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Pollution Due to Vehicle Emissions

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Abstract –

Pollution from vehicle is becoming international issues of society . It taking lot of attention for improvising the pollution or control pollution. Topic which are going to discussing here related to automobile vehicle emissions and how it's badly effect on environment and human health.

Emission such as hydrocarbon, Carbon monoxide, nitrogen.

It occurs from the burning fossil fuels like petrol and diesel in Internal combustion engine. Technology have been developed in most of the countries to replacing the polluted vehicle to electric vehicles which is working on the battery. Zero gases has emitted from it. It's environmental friendly vehicles this becomes an option for upcoming generation.

Keywords- Automobile Vehicles, emissions, environmental pollutions, control measures.

1. INTRODUCTION

The pollutant emissions obtained from fuel Vehicle regional atmospheric air quality combustion by internal combustion engines include nitrogen oxides , hydrocarbon also known as volatile organic compounds. Governments worldwide regulate vehicle emissions of criteria pollutants.This paper focuses on criteria pollutants. Emissions from ICE vehicles also include carbon dioxide (CO2), a greenhouse gas that is the main combustion product of carbon-based fuels. Vehicle CO2 emissions are regulated around the world and are decreased by improving the fuel efficiency of the vehicles.

As output of regulations and future technology changes. Emissions from cars taxi and all other vehicles and stationary sources have reduced and atmospheric air quality has better significantly in most bigger cities in all over the world. The following sections review is based on earlier vehicle emission and air quality trends and discuss the future of vehicle regulations.

1.1 Literature Survey

Serial number	Title of paper	Author and year
1	Vehicle Emissions and their effect on natural environment	B.O. Bolaji and S.B. Adejuyigbe 2006
2	Vehicle criteria pollutant (PM, NOx, CO, HCs) emissions: how low should we go?	S.L. Winkler, J.E. Anderson, L. Garza1, W. C. Ruona, R. Vogt T.J. Wallington .2018
3	On-road vehicle emissions and their control in China	Wu, Ye, Zhang, Shaojun, Hao, Jiming, Liu, Huan, Wu, Xiaomeng. 2017
4	A review of vehicular pollution in urban India and its effects on human health	Chetana Khandar and Sharda Kosankar.2014
5	Vehicular Emissions in Review	Timothy Johnson 2016

2. Cause of Vehicular Pollution

2.1 Urban population

Between, 1951 and 2011, the urban population has multiplied, from 62.4 million to 377.1 million, and its proportion has induced from 17.3% to 31.16%. In a period of 1991, there were 18 cities with a population of over 1 million in 2012; this is estimated to stretched to 46 cities. This rapid induced in

unplanned urban population has resulted in an increase in consumption patterns and a large demand for transport, energy and other infrastructure, thereby putting a load on the pollution problem.

2.2 Vehicular Population in India

In India, the vehicle population is increasing at the rate of over 5% per annum and today the vehicle population is a nearly 40 million. The vehicle mix is also unique to India in that there is a very top proportion of two-wheelers are 76%.The growth rate of vehicles is the back support of economic development and the Indian automotive industry. Today, in the country about 7-8 million vehicles are manufactured annually. In 2011, the country reported 141.8 million registered all vehicles (Fig. 1).

The Road transport sector accounts for a share of 4.8% in India's GDP (MORTH, 2011). In India, the numerious transport vehicles has increased from 72.7 million in 2004 to nearly 141.8 million in 2011, of which two-wheelers accounts for nearly 72% of the total vehicular population . There is a direct connection between road transport system and air pollution in a town. Vehicular emissions depend on vehicle speed, age and emission rate. Increased traffic and restricted road space have decreased peak-hour speeds to 510 Km/h in the out of district areas of many major towns. We must retain that the estimation of road transport pollutant emission should permit significant seperation of the result by fuel type and composition, by vehicle type, by emission standard. Commonly, one differentiates also emission produces in and out of town, and also time scale can be need, depending on the aim of the environmental assessment.

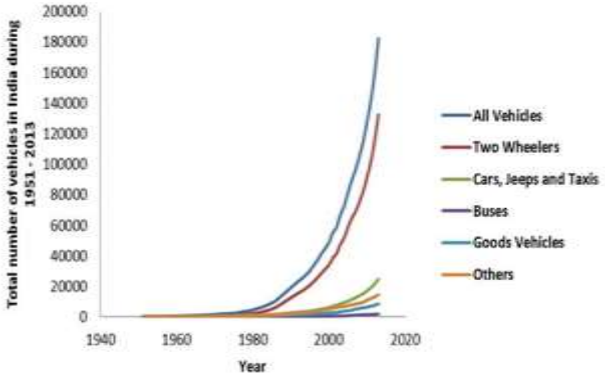

Fig. 1. Vehicle Registered in India.

