



TRAFFIC OPERATION PLAN FOR TIRUR MUNICIPALITY

Mohammed Sinan N, Gummy Joseph Kattoor, Abdul Malik K.V.

M Tech Scholar, Kottayam, Kerala India

Professor, Kottayam, Kerala India

District Town Planner, Malappuram, Kerala India

ABSTRACT

Transportation facilities are the core of any development activities especially for a developing medium sized town like Tirur. The passenger and goods transportation system exerts an influence on the quality of life as well as economic vitality of the city. In order to formulate effective and efficient transportation facilities for Tirur town, the traffic operation plan for the year 2030 is an effective measure to cater the existing and future demand. To assess the severity of the shortfalls of the existing traffic system stemmed by tremendous traffic congestion in Tirur town, various traffic studies such as traffic volume count, pedestrian movement, parking survey, origin-destination survey are conducted in the municipal area. Relevant secondary data was also collected. The traffic congestion was mainly caused by car, two wheelers and three wheelers of both passenger and goods trips. Such detailed scenarios of the traffic condition and improvement proposals for the present and horizon year are discussed.

Keywords: Traffic Operation, Transportation Planning, Short Term Measures, Long Term Measures, Traffic Projection

1. INTRODUCTION

Tirur town plays an important role in the development of Malappuram district from the transportation point of view. It is a town of great historical importance, fastest growing town and is also an important commercial center for foreign goods, fish export etc. through which major state highways and railway line passes and this town carries heavy traffic. Tirur has the most prominent railway station in the district. The exporting and importing of the goods through the railway line and major corridors of the Tirur town make the town very congested one. Commercial facilities are seen mainly as ribbon development along the major transport corridor. The town has experienced fast growth in the recent past. The city expanded dynamically without any planning and control due to the rapid socioeconomic changes. The city plays a big role in controlling the economic development of not only Tirur municipal region but also the entire

Malappuram district of the Kerala state. This state of affairs results in environmental decay and inefficient use of land and other resources. The spatial constraints put up by the unregulated growth blocks economic development. The role of urban transportation assumes all the more significance, being the backbone of the urban infrastructure.

The study methodology and analysis plans (comprehensive traffic and transportation plan, traffic operation plan, transit oriented development and comprehensive master plan) adopted for evaluating the traffic and transportation condition of different town/city is different, it may vary based on the population, infrastructure and size of the study area. It is clear that, for evaluating the traffic and transportation condition of medium sized town in Kerala, Traffic Operation Plan (TOP) can be adopted and the variables selected for the study of medium sized town may be different from other

TOP's depending on the overall characteristics of the town.

2. METHODOLOGY

The study has been taken to assess the traffic and transportation requirement and to formulate suitable solutions to mitigate the traffic problems of Tirur town in Malappuram district, Kerala. In order to explore all traffic engineering and management options various traffic survey were conducted. The preliminary study was initiated by conducting the reconnaissance survey for the study area. The traffic surveys such as the volume, pedestrian, parking, speed and delay and O-D surveys were conducted and the data was collected. Secondary data such as road accident data with injury and fatality was collected from various departments. Based on the analysis of these data, the various traffic and transportation issues faced in the Tirur town and the inadequacy of the existing traffic network were identified. Then these data were assessed in order to formulate suitable solution to mitigate the traffic problems of Tirur town. To handle the existing traffic problems of the town, suitable and most appropriate short term management measures were suggested. In order to cater for the future traffic demands, the existing traffic conditions were projected to a horizon year of 2030 and suitable long term traffic management measures were proposed.



FIGURE 1. VOLUME COUNT LOCATIONS AND ROAD NETWORK

Selection of Study Area

Tirur municipality is the study area. Tirur is a municipal town in Malappuram district. The Tirur town is situated off from the coastline at 10 degree 55'N latitude and 75 degree 55'E longitude, spread over an area of 16.55 km². It is one of the most important business centres of Malappuram district and is situated 26 km west of Malappuram and 41 km south of Kozhikode. Figure 1 indicating the volume count locations and road network. Ezhuthachan- father of Malayalam literature is located in Tirur.

Tirur is an important railway station in the Madras-Mangalore and Thiruvananthapuram-Mangalore railway lines and 5km east to the Arabian Sea. Tirur is a second grade municipality in Malappuram district with a population of 53654(2001 censuses). The area of land used for transportation is 82.231hector, Transport and communication land use covers 5.45% of municipal area. NH 17 passes through only a few kilometres off the town. Thunchan Parambu- the birthplace of Thunchathu

3. ANALYSIS AND OBSERVATIONS OF DATA

There are various surveys conducted in the study area. Among these mid-block volume survey, intersection survey, outer cordon survey, origin- destination survey and parking survey are the primary data source.

