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ENVIRONMENTAL IMPACT ASSESSMENT OF TRAFFIC AT PERUNGALATHUR TO URAPAKKAM

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ABSTRACT

The Traffic congestion in a city are a serious issue that hinders the population's mobility. This study examines traffic congestion between Perungalathur to Urapakkam during peak and nom-peak hours. The QGIS application was used to analyses the study area at G.S.T road for a stretch of 6.03km from Perungalathur to Urapakkam. To gain a better knowledge of the causes of traffic and congestion, the number of vehicles travelling along GST Road was studied using video surveillance. The video survey was conducted through out peak and non-peak hours for three consecutive weekdays (Tuesday, Wednesday and Thursday). Finally, for Perungalathur to Urapakkam, traffic analysis and Environmental impact assessment like air pollution noise pollution and travel impact at Urapakkam to Perungalathur are study.

Keywords: Traffic management system, Congestion, Vehicle counting and QGIS, Environmental Impact.

1. INTRODUCTION

The cities' populations are growing at a rapid pace. In many locations, traffic systems are currently an issue and a source of high traffic density. The growing number of automobiles on the road and increase the accident becomes more. The travel time also increases during the high density of the traffic on the road. Nowadays the two-wheelers are increasing very high. The two-wheelers are causes the most of traffic on the roadsides. The People have used the public transport to reduce the traffic density. The traffic congestion on road not only increasing the fuel consumption but consequently leads to increase in carbon dioxide emission, outdoor air pollutions as well as increasing in the time of the passenger Different experiments are used to reduce the traffic like the image detectors, Sensors are used to calculate traffic density, and sensors are utilized to manage the timing of traffic signals. The traffic is controlled via video surveillance. To examine the traffic density on the road, software such as (Image processor) is employed.

This project analyzes the real-time traffic of the perungalathur to Urapakkam. The total stretch of the project is 6.03 km and the total road stretch numbers of bridges, road crossings, and signals are calculated using the GIS map. To study the highway stretches to obtain the travel behavior, traffic density, and types of vehicles traveling on the road. Video surveillance is used to the analysis the traffic density at a particular time. For the highway stretch, we selected the 3 junctions to monitor the traffic for the three working days. Using the GIS to information about the place name, address of the street, junctions, bridges, crossings and township of the latitude and the longitude sections. The video surveillance is used to monitor the real-time traffic counting, which takes place during peak and non-peak hours on three weekdays (Tuesday, Wednesday, and Thursday.Traffic counting is done exclusively during peak and non-peak hours in the mornings, afternoons, and evenings for this project, and human counting is used to complete the study. Counting vehicles during peak and non-peak hours to calculate vehicle volume. Two-wheelers, cars, autos, buses, and lorries are among the vehicles counted. The v/c ratio is used to figure out how many vehicles and what kind of cars are on the road. The volume to capacity ratio is a method of calculating the number of traffic accidents and the volume of traffic on the road. The number of lanes on the road, the width of the road, and the gradient of the road are all factors to consider.

2. SOFTWARE USED FOR REAM TIME TRAFFIC ANALYSIS

Using a computer, a "geographic information system" (GIS) is a tool for creating, manipulating, analyzing, showing and storing data depending its location. GIS enables the integration of numerous forms of geographic information, including satellite photographs, digital maps, and GPS data, as well as accompanying information from a tabular database containing "attributes" or characteristics relating to geographical features spatial information (also known as land data or spatial data) is data that may be associated with a place name, an address on a specific street, a sector or township, a zip code, or latitude and longitude coordinates.

3. METHOLOGICAL FLOWCHART

The methodology can be broke down into the different layers of parameters such as literature survey, map collections, data collections and video analysis. The Selected Zone is 27.05 km2 and extends from Perungalathur to Urapakkam. The total distance of Perungalathur to Vandalur is 6.03Km. Intersection are present at these points vandalur (for kelambakam road), Perungalathur (for maduravoyal road), Urapakkam (for Keerapakkam road).

