RESEARCH ARTICLE OPEN ACCESS

Measurement and Control of Emission in Two Wheelers

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ABSTRACT
Vehicle emissions are a significant contributor to ambient pollution, especially in urban areas. In general, developing countries experience higher levels of traffic-related pollution compared to developed countries due to the lack of pollution control measures. Since numerous studies document adverse health effects from vehicle emission exposure, there is a need of developing some measures for the control of exhaust and non –exhaust emissions produced by the two wheelers. In four wheeler vehicles many measures are taken to reduce the exhaust and non –exhaust emission. In my thesis work I worked to understand those steps which can be implemented with the two wheelers for to reduce the formation of emission like CO, HC, NOX, and CO2.

I. Introduction

Vehicle emissions represent a serious environmental health problem, which is expected to increase in significance as vehicle ownership increases globally. The United Nations estimates that over 600 million people worldwide are exposed to hazardous levels of traffic-generated pollutants (1989). Some of the worst pollutants, and those that are closely monitored in the United States, are nitrogen oxides, carbon monoxide, sulphur dioxide, lead, and particulate matter. According to the Environmental Protection Agency, vehicles account for 51% of carbon monoxide, 34% of nitrogen oxides and 10% of particulate matter released each year in the US. Clearly, vehicle emissions are a major source of ambient air pollution that must be controlled if air quality is going to be maintained. Many studies have documented adverse health effects associated with high concentrations of transport-related pollutants. Nitrogen oxides and sulphur oxides, for example, are associated with immune system impairment, exacerbation of asthma and chronic respiratory diseases, reduced lung function, and cardiovascular disease. Exposure to carbon monoxide can result in fatigue, headaches, dizziness, loss of consciousness, and even death at very high concentrations. Particulates are especially dangerous because they have been implicated in the development of lung cancer and higher rates of mortality. Lead is similarly dangerous as poisoning causes irreversible neurobehavioral consequences, such as decreased IQ and attention deficits, and death at high levels of poisoning. In addition to these pollutants, vehicle emissions contain volatile organic compounds (VOCs), a class of petroleum combustion by-products which includes many known and probable to carcinogens and reproductive toxicants. VOCs are also hazardous because they can react with sunlight to form ozone, which exacerbates asthma and has other adverse respiratory effects

II. Previous research

Many researches are made in this field to understand the rate of emission ejected by the two wheelers. Giorgio Zamboni et al (2013) [1], this experimental and theoretical investigation is being performed to evaluate exhaust emissions and fuel consumption of Heavy Duty Vehicles. ChauThuy Pham et al (2013) [2], they determined eleven PAHs and four NPAHs in particulates and regulated pollutants (CO, CO2, HC, NOx, PM) exhausted from motorcycles to figure out the characteristics of motorcycle exhausts. Fluorantheneand pyrene accounted for more than 50% of the total detected PAHs. Murugesan Venkatapathi (2012) [3], they altered spontaneous emission of an emitter near an arbitrary body can be elucidated using an energy balance of the electromagnetic field. From a classical point of view it is trivial to show that the field scattered back from anybody should alter the emission of the source. Maria V. Prati et al (2011) [4],Regulated pollutant emissions and fuel consumption were characterized at the exhaust of two Euro 3 4-stroke medium-size motorcycles during the execution of both standard and real world driving cycles. K.S. Nesamani (2010) [5], Rapid, but unplanned urban development and the consequent urban sprawl coupled with economic growth have aggravated auto dependency in India over the last two decades. This has resulted in congestion and pollution in cities.

III. Related works

Vehicle emissions control is the study of reducing the motor vehicle emissions -- emissions produced by motor vehicles, especially internal combustion engines.

Emissions of many air pollutants have been shown to have variety of negative effectson public health and the natural environment.

