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A REVIEW PAPER ON INNOVATIVE TRAFFIC ENGINEERING TECHNIQUES

RAJ ANAND, SAMRAT ROY, SANSKAR CHOPRA, SHEIKH AZHAR UL ISLAM
Department of Civil Engineering, Dayananda Sagar College of Engineering, Bengaluru

1.ABSTRACT

Road traffic accident analysis and the creation of a prediction model are the goals of a study. Data is gathered from a variety of police documents as well as the regional transport agency. To find patterns and connections between the parameters and the risk of an accident occurring, the data is evaluated using statistical methods. An analysis-based prediction model is created that uses the inputted data to forecast the probability of an accident occurring.

Estimating and assessing road traffic noise entails measuring the noise levels generated by vehicles at a specific location and using the data to assess the effects on the environment. Sound level meters and other specialized tools can be used to accomplish this. The average noise level, as well as the highest and minimum levels, are then calculated and analyzed using statistical techniques after the data has been collected. The gathered data is contrasted with pertinent noise standards or recommendations, such as those made by the World Health Organization or municipal laws. The results of these analyses can be used to develop strategies for mitigating the effects ofroad traffic noise, such as through the use of noise barriers or the implementation of quieter road surfaces.

To comprehend the effects of traffic on the environment and to establish strategies for emission reduction, it is critical to estimate and evaluate this carbon footprint. The type of cars being used, the distance being driven, the fuel efficiency of the vehicles, and the type of fuel being used must all be considered when estimating the carbon footprint from road traffic. These variables can be discovered by data collection and analysis, and they can be used to the IPCC Guidelines to quantify the total carbon emissions from vehicle traffic.

Keywords: Traffic Accident, Severity, Prediction model, Traffic noise, Intersection, Idling emissions, Carbon footprint.

2.INTRODUCTION

Road traffic accidents, also known as traffic collisions or motor vehicle accidents, are events that involve the movement of a vehicle and result in injury or death to individuals involved. These accidents can occur on any type of road and can involve a single vehicle or multiple vehicles. According to the World Health Organization, road traffic accidents are a leading cause of death and injury globally, with an estimated 1.35 million fatalities occurring each year. In addition to the human toll, these accidents also have economic consequences, including costs associated with medical treatment, property damage, and lost productivity. There are many factors that can contribute to road traffic accidents, including speed, alcohol or drug impairment, distraction or inattention, and poor road conditions. To prevent these accidents, it is important to implement measures such as speed limits, sobriety checkpoints, and road maintenance programs. Additionally, individuals can play a role in preventing accidents by driving safely and following traffic laws.

Noise pollution due to traffic is a common problem in urban areas. It occurs when the sound of vehicles, such as cars, buses, and trucks, becomes excessive and disrupts the normal functioning of a community. Noise pollution can have negative impacts on both

physical and mental health, and can interfere with sleep, communication, and quality of life. There are several sources of noise pollution from traffic, including the engines of vehicles, tires on the road, and horns. The level of noise pollution can vary depending on the type of road, the number of vehicles, and the speed of the vehicles. In addition, certain types of roads and surfaces can amplify noise, making it more noticeable and disruptive. To address noise pollution due to traffic, cities and communities can implement measures such as building noise barriers along roads, regulating the use of horns, and enforcing speed limits. In addition, the use of electric or hybrid vehicles, which produce less noise than traditional gasoline-powered vehicles, can also help to reduce noise pollution.

Traffic is a major contributor to carbon emissions and fuel consumption. The carbon footprint of traffic refers to the amount of carbon dioxide (CO2) and other greenhouse gases that are emitted into the atmosphere as a result of vehicle use. These emissions contribute to climate change and have negative impacts on the environment and human health. Fuel consumption due to traffic is also a significant concern. The use of fossil fuels, such as gasoline and diesel, to power vehicles is a major source of air pollution and contributes to the depletion of non-renewable energy resources. There are several ways to reduce the carbon footprint and fuel consumption due to traffic. These include the use of alternative fuel sources, such as electric or hybrid vehicles, as well as measures to improve fuel efficiency, such as using public transportation or carpooling. In addition, investing in infrastructure for walking and biking can also help to reduce the need for car travel and decrease carbon emissions and fuel consumption.