3.1 Observations on Mid-Block and Outer-Cordon Volume

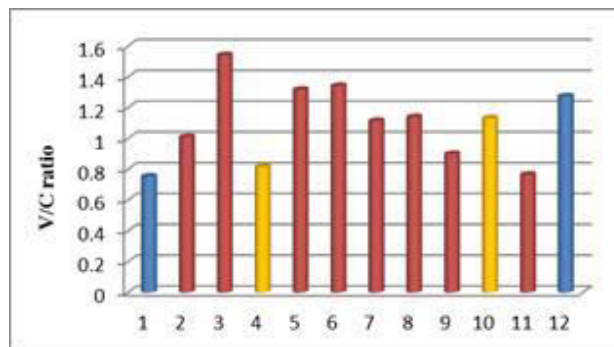


FIGURE 2. V/C RATIOS OF DIFFERENT STRETCHES

On SH -71, almost all homogenous sections, were found to be over utilized except for the Thalakatathur-Payyanangadi stretch and City junction - Thazhepalam junction, the volume-capacity ratio is about 0.75 and 0.81. On other 6 locations of major arterials, 4 homogenous sections, were found to be over utilized, Tirur Puzha road/railway station road has a service volumes which is near the capacity. The capacity utilization (v/c) of other selected sections of collector roads was found to be almost within the capacity except Central junction to Panampalam and Payyanangadi to Gulf market (via darulsalam auditorium). The figure 2 depicts that, Bus stand to City junction link has the highest peak volume with a v/c ratio of 1.54. This high v/c is due to the presence of bus stand and also due to the presence of commercial area. From the selected road links eight road stretches are having the v/c ratio higher than 1.

2 3.Traffic Volume at Intersections

Turning movement surveys at six major intersections in the study area were conducted to ascertain the peak hour traffic. Figures 3 indicating the maximum traffic flow variation at central junction in the Tirur town is 5271PCU/h and the variation of the hourly volume at city junction and Thazhepalam junction is 3607PCU/h and 3732PCU/h respectively.

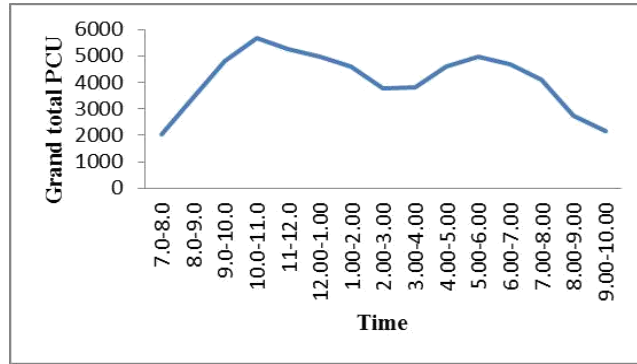


FIGURE 3. TRAFFIC FLOW VARIATION AT CENTRAL JUNCTION

2.4 Pedestrian Count

The pedestrian volume survey was conducted to determine the areas with high pedestrian volume and in order to list out the areas which lacked the adequate provision of facilities for the pedestrians. The summarized details pertaining to the pedestrian survey is given in the table 1.

TABLE 1. PEDESTRIAN SURVEY COUNT

Sl No	Location	Peak Volume (Ped/15 Minutes)	
		Lateral Movements	Cross Movements
1	Ring road	133	113
2	Police line	100	49
3	Municipality road	341	93
4	Highway Dresses	239	168
5	Municipal office	314	46
6	Payyanangadi	129	82
7	Pookkayil bus stop	255	76
8	Thazhepalam	311	123
9	Bus stand	531	200

2.5 Origin-Destination Survey

An analysis of the traffic movements will provide the proportion of bye-passable traffic along with the major external interaction areas. For a meaningful analysis of origin-destination survey data, the study region was divided into sixteen traffic zones and outside study region was divided into eight traffic zones, which included the immediate surrounding areas within the district and adjoining districts. By the data obtained through this survey the volume variation of total passenger trips excluding buses are pictured using the manifold system is shown in figure 4. The maximum daily traffic volume variation using car, two-wheelers, autoriskhaws and bus as the mode of travel was observed at zone 2. The maximum traffic

volume attracted while using the passenger mode are to the zone 2 from zone 19.

