Keyword: Level of service, Traffic congestion, Road safety, Traffic queue, vehicle operation cost and PTV VISSIM

I. INTRODUCTION

Currently, urban transportation has become great burden to the metropolitan cities in the developing country like India. With rapid increase in the vehicle demand resulting in the poor performance of intersection and also increase in the demands like parking facilities with existing roads. Bangalore is growing rapidly with software and other medium and small industries results in the job opportunities. With the increase in the population in the city there will corresponding demand in the vehicle numbers. Transport operators, companies, entrepreneurs and tourists are directly or indirectly affect the flow of traffic. Carbon dioxide, Sulphur dioxide, carbon monoxide, nitrogen oxides and particulate matter (PM) are air pollutants caused by transportation sector. Private mode of transportation among the youngsters results in the increase in the two wheelers. Therefore sustainable traffic management is required to achieving an efficient transport planning.

2. OBJECTIVES OF THE STUDY

- To study the heterogeneous traffic condition in the controlled and uncontrolled intersections.
- To determine PCU values for controlled and uncontrolled intersections.
- To determine Queue length, Vehicle Delays and Level of Service in the controlled intersection.
- To determine Arithmetic speed and Harmonic speed for controlled and uncontrolled intersections.
- To determine Acceleration and Occupancy Rate for controlled and uncontrolled intersections

3. CHARACTERISTICS OF STUDY AREA

Signalized intersection and Unsignalized intersections were selected for the study. Signalized intersection is of actuated signals. Study area are selected based on road geometries, traffic movement and accessibility to business area (Jayanagar 4th Block)



Fig -1: Study Area Map

4. DATA COLLECTION AND ANALYSIS

4.1 Signalized Intersection

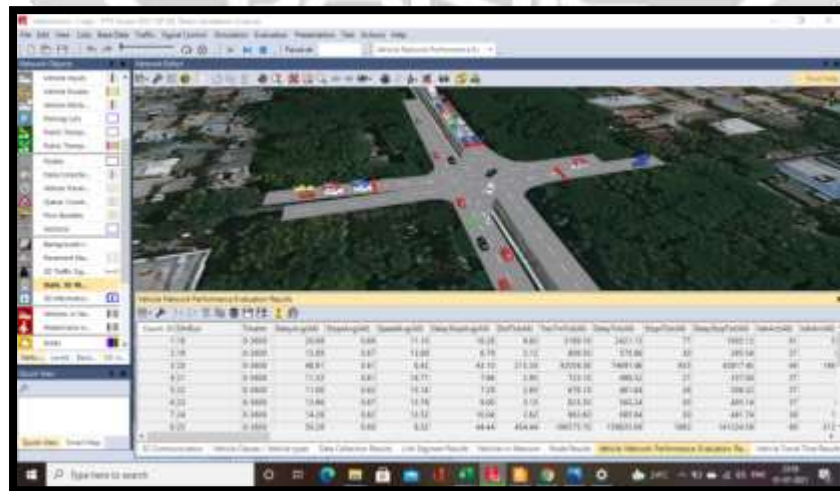


Fig-2: Simulation runs at the Signalized intersection – 1

Table 4.5: LOS results for Signalized Intersection - 1

Time Interval	Movement	Queue Length	Queue Length Maximum in mts	Vehicles in nos.	LOS	Vehicles Delay in Sec	Stop Delay in Sec	Stops in Sec
0-3600	South End to NMKRV	24.01	41.41	0	LOS_A	-	-	-
0-3600	South End to Yediur	24.01	41.41	0	LOS_A	-	-	-
0-3600	South End to RV road	47.13	69.18	875	LOS_E	56.81	51.61	0.62
0-3600	NMKRV to South End	89.58	115.25	233	LOS_F	93.92	85.18	1.05
0-3600	NMKRV to RV road	89.58	115.25	250	LOS_F	93.37	84.94	1.05
0-3600	NMKRV to Yediur	89.58	115.25	509	LOS_F	94.42	85.92	1.05
0-3600	RV to NMKRV	3.12	36.7	0	LOS_A	-	-	-
0-3600	RV to Yediur	3.06	36.54	966	LOS_A	3.51	1.71	0.1
0-3600	RV road to South End	7.63	36.37	272	LOS_C	29.8	24.91	0.59
0-3600	Yediur to RV Road	2.62	27.73	0	LOS_A	-	-	-
0-3600	Yediur to NMKRV	25.31	115.25	3105	LOS_D	49.75	44.57	0.59

4.2 Unsignalized Intersection – 2



Fig 3: Simulation runs at the unsignalized intersection – 2

Table 4.5: LOS results for unsignalized Intersection - 2

Time Interval	Movement	Queue Length	Queue Length Maximum in mts	Vehicles in nos.	LOS	Vehicles Delay in Sec	Stop Delay in Sec	Stops in Sec
0-3600	WB	4.01	18.87	1016	LOS-C	20.72	0.76	1.97
0-3600	SB	27.72	41.04	992	LOS-D	32.78	1.02	2.72
0-3600	NB	10.09	23.61	978	LOS-E	49.59	1.75	4.36
0-3600	EB	13.94	41.04	2986	LOS-D	34.19	1.17	3

5. CONCLUSIONS

The comparison was with signalized and unsignalized intersection thought the same network distance showed better results.

- The results of data collection at some predefined points shows an increase in the queue length at NMKRV to South End road, NMKRV to RV road and NMKRV to Yediur found to be 89.58 meters.
- The maximum queue length in meters found to 115.25 meters.
- The movement of vehicles from NMKRV to South End road, NMKRV to RV road and NMKRV to Yediur found to be 93.92, 93.37 and 94.42 respectively in Vehicles Delay in Seconds.
- Level of service from NMKRV to South End road, NMKRV to RV road and NMKRV to Yediur (Signalized intersection) found to be LOS – F.
- The maximum queue length in meters found to be 27.72 meters.
- Level of service in North Bound (NB) for unsignalized found to be LOS- E
- The movement of vehicles in North Bound has maximum vehicle delay with 49.59 Seconds.

5. ACKNOWLEDGEMENT

I would like to extend my sincere thanks to **Dr. Vivek R Das**, Professor and Dr. P PRAKASH, Professor and Head, Department of CTM, DSCE, Bengaluru for his kind attitude, guidance, keen interest, immense help and constant inspiration in preparation of this paper.

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