FLOW CHART

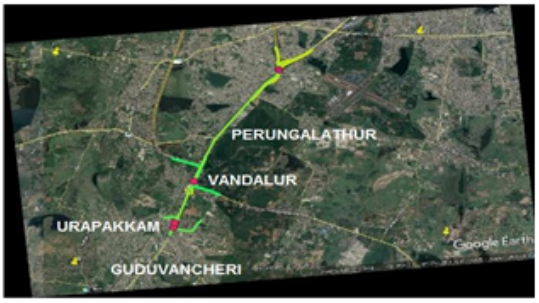

Figure 1 Site View of above the stretch

Figure 2 Site View of Perungalathur stretch

Figure 1 Site View of Vandalur stretch

Table 1: Volume of Capacity Ratio

Zone	2W		3W		LMV		HMV		PCU Peak	PCU Non Peak	V/C Peak	V/C Non Peak
	Peak	Non Peak	Peak	Non Peak	Peak	Non Peak	Peak	Non Peak				
Perungalathur	996	879	245	210	1560	1300	1167	417	8404	2039	1.60	1.12
kelambakkam to urapakkam (left turn)	888	500	72	44	272	172	68	36	992	574	0.66	0.38
kelambakkam to vandalur (Right turn)	1744	776	80	44	80	44	292	152	2636	1400	1.75	0.93
Urapakkam to kelambakkam (Right turn)	1384	448	76	40	324	188	68	48	1296	596	0.86	0.39
Vandalur to kelambakkam (Left turn)	1308	448	112	76	696	476	312	184	2398	1328	1.59	0.88
Vandalur to Urapakkam (Straight line traffic)	1216	416	112	52	563	356	401	316	2486	1564	1.65	1.04
Urapakkam	1782	1022	1105	739	3459	2577	2229	1356	11340	7435	1.67	1.03

6. ANALYSIS

- For a regular flow, the v/c ratio should be lower than 1.
- The calculated v/c ratio of Perungalathur ranges between 1.60 to 0.42 and 1.09 to 0.44.
- The v/c ratio of Kelambakkam to urapakkam (Right turn) ranges between 1.75 to 0.93.
- The v/c ratio of Vandalur to Kelambakkam (Left turn) ranges between 1.59 to 0.88.
- The v/c ratio of Vandalur to urapakkam (Stright line) ranges between 1.56 to 1.04.
- The v/c ratio of Urapakkam ranges between 1.05 to 1.03 and 1.6 to 0.95.
- The v/c ratio is more than 1, which suggests traffic congestion in that location, according to the data shown above.

7. EIA METHODOLOGY FOR SUSTAINABLE TRANSPORT

7.1. INTRODUCTION

Changes in the economy, society, and environment are a natural part of development. Since our transportation system may be both economically and environmentally inefficient, its effects on human society and the environment are extensive and include both environmental and economic factors. Environmental issues at least include air pollution, acidification, and climate change, whereas inefficient economic practices at least include direct and indirect subsidies.

7.2. IMPACT AND ASSESSMENT

The many effects of transportation projects on the environment, society, economics, ecology, and travel are discussed and classified so that competing plans may be evaluated for their relative environmental impact.

7.3. AIR POLLUTION

T he urban air pollution is becoming a bigger issue as a result of urbanization and heavy energy use. The amount of air pollution near a roadway varies (lane, et, al). These are the amounts of emissions from saturation sources and the rate of pollution emission from automobiles.

$$C = \frac{QT}{2\pi\sigma y\ \sigma z\ u} exp\left[-\frac{y}{2\sigma y2}\right] exp[-1/2\frac{z+H}{\sigma 2}]^2 + exp[-1/2\frac{z-H}{\sigma z}]^2$$

WHERE, C = CONCENTRATION POLLUTANTS AT X AND Y AXES

Q = emission rate of pollution

T = Traffic flow in veh/hr

σy and σz = standard deviation of horizontal and vertical direction.

U = wind speed.

H = Emission height

$$C = \frac{124\,X868}{2\pi X\,38\,X\,15\,X\,5.15} exp\left[-\frac{2.5}{2X\,382}\right] exp[-1/2\frac{5+100}{15}]^2 + exp[-1/2\frac{5-100}{15}]^2$$

$$C = \frac{107632}{1843.95} exp[-8656]\ exp[-3.88] + exp[-20.04]$$

C = 385.5.

The air pollution at the perungalathur to urapakkam is 385.5. It is causes of affect the high range in this area and it is also the forest zone.

7.4. NOISE IMPACT ASSESSMENT

The measuring and keeping track of traffic noise. Sound level meters that can measure direction take a weighted noise level reading. The location must be dry, level, and within a 50-meter radius of the vehicle in order to meet the international standard for measuring noise emissions. Depending on the weather, meteorological variables may cause the sound waves to refract, resulting in a lowered or increased noise level.

$$\textbf{Leq (h)i = Loe +10 log (Ni./SiTi) + 10 log (15/D)}^{1+a} \textbf{ + So-15}$$

Where, Leq (h) i= Types of vehicle per hour

Loe = Reference of mean sound level for ith type vehicle.

Ni = Number of ith typeof vehicle passing during time

T Si = speed of the ith vehicle km/hr.

