International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

TRAFFIC VOLUME STUDIES & CONGESTION SOLUTIONS

SHAIB SHABIR, VISHAL SINGH, VIMALRAJ
Vellore Institute of Technology, Vellore, India

***ABSTRACT* - Traffic congestion is a condition in transport that is characterized by slower speeds, longer trip times, and increased vehicular queuing. Traffic congestion on urban road networks has increased substantially, since the 1950s. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, this results in some congestion. While congestion is a possibility for any mode of transportation, this article will focus on automobile congestion on public roads. Traffic volume studies are conducted to determine the volume of traffic moving on the roads and classifications of roadway vehicles at a particular section during a particular time. As demand approaches the capacity of a road (or of the intersections along the road), extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is known as a traffic jam or (informally) a traffic snarl-up. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. Traffic Volume survey is the determination of the number, movement and classifications of roadway vehicles at a given location.**

Keywords: **Traffic, Congestion, Flyways, Matrix**

I. INTRODUCTION

Traffic congestion is when vehicles travel slower because there is too much traffic on roads. This makes trip times longer, and increases queuing. This is also known as a traffic jam. Congestion may result from a decrease in capacity, for example accidents on the road or roads being closed. Bad road layouts can also restrict capacity. Increased traffic, for example by many cars leaving a sports stadium at the same time, can also cause congestion.

Where congestion is common, for example because of commuting in big cities, several methods are used to relieve it. Cars may be banned in certain districts or certain times, or made to carry passengers or pay a fee, or people may use public transport, such as rapid transit, which travel independently of car traffic and are not affected by traffic jams.

Traffic congestion is not primarily a problem, but rather the solution to our basic mobility problem, which is that too many people want to move at the same times each day. Why? Because efficient operation of both the economy and school systems requires that people work, go to school, and even run errands during about the same hours so they can interact with each other. That basic requirement cannot be altered without crippling our economy and society. The same problem exists in every major metropolitan area in the world.

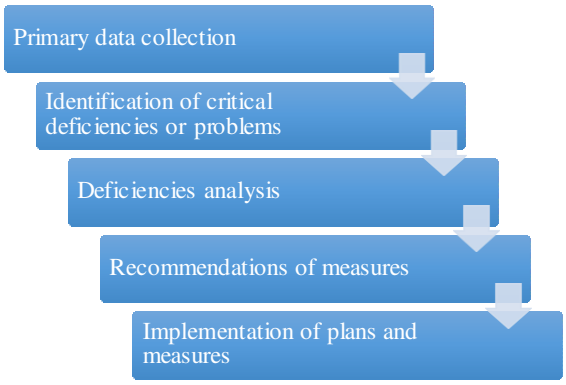
Traffic surveys are required to transportation engineers for:

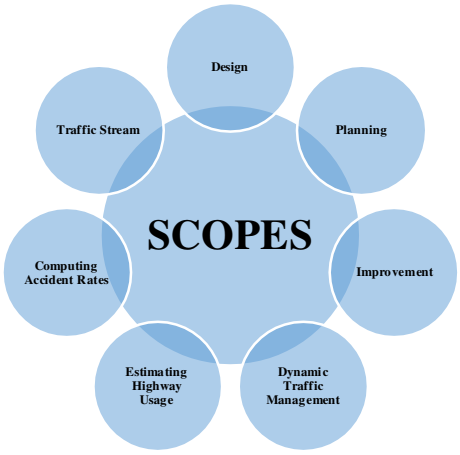
- Planning and designing traffic facilities & determining the need for traffic control devices.
- Studying the effectiveness of introduced schemes.
- Diagnosing given situations and finding appropriate solutions.
- Forecasting the effects of projected strategies.
- Calibrating and validating traffic models etc.

II. OBJECTIVES

- To observe the different type of vehicle composition.
- To study the traffic stream and its properties.
- To calculate the average daily traffic at different hours.
- To determine the Traffic directional distribution.
- To determine and provide solution for traffic flow fluctuation.

III. METHODOLOGY





CLASSIFICATION OF TRAFFIC SURVEY

- Traffic Stream characteristics – volume, speeds, density, and occupancy studies etc.
- Axle load survey.
- Capacity studies of streets and intersections.
- Travel demand – Home interview survey.
- Studies of road users cost.
- Parking supply and demand studies.
- Inventories of road-traffic physical features.
- Traffic accident studies.
- Environmental impact studies of transport.
- System usage studies.

IV. SCOPE

This paper is made to study the traffic stream properties of Noida, as it is a city that represents everything urban. Concrete jungles, express highways, hundreds of IT companies, sky-kissing buildings, flyways, and neatly landscaped park due to which traffic induced. Further studies are done for vehicular traffic flow and public transport flow.

