

Traffic Congestion Solution at Angamaly

Deepthy K V, Bhavya Jose,
 Jesna E Jose, Soumya Joseph,
 UG Students,
 Department of civil Engineering,
 Christ Knowledge City,
 Muvattupuzha,Ernakulam.

Er.Reshma Theresa,
 Asst. Professor,
 Department of civil Engineering,
 Christ Knowledge City,
 Muvattupuzha,Ernakulam.

Abstract: Transportation is one of the most important components of urban development and an efficient network of transportation services is required to support the complex activity patterns within cities. Transportation can promote or hinder development. Now a day traffic congestion is the most complex issue of transportation due to increase in high ownership of vehicles. Urban transportation planning contains a sequence of activities including analyzing the present condition of the area such as the land use patterns and the travel demand produced from this land developments and forecasting of these land use, population, travel demand etc. The purpose of this planning is to estimate the traffic demand and to suggest several transportation alternatives that are being considered for implementation. Angamaly is one of the fastest growing town in Kerala, which is well connected by all means of transport. The town lies at the intersection of Main Central Road and National Highway and it is enriched with cultural and devotional centers. These factors improve the importance of Angamaly as well as the traffic congestion. Future expansion of metro towards Angamlay also enunciates the need of well traffic system at Angamaly.

Keywords: Urban transportation planning; Traffic congestion; Traffic demand;

I.INTRODUCTION

Transportation is one of the most important components of a developing city and which is necessary for ensuring the growth of an urban area. An efficient network of transportation services is required to support the complex activity patterns within cities. Also there is a strong relation between transportation and city development.

The increased transportation demand requires an effective transportation planning process.

The fundamental purpose of transportation is to provide efficient access to various activities that satisfy human needs for a heterogeneous variety of societal groups. Therefore the general goal of transportation planning is to meet this need for mobility. Urban transportation planning contains a sequence of activities including inventing the present condition of the area such as the land use patterns and the travel demand produced from this land developments. Forecasting of these land use, population, travel demand are required for preparation of the development plans. The purpose of this travel-forecast of the urban transportation planning process is to perform a conditional prediction of travel demand in order to estimate the likely transportation consequences of the several transportation alternatives that are being considered for implementation. Department of Town and Country Planning, Government of Kerala has accorded sanction for

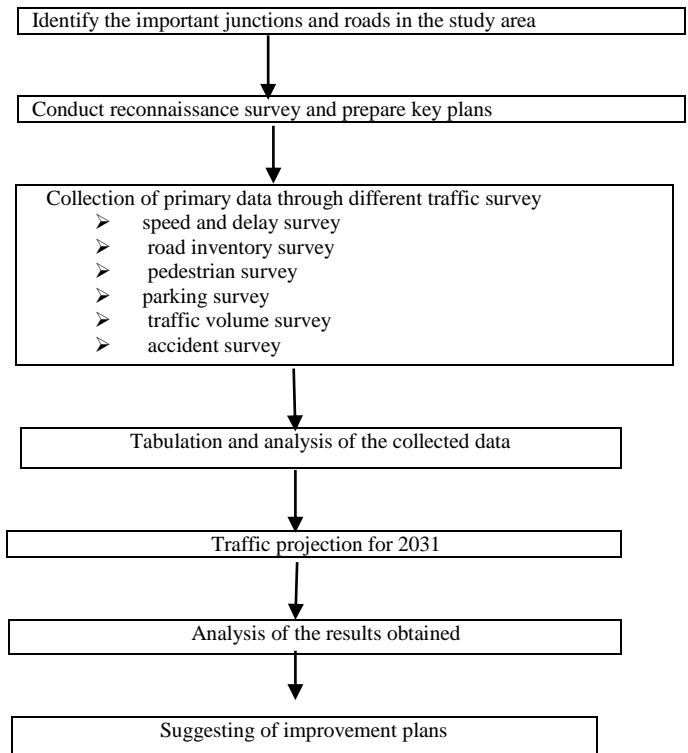
the preparation of Development Plan for Angamaly Municipality. As part of the scheme of preparation of development plan for the Municipality, a traffic and transportation study has to be carried out for the town and the same has been entrusted to the Department of Civil Engineering of Christ Knowledge City, Muvattupuzha.