3.LITERATURE REVIEW

[1]Gebretensay, et al carried the road traffic accident analysis. Its objective was to perform micro level analysis of traffic accident and to develop accident prediction model for road accident and provide integrated permanent solution. The accident analysis was carried for seven years (2010-2016). Methodology included collection of accident data from different police stations and vehicle registration data from regional transport office of Vadodara City. The detailed analysis was performed on the basis like Hour, year, location, type of collection, type of road, weather condition etc. After analysis, the prediction model for road traffic accident was developed based on different parameter. The result showed that the number of killed people were increasing year to year into increasing population and highest case of accident was due to fault of driver and type of vehicle in city. Also, the prediction model was validated by chi-squared test.

[2]Pradeep, et al did the investigation of road accidents of the Kaithal city on stretch of Ambala road-ITI Kaithal-KKR Bypass-Bus standKaithal – passing through(SH-12) railway road Kaithal. The data collection regarding the accident of 3 years (2016-2018) were collected from different police stations, PWD B&R and field study. The analysis of road accident data was done based on various features, viz, accident severity index, accident risk, variation in deaths with population, type of injuries, etc. It was observed that the characteristic of accident was dependent on the population factor. The results showed that accident severity index was expanded from 33.3% to 46% from year 2016 to 2017. It was also watched that level of day time accidents were considerably higher than the evening time mishaps.

[3] Sunny Tawar, Sachin Dasa. The paper deals with study of road traffic scenario in section from Chandhariwas, Hisar to Hisar city on NH-65, Haryana, India and to identify the suitable black spots and Suggesting possible improvements and measures. The 6 years (2011-2015) accident data was collected from various police stations. The analysis was carried on basis like year, month, hour, etc. The results showed maximum accidents where due to head-on-collision and due to heavy traffic.

[4]Athira, et al Conducted the study of road accidents along Amaravati- Nagpur Road stretch from Asian highway 46. So as to identify the black spot and rank the black spot on the level of accident severity. Primary and secondary data were collected from the study. The analysis of primary data was carried which included road inventory survey, traffic volume count, etc. The secondary data were analysed by the weighted severity index method.

[5]R.R.Soraye, et al used the accident data from the identification of accident black spots on NH-4, from new Katraj tunnel to Chandni chowk which spans about 14.5 kilometres and providing the necessary remedial measures. The methodology included the collection of secondary data from the respective authority. The physicalsurveywas also conducted and analysis was done by method of ranking and severity index and accident density method, weighted severity index. The corrective measures we are suggested, viz, Providing speed limit boards, cat eye installation, etc.

[6]R.V. Jadhav ,et al surveyed state highway between Asha and Islampur cities, Maharashtra. The accident data 5 year (2011-2015) we are collected from nearest police stations. The 5 black spots were identified from the preliminary detailed analysis detailed analysis were carried on these locations which included collections of Gcp, data processing, map scanning, Geo Referencing, digitalizing and also the determination of critical crash rate. The results showed that total crashes increased and the peak period for crashes comes between 14:00-16:00 hours.

[7]Ch. Ravi, et al attempted to calculate the time lost & fuel lost by idling cars at signalized junction in Ahmedabad. The corridor on Yeh driven-in route in Ahmedabad city was taken into consideration. For tracking traffic volume&consumption, 10-hours classified traffic volume count survey were carried out at four locations. A velocity-Box (v-Box) device, GPS based was installed in vehicle for determination of Speed &delaycharacteristic. The VISSIM micro simulation software was used for estimating overall delay. The Estimation fuel loss at each intersection was based on CSIR-CRRM fuel loss data. VISSIM model was used to implement integrationmeasure in order to quantify the reduction in fuel loss.

[8]Dr Manish pal &DipankarSarkar. The paper aimed for study of delay, fuel loss & noise pollution during vehicle idling in five intersection of varying traffic volumes in Agartala city. For noise level measurement, sound level meter was used. Each vehicle idling condition fuel consumption was measured by filling vehicle fuel tank to capacity& running engines while vehicle was stationary.Each Vehicle's revenue loss from fuel was calculated by multiplying fuel loss by current cost of fuel. Regression equation were developed for finding correlation b/w vehicular delay & noise level.