This study helps to reduce the traffic flow over different hours and to learn about its properties by AUOTMATIC VEHICLE LOCATION.

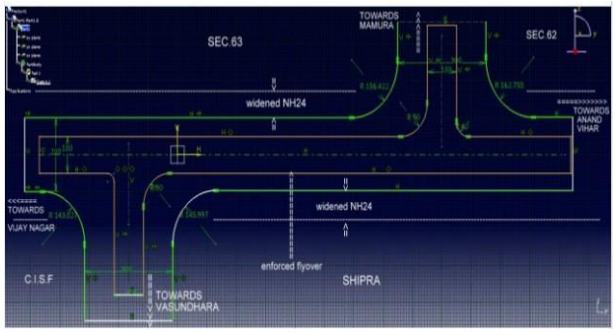
V. WORK

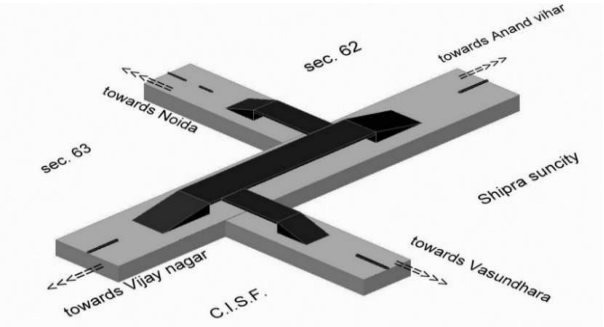
As per our topic, Traffic Volume Studies and Congestion Solution, getting various methods

,solution and implementation for the solution process from the journal papers.

Our team has decided to select NOIDA (New Okhla Industrial Development Authority) for survey ,as it is a HUB(for Business, Commercial and Education) due to which lot of traffic arrises in the peak hours.

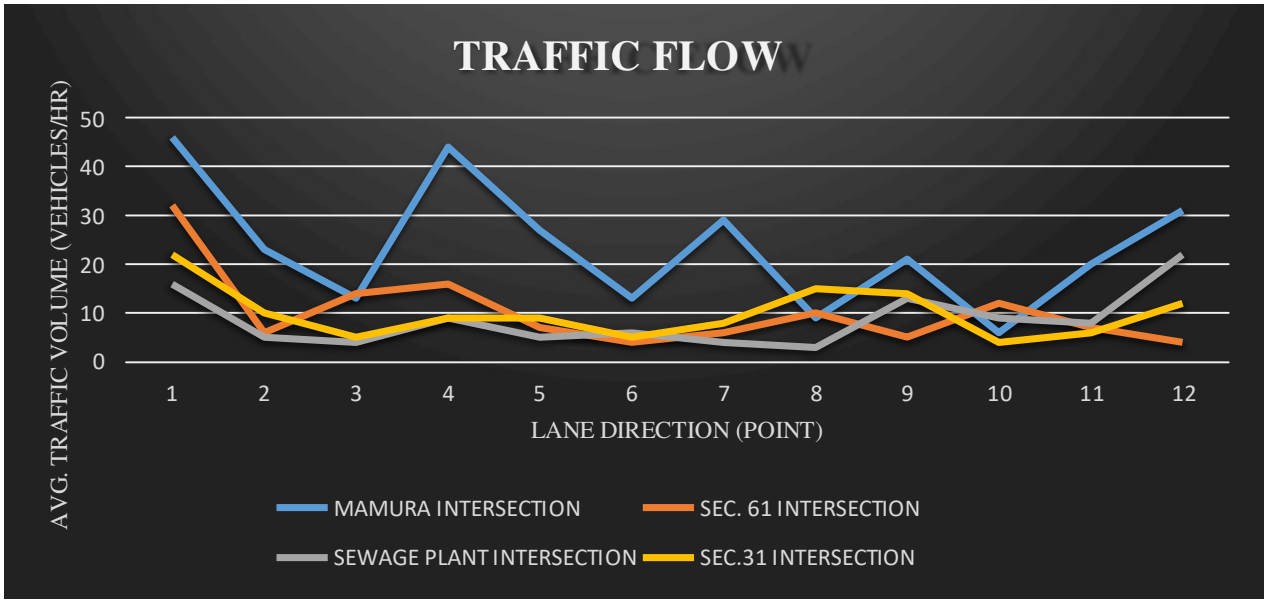
- The data's are considered from: -
- https://data.gov.in/
- https:/analyticsindiamag.com/
- https://www.kaggle.com/





VEHICULAR TRAFFIC FLOW

- The road network under consideration for the project starts from kilometerage 13 to t- point at Sec.18 Metro station.
- The total length of the project route is 9.7 kms.
- The selected route consists of 4 lanes from C.I.S.F. camp t- point to Sec.62 Police chowki t-point enrouting 2 lanes for each direction of flow, and from there on consists of 6 lanes providing 3 lanes for each directions of movement.