The objectives of the study are as given below:

- (i) To assess the existing condition of road network and to identify the traffic bottleneck locations,(ii) To collect the traffic volume on selected roads and to assess the extent of shortfall of the road system,(iii) To collect the parking characteristics of the roads , (iv) To find the pedestrian crossing volumes in the main road,(v) To formulate a suitable road development plan keeping in view the growth potentials of the study area ,(vi) To prepare the suggestions and improvement plans for the study area by considering future developments of the city,(vii) Preparation of detailed engineering/structural design of the improvement proposals

The scope of the study is confined to Angamaly Municipal Town. The map of the study area is shown in Fig.1.1

II. METHODOLOGY



III. REPORT ORGANISATION

This report contains five chapters. The chapter 1 gives the introduction to the topic, the scope and objectives and methodology of the work conducted. The Chapter 2 contains the literature review of the various traffic survey conducted, details of the survey procedure and equations and relations used in the calculation. Chapter 3 covers the details of data collected through each surveys and its analysis. The data collected through field surveys and from different authorities are tabulated and analysed. Chapter 4 deals with the problems identified and their remedial measures by analysing the results obtained. In this chapter the various problems that are identified by the analysis stage are discussed and solution for each problem is suggested. Chapter 5 discusses the conclusions and limitations of the study conducted.

Reconnaissance Survey

A reconnaissance survey was conducted on 22-09-2015 to study the area and to get an overall idea about the existing traffic and transportation scenario.

Locations identified for traffic surveys

During the reconnaissance survey, locations and/or stretches were identified for conducting the Traffic volume survey, Speed and Delay survey, Parking Survey and Pedestrian Survey.

Intersections Chosen for the Study

The major intersections chosen for the study in Angamaly Municipal Town are listed below:

- (1) TB Junction
- (2) Manjapra Junction
- (3) LF Junction
- (4) Airport Junction
- (5) Signal Junction
- (6) Bank Junction

ROAD AND INTERSECTIONS

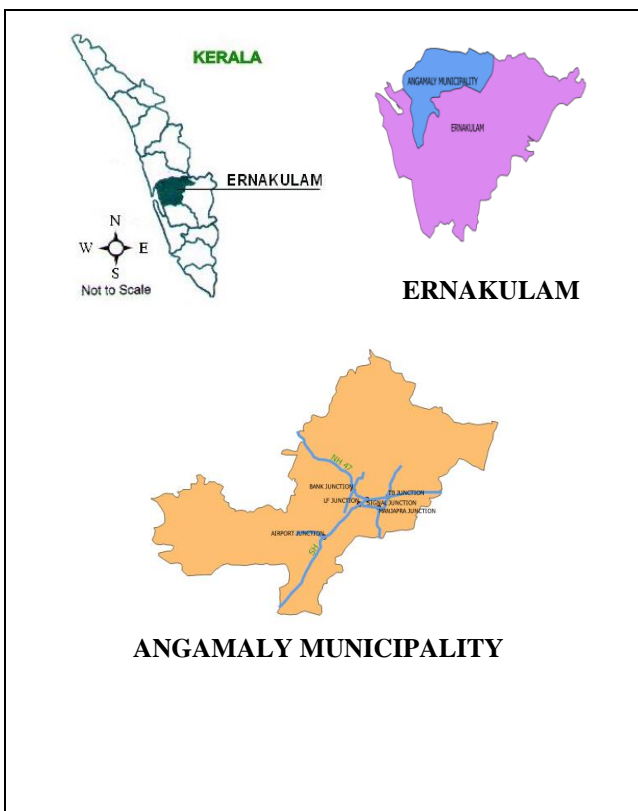


Fig.1 GIS Map showing study area

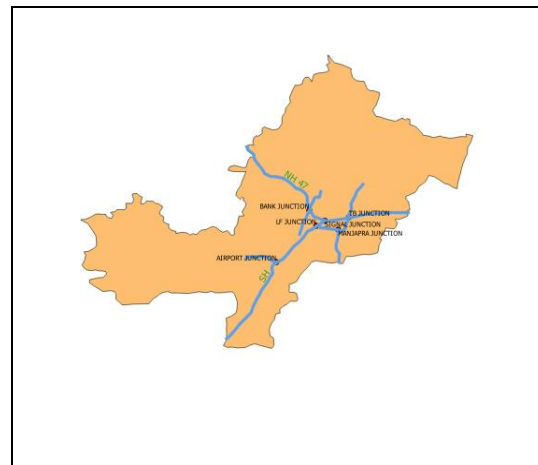


Fig.2 Map showing Roads and Intersections

IV. DATA COLLECTION AND ANALYSIS

The different data required for the study is collected through different traffic surveys. The team carried traffic surveys in different days by short term surveys. Due to the difference in day-to-day variations in the traffic flow the collected data is dependent on the road on which it is located.