The maximum daily traffic volume generated using goods truck as the mode of goods transportation was observed at zone 2 and the maximum traffic attracted to the same zone 2 from the outer zones. Whereas for the light commercial vehicles the maximum trips were generated from the zone 2 and maximum trips attracted to zone 2 from 19.

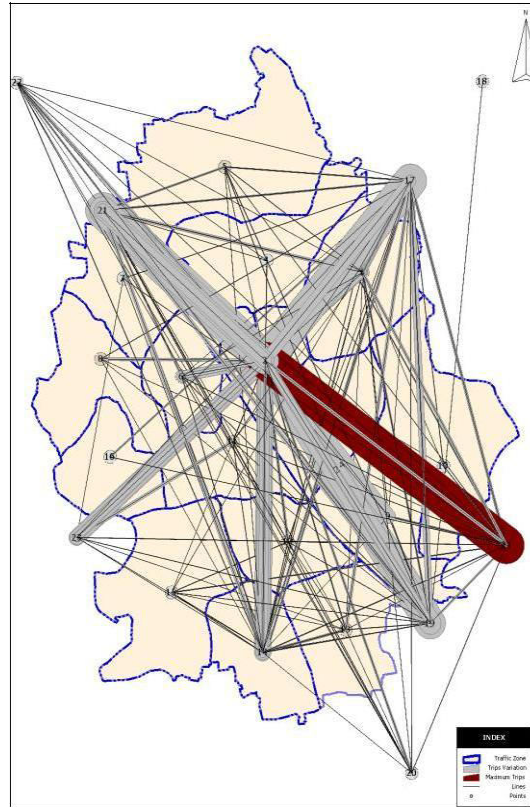


FIGURE 4. DESIRE LINE DIAGRAM

2.6 Speed and Delay Survey

On SH-71, the maximum of 39.5 km per hour was noted between Payyanangadi jn-Thalakadathur on a normal working day. The lowest journey speed experienced along the SH 71, 24.5 km per hour was along the City jn- Thazhepalam stretch. The variation in the journey speed is due to the high traffic volume and parking on the roadside, inadequate pavement width and the dangerous driving behavior of bus and auto drivers. A maximum speed of 34.9 km per hour was noted between Poongottukulam jn to Police line on the Kuttippuram route. The lowest journey speed experienced along this route, 21.7 km per hour was along the Thazhepalam - Poongottukulam jn stretch. The main reason behind this variation in the journey speed could be due to sharp curves and presence of the commercial areas. On Parappanangadi road section, the maximum of 31.2 km per hour was noted between Thazhepalam to Naduvilangadi. The lowest journey speed experienced along Pookayil – Peruvazhiyambalam stretch, 19.1km per hour. The main reason behind this variation in the journey speed could be due to the heavy parking on the roadside, which mainly constitute of two wheelers, cars and autoriskhaws.

4. RECOMMENDATIONS

An appropriate and systematic traffic management plan is essential for the safe and smooth flow of the increasing motor traffic on roads. The traffic management plan is composed of a short-term Plan and Long-Term Plan.

4.1 Short Term Measure

Traffic management is particularly important to make the maximum use of the existing road facilities and to improve current road capacities. Since traffic management plans have a relatively low cost and it is possible to carry out a trial and error method while observing the effects on the traffic flow and other factors. It is necessary to introduce improvement measures that respond to the changing requirements at different times. The short-term plan is an immediate action plan focused on issues in the selected traffic congested area, and does not comprehensively result from a study of the whole area on a unified theme.

4.2 Traffic Projection

To effectively evaluate traffic operations for the design year 2030 future traffic projections must be developed by applying an annual growth rate to the existing traffic counts conducted at these corresponding locations. A compound annual growth rate of 11% was applied to the traffic volumes. The growth rate is the standardised growth rate for the medium sized towns in Kerala. The direct projection of traffic volume into 2030 may inadequate to found the traffic problems and demand of rapidly growing city in 2020. The existing capacity utilization is controlled by the short term measures in the town. Then the traffic at 2013 was projected for the year 2020. Most of the sections exceed its capacity. So it is recommended to convert all the identified stretches in the Tirur municipality into 4 lanes road and new bypass was being constructed from Manjeri road to Kuttippuram road. Hence capacity of the roads was increased and a certain percentage of the traffic may be diverted into the new bypass. This diversion would also affect the traffic in the other links in the town and all the links are within the capacity except road no 3.