VI. RESULT

The enforced flyover with a start point 150 m after kilometrage 13 to 75 m ahead of the Sec.62 chowki t-point can be constructed to provide two extra lanes for the road users which can be used by the opposite traffic at different time of the day. With total span of about 500 m the flyover can work as a one-way road network providing two extra lane for the coming traffic of Vijay Nagar and Vasundhara side towards NOIDA for the first half time of the day. While during the second half time of the day the opposite traffic from the NOIDA and Anand Vihar side can be allowed to overpass the flyover resulting in the reduced traffic congestion at parts A, B, C, D of the region as mentioned earlier.

ITS is an umbrella term for advanced automation in moving vehicles. It includes vehicle-to-vehicle communication systems as well as collision avoidance and crash detection systems. ITS also covers systems that monitor traffic in order to control signal lights, electronic speed limit signs, reversible lanes and other highway safety components.

AUTOMATIC VEHICLE LOCATION

Automatic vehicle location (**AVL** or **~locating**; **tele locating** in EU) is a means for automatically determining and transmitting the geographic location of a vehicle. This vehicle location data, from one or more vehicles, may then be collected by a vehicle tracking system to manage an overview of vehicle travel. As of 2017, GPS

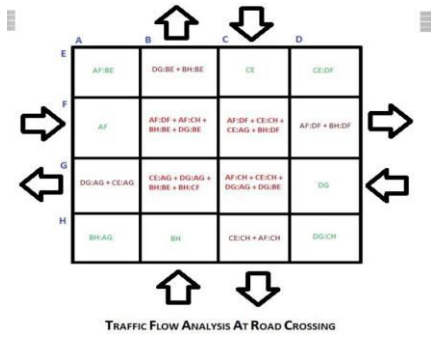
technology has reached the point of having the transmitting device be smaller than the size of a human thumb (thus easier to conceal), able to run 6 months or more between battery charges, easy to communicate with smartphones

Automatic vehicle locating is a powerful tool for managing fleets of vehicles such as service vehicles, emergency vehicles, and public transport vehicles such as buses and trains. It is also used to track mobile assets, such as non-wheeled construction equipment, non-motorized trailers, and mobile power generators. AVL is often utilized by government agencies, such as Public Safety and Parks and Recreation, to track the movement of patrol units, emergency responders, and field workers.

Another purpose of tracking is to provide graded service or to manage a large driver and crewing staff effectively. For example, suppose an ambulance fleet has an objective of arriving at the location of a call for service within six minutes of receiving the request. Using an AVL system allows to evaluate the locations of all vehicles in service with drivers and other crew in order to pick the vehicle that will most likely arrive at the destination fastest, Most commonly, the location is determined using GPS and the transmission mechanism is SMS, GPRS, or a satellite or terrestrial radio from the vehicle to a radio receiver. A single antenna unit covering all the needed frequency bands can be employed. GSM and EVDO are the most common services applied, because of the low data rate needed for AVL, and the low cost and near-ubiquitous nature of these public networks. The low bandwidth requirements also allow for satellite technology to receive telemetry data at a moderately higher cost, but across a global coverage area and into very remote locations not covered well by terrestrial radio or public carriers. Other options for determining actual location, for example in environments where GPS illumination is poor, are dead reckoning,
i.e. inertial navigation, or active RFID systems or cooperative RTLS systems. These systems may be applied in combination in some cases. In addition, terrestrial radio positioning systems using a low frequency switched packet radio network have also been used as an alternative to GPS based systems.

Matrix Method for Analysis of Intersections

This is the tool developed by us to study the traffic flow pattern at particular intersection. With the help of this, it easily provides solution to tackle traffic flow at the intersection. It also helps to decide whether there is a need for a flyover or tunnel and if yes then its orientation. Plus, this system is easily adaptable with computer programming.



TRAFFIC FLOW ANALYSIS AT ROAD CROSSING

Time based Reversible traffic flow system

During morning peak hours, one direction lanes of roads are over congested and opposite lanes are with a few vehicles. Whereas in evening hours' condition is just reversed. To tackle this problem, there should be controllable gates/barriers through ITS command centre just before the undivided road/flyover/tunnel. There should be LED message boards, CCTVs, NPRDs controlled by the ITS command centre at proper distances from the end and start point.