During the reconnaissance survey salient features/problems were observed at the above junctions. These details along with their location sketches are given in Table 1




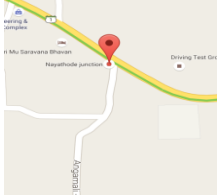
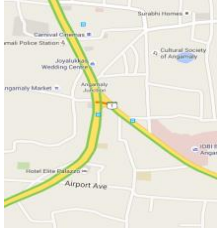
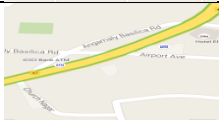
INTERSECTION	SALIENT FEATURES AND PROBLEMS INVOLVED	LOCATION MAP
T B Junction	<ul style="list-style-type: none"> • Intersecting NH and ODR • KSRTC bus stand is near the junction • No pedestrian crossings • Continues entry of KSRTC buses • High traffic volume 	
Mmanjapra junction	<ul style="list-style-type: none"> • Normally medium traffic volume • More congested due to present diversions • Intersection of 4 roads 	
L IF Junction	<ul style="list-style-type: none"> • Intersection of 3 roads • Pedestrian crossing is high • No zebra crossing is provided 	
AiAirport Junction	<ul style="list-style-type: none"> • Intersection of three roads • Traffic volume is medium • Mainly due to Airport 	
SiSignal Junction	<ul style="list-style-type: none"> • Intersection of SH and NH • Traffic volume is heavy • Pedestrian crossing is required 	
Bank Junction	<ul style="list-style-type: none"> • Intersection of 4 roads • Medium traffic 	

Table1.Salient features and major traffic problems identified at intersections

Pedestrian Survey

Arm wise pedestrian survey for all the major junctions of Angamaly study area has been conducted. The survey was carried out for duration of 6 hours ranging from time interval of 10.00 am to 05.00 pm to ascertain the morning and evening peak hour lateral and cross movement demands. The obtained pedestrian crossing volume is used for identifying the junctions with greater pedestrian crossing.

Table2. Arm wise Pedestrian crossing volume of each road stretch in intersectionsG5V4F

S I n o	Name of Location	Peak Hours	No. of Pedestrians			Juncti on Total
			Up	Do wn	Total	
1	TB Junction	8.30am-9.30am	178	127	305	1132
	1.Thrissur Road		238	345	583	
	2.Ernakulam Road		80	92	172	
	3.Manjapra Road		42	30	72	
	4.Vattaparamb Road	192	119	311	1276	
	1.Thrissur Road	4.15pm-5.15pm	328	415		743
	2.Ernakulam Road	83	77	160		
	3.Manjapra Road	38	24	62		
2	LF Junction	8.30am-9.30am	183	124	307	932
	1.Angamaly Road		238	187	425	
	2.Kalady Road		107	93	200	
	3.Manjapra Road		198	119	317	
	1.Angamaly Road	4.15pm-5.15pm	178	210	388	875
	2.Kalady Road		73	97	170	
	3.Manjapra Road					
3	Manjapra Junction	8.30am-9.30am	52	61	113	892
	1.LF Hospital Road		124	183	307	
	2.Angamaly Road		98	112	210	
	3.Manjapra Road		152	110	262	
	4.Market Road	4.15pm-5.15pm	72	58	130	900
	1.LF Hospital Road		172	133	305	
	2.Angamaly Road		105	84	189	
	3.Manjapra Road		167	109	276	
4	Airport Junction	8.30am-9.30am	97	65	162	309
	1.Angamaly Road		51	57	108	
	2.Kalady Road		21	18	39	
	3.Airport Road		58	73	131	
	1.Angamaly Road	4.15pm-5.15pm	98	64	162	344
	2.Kalady Road		28	23	51	
	3.Airport Road					
5	Signal Junction	8.30am-9.30am	128	193	321	1262
	1.Kalady Road		305	318	623	
	2.Angamaly Road		173	145	664	
	3.Aluva Road		321	343	372	
	1.Kalady Road	4.15pm-5.15pm	159	213	318	1414
	2.Angamaly Road		136	264	510	
	3.Aluva Road					
6	Bank Junction	8.30am-9.30am	374	323	697	1592
	1.Angamaly Road		298	317	615	
	2.Aluva Road		76	89	165	
	3.East Church Road		53	62	115	
	4.Basilica Church Road		385	368	753	
	3.Basilica Church Road		392	378	770	
	1.Angamaly Road	4.15pm-5.15pm	61	48	109	1769
	2.Aluva Road		81	56	137	
	3.East Church Road					
	3.Basilica Church Road					