3. Vehicle Fuel pollutants

Automotive vehicles exhaust several pollutants depending upon the type of quality of fuel swallow by them. The release of pollutants from vehicles also includes already released emissions of the fuel, the source and level of these emissions depending upon the vehicle structure, its maintenance, etc. The majority pollutants exhaust as a vehicle/fuel emissions are carbon monoxide,oxides of sulphur and polycyclic aromatic hydrocarbon. nitrogen oxides, photochemical oxidants, air toxics namely benzene, aldehydes, particulate matter, hydrocarbon.1,3-butadienIncreased

Fig 2 – Emitted gases

Automobiles are the basic source of air pollution in India's number of cities. In India, transportation sector exhaust an estimated 261 tonnes of CO2, of which 94.5% is donoted by road transport. The transport sector in India swallow about 17% of total energy and responsible for a 60% production of the

greenhouse gases from various activities. The pollution from vehicles is due to discharge like carbon monoxide, unburnt Hydrocarbon, lead,nitrogen oxides and SO2 and (SPM)Suspended particulate matter mainly from tailpipes.

Vehicles in number of metropolitan town are exhausted to account for 70% of Carbon monoxide(CO), 50% of Hydrocarbons(HC), 30% to 40% of Nitrogen oxides (Nox), 30% of (SPM) Suspended particulate matter and 10% of SO2 of the total pollution load of these cities, of which two-thirds is contributed by two-wheelers alone. These high levels of pollutants are mainly responsible and harmful for human as well as animal for respiratory and other air pollution-related ailments including lung cancer, asthma, etc., which is significantly greater than the national average.

4. Country's status

Overall Indian transport emission of CO2, CO, NOx, CH4, SO2, PM, HC, N2O and NMVOC are compendious in Table 1. During 2003–2004, overall transport emission of CO2 was 258.10 Tg. The CO2 donation of road sector, , railways, aviation and shipping was 243.82 Tg (94.5%), 7.60 Tg (2.9%), 5.22 Tg (2%) and 1.45 Tg (0.6%) respectively. Road sector and aviation mainly contribute 3.03 Tg (53.3%) and 2.57 Tg (45.1%) of Carbon monoxide (CO). Among all types (road, shipping, railways and aviation) of transport, road and aviation are the number of contributors to air pollution .

4.1 Emissions from different vehicle type of India

The emissions measured for various type of road transport vehicles are compendious in Table 4. Among various types of vehicles, Trucks and Lorries contribute 28.8% (CO2) carbon dioxide (70.29 Tg), 39% NOx nitrogen oxides (0.86 Tg), 27.3% SO2 (0.19 Tg) and 25% PM (0.03 Tg), which constitute 25% of the overall vehicular emission of India. Same with, two-wheelers are a number of source of (CO) carbon monoxide (0.72 Tg; 23.7%), Methane (CH4). (0.06 Tg; 46.4%), and Hydrocarbon (0.46 Tg; 64.2%) and buses are exhausting NOx (0.68 Tg; 30.7%) and PM (0.03 Tg; 20.5%). Vehicular emissions fluctuate with type, efficiency and the type of fuel used. Emission analysis based on the vehicle type reveals that bus and Omnibuses contribute higher CO2 carbon dioxide (CO2: 96.5%, NOx: 2.28%) differentiate to two-wheelers (CO2: 86.8%, CO: 7.18%, HC: 4.6%).

Passenger light motor vehicles (CO2: 86.8%, CO: 7.6%, NOx: 1.9%), jeeps and cars (CO2: 98.8%), taxi (CO2: 94.6%, SO2: 4.68%), Lorries and Trucks (CO2: 97.6%, NOx: 1.2%), better light motor vehicles (CO2: 98.4%), and trailers and tractors (CO2: 98.4%) is different (CPCB, 2010).

4.2 Pollution Load from road traffic in various megacities

Fig 3- Pollution due to traffic

The vehicle pollution load as estimated through a joint study directed by Central Road Research Institute (CRRI), National Environmental Engineering Research Institute (NEERI) and Indian Institute of Petroleum (IIP) in the year 2002 for four key pollutants (i.e. CO, NOx, HC and PM) in eight megacities, namely Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Kanpur and Agra are given in Table 2.

