

## A Review of Literature on Planning of Tunnel to reduce the Traffic Congestion at Hazarat Ganj Chauraha Lucknow

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### ABSTRACT

The growth of urban populations, the increase in the number and size of major cities, and the reversal of urban migration, the tunnels construction are often the answer to traffic problems. that enhances ecology and livability of the city . Sophisticated systems are designed to measure the limitations of a different alternative to Lucknow's transport system. Tunnel which make road and traffic more efficient and most useful for future purpose less the traffic congestion more economical transportation system and result in less delays, less time consumptions as well as less fuel consumption

**Key word:** Tunnels, Tunnel Boring Machine, Traffic congestion, highway system, urbanization.

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### I. INTRODUCTION

With the growing most of the cities, the cities are undergoing multifaceted problem because of the rapid urbanization. The congestion due to traffic becomes one of the most unacceptable problems at developed cities arising from the sudden increase in private transport affecting the community, the economy. Traffic Tunnel and construction of underground passage , protection from the fire and management of risk and task during design construction process. For the construction process of Tunnel the TBM (Tunnel Boring Machine) is used. Tunnel Boring Machine generally having a large diameter of cylindrical shield equipment with a front rotating cutter head, a mucking device system, and an automatic segment erector are most frequently used. The Tunnel Boring Machine is a machine that Tunnel under ground, progressively installing concrete lining, to support the excavated Tunnel. TBMs are tailored for specific ground condition and are more than 100 meters long and weigh up to the 1,000 tones. Tunnel proves to be the shortest alignment for the road traffic congestion proving more efficient and effective medium of construction. Tunnel has shortest rout due to this the short rout this become more economical as well as best solution for the reduction of the traffic congestion. For all this purpose we will do survey work at Hazarat Ganj Chauraha Lucknow. congestion prevents the movement of traffic, leading to intolerable increase journey time. The main aim of this paper is to give a

solution for this traffic congestion problem. For solution of this traffic congestion Tunnel have become essential structures linking highway system. Tunnel is a tabular structure with the both ends are opened and it is enclosed at the middle , plus resistance , some alignment design's transition , adornment and climate condition , especially at the entrance . The Tunnel construction include the issue of process and mechanization of the impact of driving Tunnel.

We will do two way classified traffic survey of road and also will calculate average speed of commercial vehicles , private vehicles and two wheelers vehicles within mixed traffic after that we will do traffic survey excluding whose amount of traffic more than the all other vehicles . Lastly we will study and comparison of fuel consumption and the total cost saving during the Tunnel construction.

### II. REVIEW OF LITERATURE

**Douglas Allenby and John W.T. Ropkins (2006)**1, conducted a research on underground passage at depth bellow our mega cities by using jacked box process of tunneling , the description of the jacked box tunneling has given with the example its uses and sensitivity elaborations . This tunneling method of construction that enables Tunnel engineers to construct the underground space at shallow depth in a system that avoid disturbance of profitable infrastructure and reduction in environmental impact.

**Alessandro Calvi , Claudia Guattari (2012)2**, conducted a research on the driver drive in inside the tunnel based road and accustomed some new technique how driver behavior inside road of the tunnel and approaching it and going out from it. driving simulator has provided as a technology . it result in the percentage of driver driving speed that reduce their linear speed from controllable framework to Tunnel concept is more than 60% for each and every tunnel .

**Yan Bin ,Zhou Ji-Biao, Wang Lu (2013)3**, presented an investigation into the effectiveness of road traffic signals at a nearby tunnel outlet .Using of a human machine structure is a traffic signal model that includes motivation and learning, decision-making and behavior. entry and exit of the tunnel with minimal traffic congestion and driver safety.

**Vinayak Demane et al., (2013)4**, researched the interaction of the ground structure of the lower RCC Bridge. A study of comparing a building in the form of a solid support and a combination of soil structure applied to a foundation and a side wall. Therefore neglect of soil compaction is not possible and also saw shear strength and bending minute value is low for soil compaction.

**Rui Zhou et al .,(2014)5**, conducted a research on the Traffic air pollution inner side and outer side a road Tunnel in china , Shanghai . the methodology that they adopted are experimental location ,monitoring site, instrument & sampling , instrument and statistical method . lastly found that the highest hourly concentrations of CO, NO, NO<sub>2</sub> and NO<sub>X</sub> within the tunnel were 13.223 mg / m<sup>3</sup>, 1.829 mg / m<sup>3</sup>, 0.291 mg / m<sup>3</sup> and 3.029 mg / m<sup>3</sup>, respectively, and the lowest was 3.086 mg / m<sup>3</sup>, 0.344 mg / m<sup>3</sup>, 0.080 mg / m<sup>3</sup> and 0.619 mg / m<sup>3</sup>.

**Abdel Salam et al., (2015)6**, Greater Cairo Metro Line TB Model Construction Model: Low-cost services due to the construction of a tunnel with boring road safety equipment are predicted in this paper. The construction and design stage is analyzed by FEM analysis and simulated the phase phase along the proposed road.