Table 3.Parking survey

Name of Strech	Towards	2 wheel er	3 whee ler	C a r	B u s	T r u c k	Cy cle	Ot he rs
Signal to TB	Thrissur	23	10	28	0	2	1	0
	Ernakulam	34	2	32	0	0	0	0
TB to Manjapra	Manjapra	12	0	18	0	0	1	0
	Angamaly	17	3	14	0	0	0	0
Manjapra to LF	Kalady	24	0	27	0	4	2	0
	Angamaly	18	0	21	0	2	0	0
LF to Airport	Kalady	34	1	49	0	0	0	0
	Angamaly	28	0	41	0	0	0	0
LF to Signal	Kalady	26	0	39	0	0	0	0
	Angamaly	21	2	43	0	0	0	0
Signal to Bank	Aluva	33	5	47	0	0	0	0
	Angamaly	35	0	54	0	0	0	0

Out of 6 corridors the major parking percentage is by 4-wheelers and 2- wheelers. Highest parking is found at bank junction in Angamaly road. About 89 vehicles in the time interval of 10.0am to 12.0pm.Second highest parking is at LF junction in Kalady road, 84 vehicles. Least parking is at TB junction in Manjapra road.

Traffic volume survey

The capacity of urban roads to a great extend depends on capacity of intersections. Thus the intersections have an important role to play in efficient and smooth traffic flow in the network. The volume count at selected intersections was carried out and the existing condition of the road stretches and junctions are analysed. The results obtained after calculation are given below:

If the crossing movement exceed 150 passenger/hr for a junction signal is to be provided. And here the pedestrian crossings are larger at Bank junction, followed by TB junction.

Table 4. Traffic Volume In Major Junctions

NAME OF JUNCTIONS	NAME OF ARM	DIRECTION OF FLOW	PEAK HOUR VOLUME (PCU/HR)	PEAK HOUR TIME
Signal junction	Angamaly	L	1592	9.30am-10.30am
		S	2964	
	Aluva	S	1928	
		R	632	
	Kalady	L	928	
		R	1588	
Signal junction	Angamaly	L	2192	4pm-5pm
		S	1812	
	Kalady	L	790	
		R	1896	
	Aluva	S	2853	
		R	928	
L F junction	Kalady	S	1764	9.30am-10.30am
		R	864	
	Angamaly	L	188	
		S	1652	
	Manjapra	L	1094	
		R	186	
L F junction	Angamaly	L	152	4pm-5pm
		S	1186	
	Kalady	S	1618	
		R	617	
	Manjapra	L	1186	
		R	110	
T B Junction	Thrissur	L	897	9.30am-10.30am
		S	2247	
		R	621	
	Ernakulam	L	541	
		S	2625	
		R	1812	
	Manjapra	L	982	
		S	439	
		R	874	
	Vattapparambu	L	177	
		S	437	
		R	712	
T B junction	Thrissur	L	760	4pm-5pm
		S	3088	
		R	72	
	Ernakulam	L	208	
		S	3468	
		R	364	
Manjapra junction	Manjapra	L	500	
		S	3088	
		R	960	
	Vattapparambu	L	100	
		S	228	
		R	356	
Manjapra junction	L F hospital	L	57	9.30am-10.30am
		S	1266	
		R	838	
	Angamaly	L	918	
		S	2010	
		R	68	
	Manjapra	L	842	
		S	91	
		R	876	
	Market road	L	82	
		S	76	
		R	102	