This is attributable to the largest number of automobiles utilizes in Delhi. From the Table, it can be seen that Delhi has the high ratio of vehicle pollution load differentiate to any other towns in the country.

4.3 Vehicular pollution problems in India

Motor vehicles have been nearly identified with increasing air pollution levels in main cities centers of the world . Besides substantial CO2 carbon dioxide emissions, significant quantities of CO carbon monoxide, Hydrocarbon, NOx nitrogen oxides, SPM and other air toxins are exhausted from these all vehicles in the atmosphere, causing serious environmental and health impacts. Like many other parts of the world, air pollution from all vehicles is one of the most serious and rapidly increasing problems in main cities centers of India .

The problem of air pollution has assumed serious proportions in some of the number of metropolitan cities of India and vehicular emissions.

Fig 4 – Problem Arises due to Pollution

Although earlier, improvement in atmospheric air quality with reference to the criteria pollutants (viz. NOx, SO2, CO and HC) have been observed in some of the cities, the air pollution situation in most of the cities is still far from satisfactory .

The problem has further been compounded by the observation of a large number of vehicles and differentially large motor vehicles to population ratios in these cities

5. Vehicle emission control strategies and policies

The emission inventory onserves clearly establish that atmospheric air quality in Chennai has disgraced. The following three strategies have been identified to decrease local and global pollutants .. Each strategy is discussed in detail with reference.

1. Deduction of vehicle kilometer traveled (VKT) through transit-oriented progress and travel demand management (TDM).
2. Advanced technology adopted (vehicles, fuel and I/M program)
3. Transport system management (TSM).

5.1 Advanced Technology:

Creating advanced technology to meet stringent standards may be a smart way to deduce vehicular emissions. Bharat Stage I, II, and III were known in 2000, 2001, and 2005 respectively for four-wheeled vehicles in Chennai. Bharat Stage IV is expected to be applied in 2010. Bharat Stages I and II were known during 2000 and 2005 respectively for two- and three-wheelers and are the most stringent norms overall worldwide.

Fossil Fuel quality must align with advanced technology to meet stringent emission standards. Sulphur content in fuel is the most crucial factor and has a drastic impact on emission-control technologies. Indicates the necessity of sulphur content to meet the various levels of stringent emission standards. Fuel injection technology with a two-way oxidation catalyst must be used to meet the Bharat Stage III standards in two- and three-wheeler segments

5.2 Policy Evaluation

Travel want for passenger and vehicles was estimated for 2005-2025 with 10-year intervals using the Equation 1. The share of vehicle travel demand feeded by various modes .The overall VKT in Chennai is look for to double earlier 2015 and induced 5 times by 2025. The annual increase rate of private vehicles is foreseeable to be about 21 percent between 2005 and 2025.

This fast growth is attributable to an induced in per capita income, induced access to personalized vehicles, and higher distances traveled. The major of buses is lower than 1 percent of vehicles, which caters to about 35 percent of the passenger travel wanted. However, in the future, it is to look for to deduce to 29 percent by 2025. The overall freight demand in the city went up 6.4 percent annually from 2005 – 2025.

6. Discussion and Conclusions

Vehicle emission deductions and with positive changes in air quality in the India have been impressive performance over the last three decades. As other regions implement the latest Indian emission regulations, similar results can be to look for. Regulations and auto manufacturer plans include induced vehicle electrification, further deducing local emissions. With simultaneously improvement in air quality following vehicle emission deductions, it is time to consider the long-term outlook for future vehicle regulations.

7. Acknowledge

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8. Reference

https://reader.elsevier.com/reader/sd/pii/S2095756421000714?token=F0CC12C608C54F445EA498228069E8C035217828645C3218C6AE277D32CE8BD87148C3765960A7432B19FF3E0D298978&originRegion=eu-west-1&originCreation=20221203110631

https://www.researchgate.net/publication/262212816_Vehicle_Emissions_and_their_Effects_on_the_Natural_Environment_-_a_Review

https://media.neliti.com/media/publications/279076-a-review-of-vehicular-pollution-in-urban-0f3926d1.pdf

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9047626/

https://iopscience.iop.org/article/10.1088/1742-6596/1198/8/082030/pdf

https://inpressco.com/wp-content/uploads/2018/04/Paper27356-360.pdf

https://www.frontiersin.org/articles/10.3389/fpubh.2020.00014/full