**Ofira Ayalon et al.,(2016)7**, conducted a research on direct and indirect benefits of the Carmel tunnel compare to alternative routes are analyzed in this paper to reduce traffic congestion, air and noise pollution as well . The method dynamic financial excel model (DFEM) is used to evaluate and quantify the profits for the road users populations . At last result in 70% reduction in air pollution and 40% reduction in toll.

**Arshad and R.A. Abdullah (2016)8**, Presented a new method for the Tunnel construction such as ground pressure gauge, bond box method, slurry and flexibility of Tunnel drilling and blasting, TBM , cut

and cover method etc . They also research on the Parameter that effecting ground settlement in this. The result is cut and cover has limited use only for construction of shallows depth and jacked box method only for the purpose of rail ,pedestrian & car parking etc.

**A Nosenko et al., (2016)9**, Research has been done to find the directions and types of road tuning indicators to be done, a system of classification of routes, classes, conditions and groups by geographical, structural and technical features has developed. As in the result, the road system segregation on public highways system aimed at designating corridors in the design, construction, reconstruction, maintenance and operation of international requirements has been created.

**Bolin Jiang , Bo Liang (2016)10**, they have researched about the traffic loads calculation formula, within a comprehensive consideration of influencing different factors including in design of tunnel safety. To get the degrees of Impact of those items on the calculated values of traffic loads and the powerful response of SFTs and the weight of each item, they have uses the process of orthogonal experiment method and also the process of analytic hierarchy, combined both of them with a finite element software simulation. the result is Where the impact factors apply to the maximum calculation value, the impact level follows the order: hard road > speed of vehicles > multiple loads of wheels > wave height.

**Qian Yang and Zhaoling Wang ( 2017)11**, conducted a research on the high speed railway tunnel constructed using information based system i.e. numerical simulation of construction .The majorly TMS (tunnel measurement system) was used to maximizing measuring time and improvement in the efficiency and reduce cost . Numerical simulation results in basis of the qualitative analysis and changes the current minimum level construction technologies quality and applies the concept and process of information construction.

**Vaibhav Phadke and Nikhil Titimare (2017)12**, conducted the research on the advanced method of construction of Tunnels .The methodology is NATM and TBM is used this proved as the advanced technology for the construction .The greater level of tunnel system will reduce the construction time as well as help in early revenue generation.

**Vladimir V. Makarov et al., (2017)13** , The key alternative is for the city Vladivostok is not dependent tunneled transportation system along with the added bellow underground parking system so that transportation problem define in this manner that enhance livability of the city .tunnel is 1.8 times

preferable than the above ground bridges. After building a road tunnel the quantity of harmful emission reduces 8-10 times. Decrease in street noise, air pollution as well as improving traffic safety and result in increase in infrastructure attractiveness of the city.

**Frolov Y.S et al., (2017)14**, have conducted a research to ensure the operational reliability of the tunnel railways construction with the highway tunnels constructed above ground surface in the city of Sochi. bank attack method is used to pass the road tunnel with the reverse arch of concrete installed to performed the excavation of deepest deep full height of the bench .As the results obtained of the theoretical approach research, limits value of the strength and deflection parameters of tunnel railway lining were determined.

**P.L. Ng et al., (2017)15**, conducted a research on the development process of Tunnel dismantling machine (TDM) in an underground railway Tunnel project. To enhance the construction risk, a bespoke tunnel dismantling machine was developed (TDM). The TDM working in railway interface inner side the ORT each lining segments ring under 2.8 bar compression air pressure has removed.

**Speed:** Speed is considered as a quality measurement of time travel as the drivers and passengers will be more concerned about the speed of the journey which is taken than the design consideration of the traffic. It is defined as the ratio of distance per unit of time.

**Time mean speed :** It is the average speed of all the vehicles passing a point or a section on a highway over some specified time period.

**Space mean speed :** It is the average speed of all the vehicles occupying a given point or a section of a highway over some specified time period.

**Flow :** It is defined as the number of vehicles that passage through a point on a highway or a given lane during a specific time interval. The measurement can be find out by counting the number of vehicles passing a particular point in one lane in a defined period. Then the flow is denoted in vehicles/hour.

**Density :** It is defined as the number of vehicles in a given length of highway or lane and is generally denoted as vehicles per km.

**Distance Headway:** It is defined as the distance between corresponding points of two successive vehicles at any specified or given time.

**Time Headway:** It is the process as the time difference between any two successive vehicles when they cross a given point or a section .

### III. CONCLUSION

1. construction of road Tunnel can decrease the congestion of traffic at Hazrat Ganj Chauraha Lucknow

2. Reduce parking congestion and roadway congestion also

3. Construction of the Tunnel for transportation system allows most frequent use of underground land , converting traffic congestion from major mega center , decreasing in the landscape damage due to maximum road passing through open space and more

4. Tunnel construction appears promising in helping to reduce physical inactivity as well.

5. All alternative that we examined showed benefits from each parameter including (time, fuel pollution, and noise) compare to the alternative routes related to this.

6. The government in 2016 has offers financial incentives for trucks, namely a 40% reduction of the toll this incentive will encourage in the travelling via the Tunnel.

Thereby encouraging the travelers to use of road tunnel during peak hour , as the results in benefits of using the Tunnel during peak hours time are much higher than the alternative routes like open space

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