T = Duration for which Leq is desired

D = Perpendicular distance in m from centre line of the traffic lane to the location.

a = Factor relating to absorption characteristics of ground cover

So = Shielding factor

$Leq\ (h)i = Loe + 10 \log (Ni./SiTi) + 10 \log (15/D)^{1+a} + So-15$

$Leq\ (h)i = 55 + 10 \log (360./50x\ 3600) + 10 \log (15/7.2)^{1+2.4} + 7-15$

$Leq\ (h)i = 55 + 2x10^{-3} + 12.2 + 70.15$

$Leq\ (h)i = 137.35.$

The Noise pollution at the perungalathur to urapakkam is 137.05. It is causes of affect the high range in this area and it is also the forest zone.

7.5. TRAVEL IMPACT

A network's many connections are interconnected. The features of one link's traffic flow are influenced by that link's type. The percentage of link length in a subregion that is longer than the v/c ratio of 0.7 for intercity travel and 0.87 for downtown is known as the transportation congestion index (TCI). the direction determined by the local transportation method.

$$TEI = 0.5\left[\frac{\Sigma\, PCUil\left[1-\left[\frac{speed}{65}\right]\right]}{\Sigma\, PCUil} + \frac{\Sigma\, PCUih\left[1-\left[\frac{speed}{45}\right]\right]}{\Sigma\, PCUilh}\right]$$

Where, PCU_{il} = Passenger car unit of light vehicles for road link i

PCU_{ih} = Passenger car unit of heavy vehicles for road link I

S_{il} = Average speed of light vehicle on link I

S_{ih} = Average speed of heavy vehicle on link I

65 , 45 = optimum speed for light and heavy vehicle (km/hr)

$$TEI = 0.5\left[\frac{\Sigma\, PCUil\left[1-\left[\frac{speed}{65}\right]\right]}{\Sigma\, PCUil} + \frac{\Sigma\, PCUih\left[1-\left[\frac{speed}{45}\right]\right]}{\Sigma\, PCUilh}\right]$$

$$TEI = 0.5\left[\frac{2860\left[1-\left[\frac{50}{65}\right]\right]}{2860} + \frac{4752\left[1-\left[\frac{60}{45}\right]\right]}{4752}\right]$$

$$TEI = 0.5[\,0.24 + 0.33\,]$$

$$TEI = 0.285.$$

The travel impact of the perungalathur to urapakkam is 0.285. The travel time is high in this area.

8. CONCLUSION

This Paper discusses the difficulties and problems that stand in the way of increasing traffic from Perungalathur to Urapakkam. This study provides a detailed explanation of the problems that operate as obstacles, including traffic congestion, parking problems, and pedestrian activity. The alternative roads are provided to reduce the traffic congestion at this area. To calculate the environmental impact assessment like Air pollution, Noise pollution and Travel impact at Perungalathur to Urapakkam.

More number of trees can be provided to the carriageway and expressway. In in-between median can be used for planting the element. To reduce air pollution, 500 trees have been planted along the route from Perungalathur to Urapakkam.

The travel impact can be reduced by providing the better road and higher design speed. This can used to reduced the travel time so in along the stretch now it has been converted 6 way but anyway the service road has to be provided properly with the increasing the design speed.

Increased mobility and vehicle traffic will result from connectivity via good weather highways, making it simpler to access markets.

REFERENCES

[1] Dr.K.Yogeswari, S.Jagatheeswaran, Achieving Smart Transportation System for Chennai Problems and Issues, 2018, IJAER
[2] Arunkumar.A , Dr. K. Yogeswari.,(2021), Real time big data analysis on origin destination matrix using crowdsourcing data for smart transportation.
[3] Dr. K. Yogeswari.,(2017) "Sustainable road layout Design For A suburban Area(Tambaram) using Fixy Aid Sustem, (IJAIMPT), Vol 4, issue 1, pp 151 – 157.
[4] Alsger, A., Tavassoli, A., Mesbah, Integrated assessment of traffic management efficiency in real time based on DTA model, Elsevier 2020.
[5] Benjamin ZHAN , LU Yong-mei , YANG Min-hua, Effects of real-time traffic information systems on traffic performance under different network structures, Springer 2012.
[6] Honghong Yang , Shiru Qu, Real-time vehicle detection and counting in complex traffic scenes using background subtraction model with low-rank decomposition, IET 2017
[7] Ilya Brylev, Sergei Evtiukov, Stanislav Evtiukov, Problems of calculating the speed of two-wheeled motor vehicles in an accident,Elsevier 2018
[8] Prema Somanathan Praveen1 , Venkatachalam Thamizh Arasan, Influence of traffic mix on pcu value of vehicles under heterogeneous traffic conditions, IJTTE 2013
[9] Sebastiano battiato, Stefano cafiso, Alessandro Di Graziano, Giovanni M, Road traffic conflict analysis from Geo-reference stereo sequences, springer 2013.
[10] Zervalis.M, Kastrinaki.V, Kalaitzakis, asurvey of video processing techniques for traffic applications, Elsever 2003.