Manjapra junction	L F hospital	L	891	4pm-5pm
		S	2291	
		R	54	
	Angamaly	L	784	
		S	2076	
		R	891	
	Manjapra	L	954	
		S	81	
		R	772	
Market road	L	73		
	S	94		
	R	99		
Bank junction	Angamaly	L	395	9.30am-10.30am
		S	2870	
		R	405	
	Aluva	L	353	
		S	3118	
		R	729	
	East church	L	638	
		S	398	
		R	763	
	Basilica church	L	876	
		S	487	
		R	548	
Bank junction	Angamaly	L	439	4pm-5pm
		S	2340	
		R	387	
	Aluva	L	289	
		S	2905	
		R	674	
	East church	L	692	
		S	363	
		R	736	
	Basilica church	L	631	
		S	463	
		R	474	
Airport junction	Kalady	L	65	9.30am-10.30am
		S	1179	
	Angamaly	R	598	
		S	1612	
	Airport	L	512	
		R	86	
Airport junction	Kalady	L	76	4pm-5pm
		S	1274	
	Angamaly	S	1392	
		R	614	
	Airport	L	642	
		R	90	

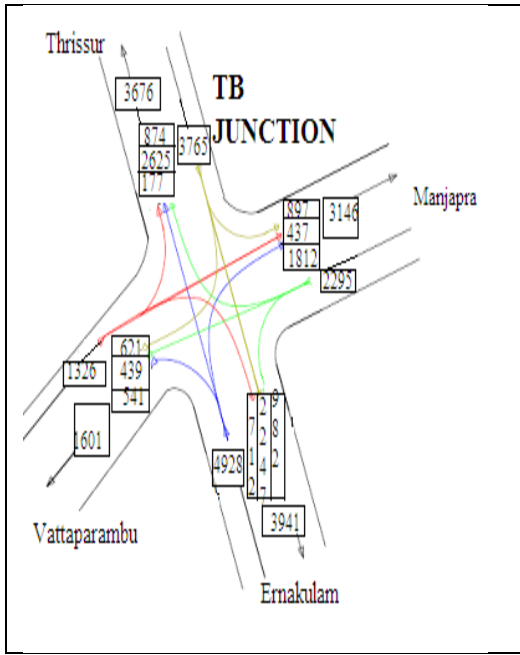


Fig.3 TB Junction

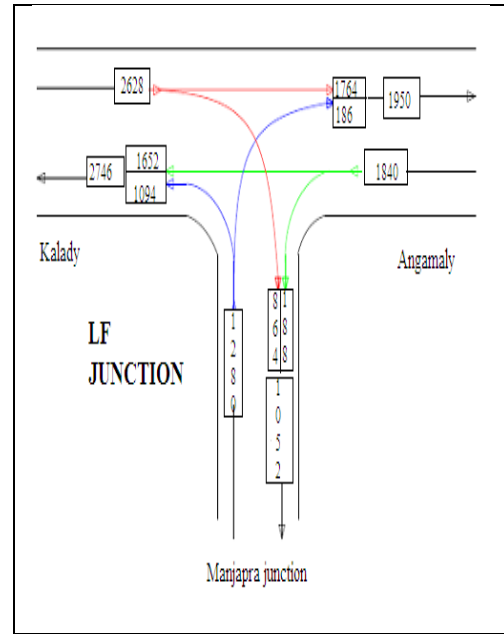


Fig.5 LF Junction

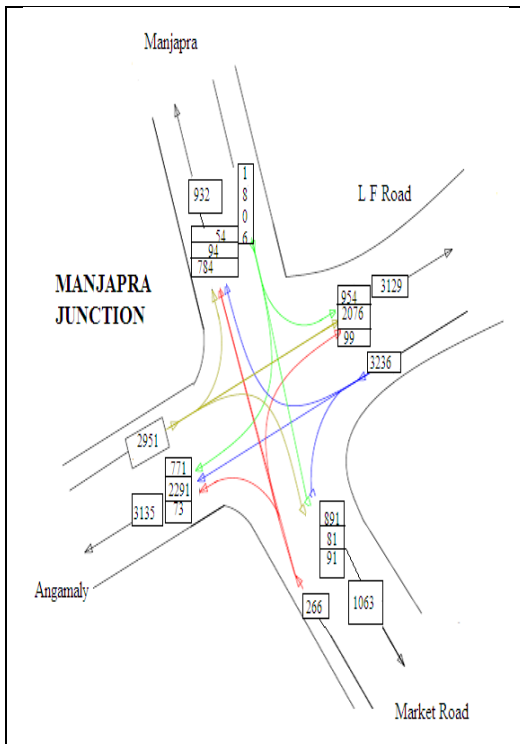


Fig.4 Manjapra Junction

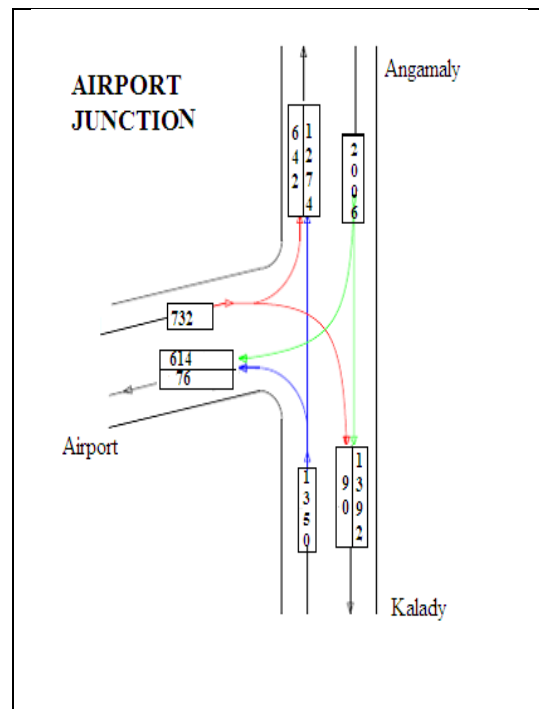


Fig.6 Airport Junction

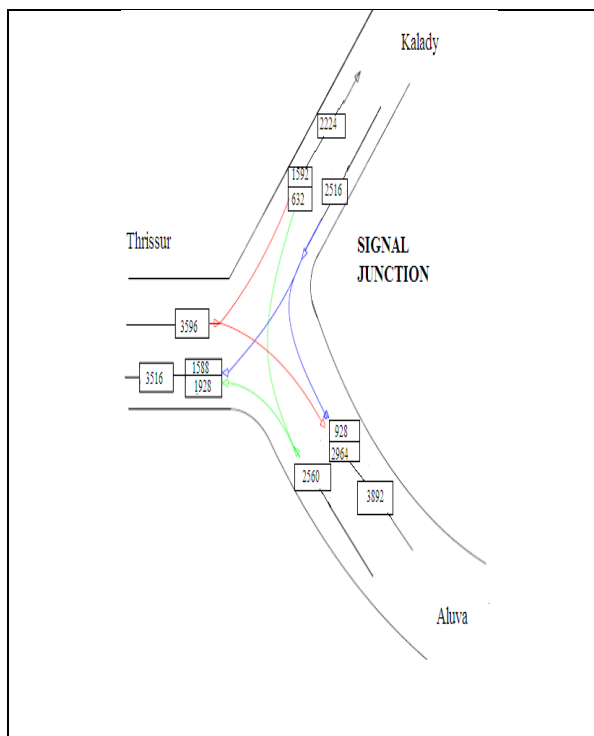


Fig.7 Signal Junction

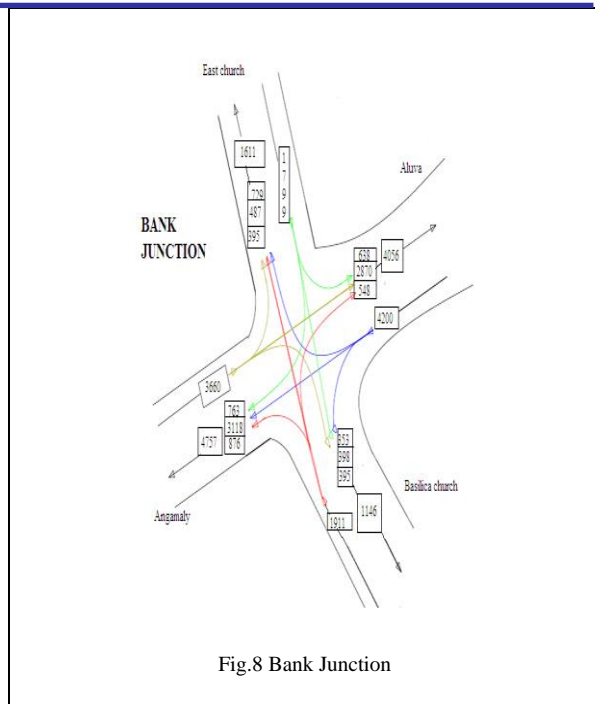


Fig.8 Bank Junction

Traffic volume is high at signal junction and TB junction due to intersection of NH and SH roads.