VII. TOOLS

Using CCTV: - CCTV cameras play an important part in road network management. They are installed at sensitive locations on the network to support traffic management, where congestion and traffic queues are frequent and at other locations where there is an increased risk of accidents and traffic incidents.

Using NPRD: - LED Message boards:- is an electronic traffic sign often used on roadways to give travellers information about special events. Such signs warn of traffic congestion, accidents, incidents such as terrorist attacks, AMBER/ Silver / Blue Alerts, roadwork zones, or speed limits on a specific highway segment. In urban areas, VMS are used within parking guidance and information systems to guide drivers to available car parking spaces. They may also ask vehicles to take alternative routes, limit travel speed, warn of duration and location of the incidents, or just inform of the traffic conditions.

Controllable Barriers: - The impact of development zone collisions reaches beyond material loss. Accidents in work zones are usually

deadly and can impact not just the drivers, but also the safety of work crews in the construction zones. barriers help to mitigate risks to pedestrians, work crews, and motorists. Not only do these traffic barricades improve visibility; they also help direct oncoming traffic This helps you ensure the safety of your work area, and improve the wellbeing of everyone in your surrounding area.

Concrete obstacles, while popular, are frequently not needed and will contribute to fatal accidents by causing harm to drivers and their vehicles. Traffic cones and drums are also attractive, but often these traffic devices are not capable in some situations that might not accomplish the specific needs of a construction zone.

VIII. CONCLUSION

The Present study appraised the traffic congestion cost at signalized connection located in NOIDA, an Indian city which conquers mixed traffic condition. This study has taken into account both engineering and economic features while dealing with signalized connection, and estimated passengers delay cost distinctly for each approach in the signalized intersection. This study shows the conventional techniques in use and vehicle navigation measures under un-signalized road nodes and traffic congestions. It also disclosed the communicative power of AVL in diverse field of research and it is very clear that application of AI in intelligent transport system- transportation structure, passenger's data, and traffic and flexibility management will greatly address the current traffic problems and the problem of gap acceptance in un signalized road connections leading to road safety and healthy traffic effectiveness.

Constructing the flyover will lead to overcome the problem traffic flow fluctuation in the peak hours.

IX. REFERENCES

1. *J. Currie, R. WalkerTraffic congestion and infant health: Evidence from E-Z Pass - American Economic Journal: Applied Economics, 3 (1) (2011), pp. 65-90*
2. *Aftabuzzaman, M, Currie, G, Sarvi, M, 2011. Exploring the underlying dimensions of elements affecting traffic congestion relief impact of transit. Cities. https://doi.org/10.1016/j.cities.201 0.08.002*
3. *Beesley, M.E, 1965. The Value of Time Spent in Travelling: Some New Evidence The Value of "Time Spent in Travelling: Some New Evidence." Source Econ. New Ser. https://doi.org/10.2307/2552547*
4. *G. B. Pervin ERSOY*, "Intelligent Transportation Systems and Their Applications in Road Transportation Industry in Turkey," in The International Conference on Logistics & Sustainable Transport 2015, 2015.*
5. *Rod Troutbeck, "Modelling Signalized and Unsignalized Junctions," in Handbook of Transport Modelling Article information., 2016, pp. 443–460.*
6. *environment model and vehicle trajectories." 2014 Iranian Conference on Intelligent Systems (ICIS). IEEE, 2014.*
7. *Sun Shuming, Juan Chen, Jian SunTraffic congestion prediction based on GPS trajectory data. International Journal of Distributed Sensor Networks, 15 (5) (2019)*
8. *Zhao Huijing, et al. On-road vehicle trajectory collection and scene-based lane change analysis: Part I. IEEE Transactions on Intelligent Transportation Systems, 18 (1) (2016), pp. 192-205*
9. *Hosseinzadeh, Arman, and Reza Safabakhsh. "Learning vehicle motion patterns based on environment model and vehicle trajectories." 2014 Iranian Conference on Intelligent Systems (ICIS). IEEE, 2014.*
10. *Senjyu T., Islam S., Wang H. (eds) Proceeding of the International Conference on Computer Networks, Big Data and IoT (ICCBI - 2018). ICCBI 2018. Lecture Notes on Data Engineering and Communications Technologies, vol 31. Springer, Cham.*
11. *Nguyen Duc-Binh, Chyi-Ren Dow, Shiow- Fen HwangAn Efficient Traffic Congestion Monitoring System on Internet of Vehicles.Wireless Communications and Mobile Computing, 2018 (2018)*
12. *"A survey of trajectory based data forwarding schemes for vehicular ad-hoc networks." 2015 IEEE International Conference on Communication Software and Networks (ICCSN). IEEE, 2015.*