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To Examine the Traffic Characteristics of Urban Area and Provide Solution with Simulation Technique

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Abstract:*Traffic Congestion is a situation of transportation system that results in slow speed of vehicles, take large time for trip and increase vehicle quening. In metro city, traffic congestion is the major problem. Pune comes in metropolitan city. The increasing number of vehicles in the metro city leads to traffic congestion. Thus, there is need of proper traffic management in the city. The objective of this research work is to study the traffic characteristics of urban area and provide simulation technique. The study is based on traffic data collected for 8 days during peak and non-peak hours. Different study is carried out to find out the problem statement like volume study, travel time studies, parking studies, delay studies, pedestrian studies, and accident studies. The study is divided in four major parts like Causes of traffic congestion in urban area, remedial measure to avoid traffic congestion. Current IRC specification on SH-27, and new traffic strategies can be implemented by Simulation of Urban Mobility SUMO - for analysis before they are using in real word simulation. In this research paper, we comparatively study the Indian Road Congress (IRC) SP:84-2014 for state highway 27 i.e.Nagar road and that study is divided into the 12 major points .*

Keywords: IRC-Indian Road congress, SUMO-simulation of urban mobility, Simulation, Traffic Congestion.

I. INTRODUCTION

Transportation contributes to economic, industrial, social and cultural development of any country. Transportation is the act of moving from one place to another. Transportation is important because it enables to trade between people which is essential for the development of civilization. Transportation is the backbone of local and national economics. Transportation is the fundamental service to the mankind. Road transport meanstransportation of good and personal from one place to another on roads. A system well designed, well-constructed and maintained roads are essential for countries economic and cultural progress. National and state highways are constructed as main veins for the development of country. One of themajor problem faced by cities today is traffic congestion it causes rise in the cost of transportation as well as affect map-reading of lives of people. Because traffic congestion the speed ofvehicle lower and takes more time to complete trip resulting in long vehicular quening. Because of traffic Congestion wastage of fuel takes place and leads to air pollution and increase carbon footprint and resulting in global warming.

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II. METHODOLOGY

1) Problem Identification for causes of traffic congestion. 2) Study of different traffic studies. 3) Study of different characteristics of IRC for state highway. 4) Different simulation technique 5) SUMO- technique is effective and can be used for Urban and rural area .6) Results and discussion . 7) Conclusion.

III. CAUSES OF TRAFFIC CONGESTION IN URBAN AREA.

1) If available street capacity is less than the demand of traffic flow then traffic congestion occurs. 2) Because of increased population in metro city the no of traffic police and proper signalling is less. 3) The unplanned roads are more in Pune metro city. 4) The parking facility is inadequate and illegal parking on the road causes traffic congestion. 5) Number of vehicles purchasing is high comparison with modifications in existing highways and subways. 6) Development planning is not proper roads, highways and service road is not pre-planned. 7) Unexpected accident also causes traffic congestion. 8) Overdevelopment in area where the mass transit system is already overcrowded and road system is inadequate. 9) VIP movement as well as political leader movement in same lane causes traffic congestion.10) Climatic condition also causes the disturbances in traffic flow.

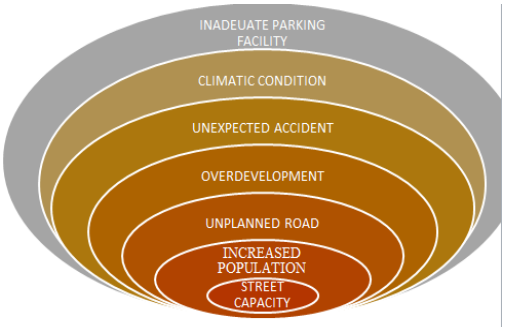

Fig. No. 1 Causes of Traffic Congestion in Urban Area

IV. REMEDIAL MEASURE TO AVOID TRAFFIC CONGESTION.

By changing traffic light management system.2) By improving public transport facility 3) Providing light rail system4) Improving cycling infrastructure and by motivating to people do the same.5) Giving concession in public transport for daily users.6) By providing more car parking and by restricting use of car in city. 7) Traffic laws and regulations can be used effectively.