The traffic volume in 2020 was again projected for another decade i.e. for the year 2030. From this projection it was found that all the stretches are severely exceeds capacity except road no 10. So it is strongly suggested to construct ring roads connecting (1) Manjeri road and Parappanangadi (2) Kuttippuram road and Parappanangadi road. The new bypasses itself not help to reduce the volume capacity value in the links, so implementing one more measure to control the traffic in the town. The solution is diverting the traffic from CBD by regulate public transportation buses on the major arteriees itself by constructing 2 new bus stands on two legs other than the existing one. The proposed bus stands on the Kuttippuram road and Calicut road. It will reduce traffic volume in the CBD and the v/c ratio in a safe value. Shuttle service buses are operated from the major three arteriees. The buses for North-West regions, southern regions and North-East regions are operated separately from bus stands in the consecutive stretches. The through buses and long route buses plying in the town should enter into the bus stand in the Manjeri road. This approach may cause some complications for the passengers towards the CBD, so it can be mitigated by providing town bus services by connecting three bus terminals from 6am to 10 pm. In 2030 Tirur town has a demand of 225000 mass transit passengers in a day. This demand is to be catered by town bus services. After the provision of the town bus services the traffic volume on the stretches of the connecting roads of the three bus stands are increased. Table 2 shows the details of the v/c

ratio with respect to the proposals in year 2020 and 2030.

TABLE 2. V/C RATIO AFTER RECOMMENDATIONS IN THE YEAR 2020 AND 2030

Road No/Capacity in 2013	Peak Volume PCU/H 2013	v/c Ratio 2013	v/c after(4 lane+1 bypass) in 2020	v/c after (2 bypass + 2 bus stand +town bus service)
1/1500	1131	0.75	0.35	0.27
2/1500	1515	1.01	0.57	0.90
3/1500	2313	1.54	1.03	1.00
4/2400	1959	0.82	0.83	0.43
5/1500	1976	1.32	0.83	0.59
6/1500	2013	1.34	0.86	0.65
7/1500	1673	1.12	0.96	1.24
8/1500	1710	1.14	0.98	0.68
9/1900	1710	0.9	0.68	0.57
10/900	1019	1.13	0.43	0.82
11/900	689	0.77	0.59	0.99
12/900	1147	1.27	0.99	1.15

When the town bus service is provided with a better trip time and serviceability may result in a trip maker's modal change towards the public transportation buses in the CBD by replacing private vehicles. These changes greatly influences the traffic conditions of Tirur town in 2030 and it is more favourable. After the provision of two new bus stand, all the stretches carries a traffic volume below the capacity except Bus stand to City junction which is 1.007. Payyanangadi to Gulf market is 1.149 and Police line to Thekkummuri is 1.242 and is not in a critical condition. The figure 5 gives major proposals of the study in 2020 and 2030.

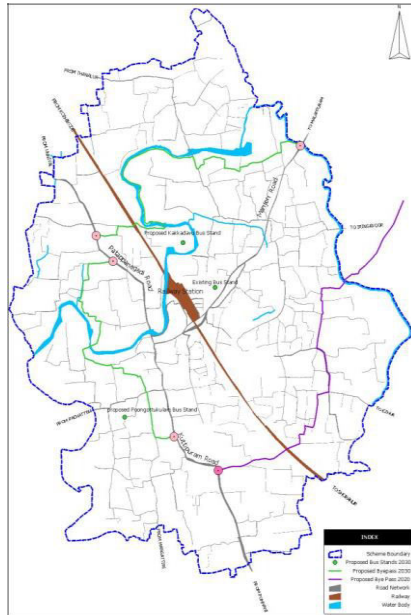


FIGURE 5. PROPOSALS IN 2020 AND 2030.

5. CONCLUSION

Through this work i founded that; traffic operation plan is the best measure for a medium sized town in Kerala to mitigate traffic and transportation problems. A number of the urgent need to strengthen the existing transportation infrastructure and to plan, implement the urban transportation system for the future to meet the projected demand traffic and transportation planning studies were under taken for a medium sized town Tirur. all these studies emphasized. The transportation facilities are not balanced with the increase of vehicle population which makes the narrow roads highly congested. To bring about relief, it is imperative to improve traffic operation for optimizing road capacity and safety by drawing up traffic operation plan for a medium sized town Tirur.

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