[9]RakeshKumar, et al monitored noise pollution using sound level meter mounted on cycle, in Nagpur, India. At each location, noise level were recorded for 5minutes at interval of one seconds, during morning& evening rush hourtraffic, yielding approx.300 readings per location. Commotion files like leg, L90, L10,LmaxLmin were determined noiselevel info. Investigation. Additionally was determined for purpose of analysing traffic noise at road intersection. The GIS was used to import equivalent noise level & spatial analysis tool was used to create spatial &strategic noise maps. In light of guides, it is uncovered that commotion levels are surpassed all around the city. It was observed that honking makes intersection of roads extremely noisy during rush hours.

[10]AdityaKamineni, et al carried the study for development of comprehensive noise prediction model by using traffic & roadway factors. Noise level were estimated through close to field& far field estimation. The time averaging method was used to log 1- seconds intervals of date to measure the continuous noise level.Likewise,SVAN 945A pocket sound level meter (SLM) wasinitialized to quantify

the noise level7 were examined utilizing SVAN Pc suit. Studies of Spot speed & traffic volume were conducted simultaneously with this noise level measurement. The measured noise level indicated that level are exceeding above the limits prescribed by central pollution control board (2000) of India.

[11]Kirti, et al studied the fuel loss & due to idling of vehicle. The study major goal was to calculate carbon footprint. The methodology adopted consisted of assortment of high, medium & low volume crossing, analysing the delays & determination of amount of fuel used by motorways. The overall carbon footprint was estimated by using IPCC guidelines. Only signalized junctions were inclined in study's scope. The findings indicates that transportation section constitute 9% of city's overall co2 emissions.

[12]D.Banerjee, et al monitored and assessed the road traffic noise in spatial- temporal aspect in urban area of Asansol,West Bengal. A digital SLM type2 having measuring range between 0-150 dB was used for the study. Under suitable climatic condition & during, working days, all measurements were carried out. For proper evaluation&analysis of result, the noise assessment revealed that road traffic noise exceeds limits set by CPCB of India even in medium sized industrial city like Asansol.

[13]Manish k. Chandel, et al analysed the GHG emissions from road transport in MumbaiMetropolitan region (MMR). The methods used include fuel consumption &the vehicular kilometre travelled. The congestion factor was established by conducting traffic survey an four major roads in (MMR) to estimates the proportion of CNG emissions. From the two methods, it was found that CO_2emissions in MMR for 2014 were 19065 & 12445 Respectively.

[14]Kriti Bhandari, et al included main line haul trip, as well as the access & egress portions of bus & metro trips is estimation of carbon footprints. The methodology comprised of estimating& comparing the direct CO_2 emissions of various mode combination trips, the traveller interview study was led at 77 metro station along sides nearby bus stations for correlations b/w two public vehicle modes. The correlations b/w variables such as co2 emissions& distance, time & cost of access egress trips, etc was examined. The IPCC method was used to calculate the emissions.

[15]Nawaf H, et al measured carbon emissions of state of Kuwait road between years 2001 &2015, using the IPCC recommendations & the natural fuel prices. After collection of necessary data, it was transferred in excel format & analysed for evaluation of carbon footprint. The data were used to map annual profile to explain variation in temperature caused by CO_2 emissions. Improbable from the enormous number of fuel vehicle, the carbon impression of utilization of diesel was more prominent.

4.CONCLUSION

After reviewing several papers on innovative traffic engineering techniques following conclusions have been made

1.Most of the papers developed accident prediction mode which relates number of fatalities to population, driver behaviour and type of the vehicle

2. Road safety should be given prime importance in the planning stage itself to avoid accidents due to improper geometrical features.

3. In most of the busy intersections of the cities, noise levels increase beyond the prescribed levels. So it is recommended to utilise GIS applications to import equivalent noise level & spatial analysis to create spatial & strategic noise maps for better understanding

4. As a result of vehicle emissions, environment is getting polluted, thus it is important to analyse overall carbon footprint produced.

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