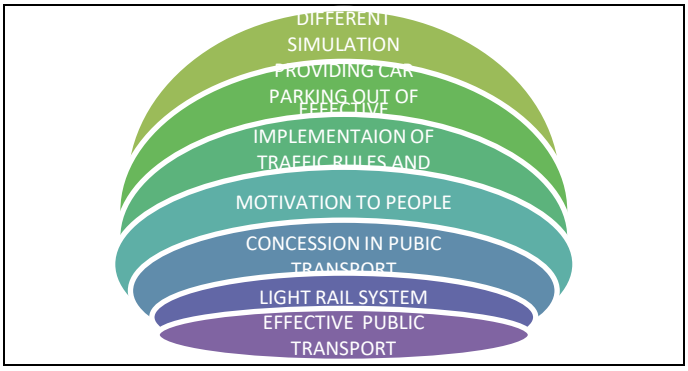

Fig. No. 2 Remedial Measure to avoid traffic in Urban Area

V. IRC SPECIFICATIONS AND STANDARDS

(IRC: SP:84-2014) according to this IRC some guidelines are decided and studied thoroughly the design speed, right of way , lane width of carriage way, median, shoulders, width, camber, service and road specification .

VI. SIMULATION TECHNIQUES RELATED TO TRAFFIC

Simulation of Urban Mobility is a free software in this software the road vehicles, Public Transportation, cycles and pedestrian can be used. SUMO is an open source traffic simulation package was created by German Aerospace Centre (DLR). The SUMO is useful in finding the effective route, and also the network emissions and calculation. The preliminary data required for simulation is traffic network, traffic counts, and origin and destination matrix. With the help of SUMO one can develop traffic light algorithm. Also with the help of SUMO one can analysis the traffic within a network. The SUMO road network can be implemented in three ways. First way is manually in this the SUMO road network can be created by developing own node edge, route connection files. In second way one can use net generation command, and third way is creating import road network from external source such as open street map or verkehr in Staten simulation model i.e. VISSM.

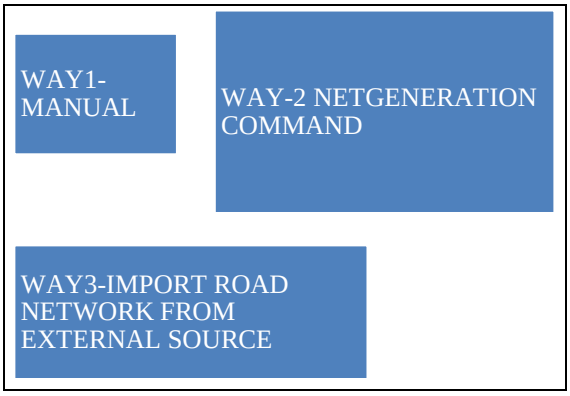

Fig. No.3 Ways of Implementing SUMO

VII. STUDY AREA.

For the case study the national highway 27 selected which is also called as Nagar road. As Many Information technology companies and academic institute comes on this road while coming to pune metro city. So traffic congestion is serious issue. The study is decided into 12 station points and 12 km road is selected. Different studies carried out such as traffic study, density study and accident studies, pedestrian study carried out. Also the data collected from Google map during peak and non peak hours. As in case study there is large no of road network so instead of doing manual data the data is imported from open street map (OSM). So a road network in SUMO is developed by Net generation command. The next step is once we can impart a map from Open Street and that can be bringing into SUMO. After bringing in sumo that can be converted into the network. The case study is carried out into following steps 1) To search and download the OSM i.e. open street map 2) Once that map is downloaded then that map is converted into the SUMO by using net generation command.3) The final steps is carried out to add and route to the network using build in Python scripts. Different coding is used to develop the network.

VIII. RESULT AND DISCUSSION

In this work is carried out to find out the basic causes of traffic congestion also different studies carried out alternatives are discussed in detail to avoid the traffic congestion. The study of "To Examine the Traffic Characteristics of Urban Area and Provide Solution with Simulation Technique." through various papers, on site visit, different data, google maps results in traffic congestion having large no of improvement in metropolitan city. Traffic congestion and remedial measures to minimize traffic congestion are listed out very effectively and simulation technique discussed in detail.

IX. CONCLUSION

From the study of research work I come to conclusion that Simulation of Urban Mobility gives the better mobility model. With the help of open source map and python gives better traffic result for Urban city as well as rural. Traffic smoothening is carried out .SUMO is lane based traffic simulation with different types of traffic. This supports the large no of data for prediction of road network and traffic congestion problem can be solved The future scope of this work is to find out end to end delay and efficiency. Also for 2 wheeler which is very much unpredictable for Indian Scenarios.

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