SUGGESTED SOLUTIONS

- Bye pass-specific class of vehicle
- Multilevel buildings –parking
- Car free days
- Rearranging school and office timings
- Rescheduling signal timings
- Overhead /Underground pedestrian crossings

V. CONCLUSION

Angamaly is one of the fastest growing towns in Kerala which is well connected by all means of transport. The town lies at the intersection of Main_Central Road and National Highway and it is enriched with cultural and devotional centers. These factors improve the importance of Angamaly as well as the traffic congestion. Future expansion of metro towards Angamaly also enunciates the need of well traffic system at Angamaly.

From the analyzed results of traffic surveys such as traffic volume survey, pedestrian survey, parking survey etc. suggestions for a new transportation network at Angamaly are proposed. First suggestion is the proposal of a bypass for a specific class of vehicle i.e. heavy vehicles which will decrease the traffic congestion at NH. A ring road that connects NH and MC Road is also suggested.

Overhead pedestrian crossing is necessary at signal junction and bank junction. As it is found that the parking area available is less than it is required, new parking methods are suggested such as multilevel car parking etc. Redesigning of signal system at TB junction is another important suggestion.

ACKNOWLEDGMENT

I convey my sincere thanks to Er. Reshma Theresa, Prof. Nabeesa K M(HOD of Civil Department) and my dear parents for their sincere support and constant guidance. At last but not least, I thank almighty for his constant blessings, showered on me.

REFERENCES

- [1] R.T. Kdiyali "Traffic Engineering" PAGE: 323-331
- [2] S.K.Ghanna, "Highway Engineering" Laxmi Publications, Chennai, India.
- [3] Amudapuram Mohan Rao, Kalaga Ramachandra Rao (2012) "Measuring Urban Traffic Congestion –A Review" *International Journal For Traffic and Transportation Engineering*
- [4] R. J. Smeed (1967) "Traffic Studies and Urban Congestion" *Inaugural address by the Professor of Traffic Studies at University College London*
- [5] J.Michael Thomson (1946) "Journal of Transport Economics and Policy" *Reflections on Economics of Traffic Congestion* (Paper No.H-070)
- [6] Bijit Kumar Banik, MD. Aktarul Islam Chowdury & MD. Shahjahan Kaisar Alam Sarkar (2006) "Study of Traffic Congestion at Sylhet city" *Journal of Indian Roads Congress*, Vol. 1: issue 2 /Jan – March 2009
- [7] Joseph. O. Ukpata1, Anderson A. Etika2 (2011) "Traffic Congestion in major Cities of Nigeria" *International Journal of Engineering and Technology* Vol 2
- [8] Takyi Harriet, Kofi Poku, Anin Kwabena Emmanuel (2013) "An Assessment of Traffic Congestion and Its Effect on Productivity in Urban Ghana" *international Journal of business and Social Sciences (JETEAS) 2 (6)* PG : 1034-1041
- [9] Olusina, J.O. and Samson, A.P. (2011) "DETERMINATION OF PREDICTIVE MODELS FOR TRAFFIC CONGESTION IN LAGOS METROPOLIS" *international Journal Of engineering and applied science Materials* © ASCE PAGE ; 1320-1327
- [10] Musa Alhassan (2008). "Potentials of Rice Husk Ash for Soil Stabilization". *AU J.T.* Vol.11 (4), pp. 246-250.
- [11] Ogunribido T.H.T. MNMGS, MTRCN (2011) "Potentials Of Sugar Cane Straw Ash For Lateritic Soil Stabilization In Road Construction" *Int. J Sci. Emerging Tech* Vol-3 No 5 PG 102-106
- [12] Robert M Brooks (2009). "Soil stabilization with Flyash and Rice husk ash" *International Journal of Research and Reviews in Applied Sciences*. Vol.1. pp.209-217.
- [13] Sivakumar G. L. Babu and A. K. Vasudevan (2008) "Seepage Velocity and Piping Resistance of Coir Fiber Mixed Soils" *Journal Of Irrigation And Drainage Engineering* © ASCE Pg : 485 -492