IV. Experimentation and methodology

The methodology followed in this work is to understand the method used to control the pollution or emission produced by the 2- wheelers. The main objective of this work is to reduce the emission by the use of catalytic converter with the tail pipe of the motor bike. Control of non-exhaust emissions like

(1) Fuel tank- The fuel tank emits fuel vapours into the atmosphere.
(2) Carburetor- The Carburetor also gives out fuel vapours
(3) Crankcase- It emits blow –by gases and fuel vapours into the atmosphere

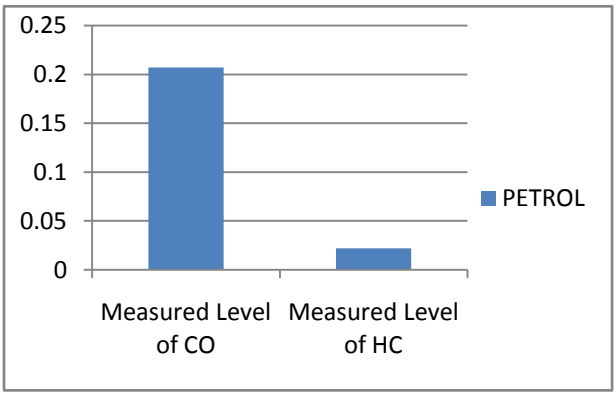
V. Result

For to find out the result for my work I compared the exhaust for both normal and catalytic converter fitted motor bike by petrol gas analyzer.

Before installing the catalytic converter with the motor bike I perform a pollution test with the help of a petrol gas analyzer system and the result that I found during the test are as follows

FUEL	Measured Level of CO	Measured Level of HC
PETROL	0.207	0.022

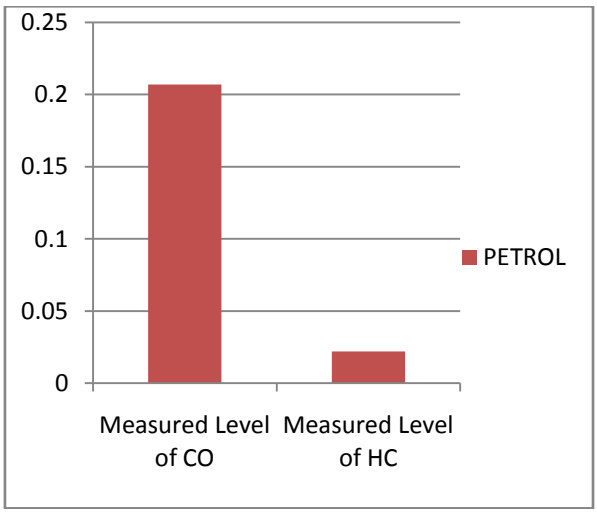
For understand more clearly we can see these values with the help of the tables.



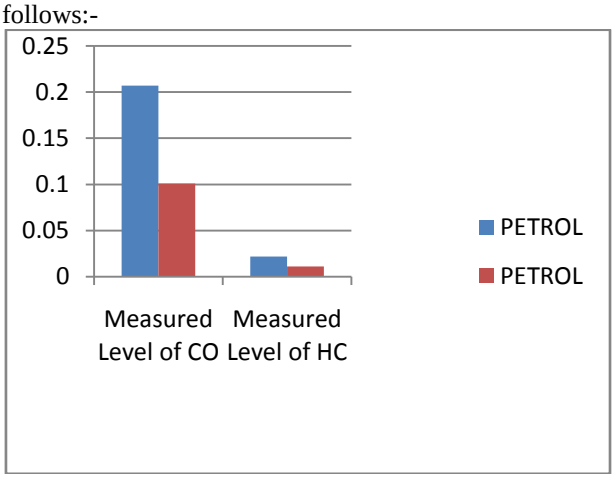
After installing the catalytic converter with same motor bike I perform a same test to find the new values.

FUEL	Measured Level of CO	Measured Level of HC
PETROL	0.101	0.011

For understand more clearly we can see these values with the help of the tables.



After finding out the values from both of the test I compare all the values which gives me the result for my work.The comparison of my data are as follows:-



From above table we can clearly see that the changes in the control of emission rejection through an motor bike bye the use of catalytic converter. The rejection of emissions becomes lower.

VI. Acknowledgement

The authors express their deepest gratitude to the Department of Automobile Engineering of Rustamji Institute of Technology BSF Academy Tekanpur, Gwalior for providing their full-fledged support to accomplish this research work**.**

References

[1] Giorgio Zamboni et al (2013), *"Assessment of heavy-duty vehicle activities, fuel consumption and exhaust emissions in port areas",* Applied Energy, Vol.111, pp. 921-929.
[2] ChauThuy Pham et al (2013), *"Polycyclic aromatic hydrocarbons and nitropolycyclic aromatichydrocarbons in particulates*

*emitted by motorcycles",*Environmental Pollution, Vol.183, pp. 175-183.

[3] StephaneEspie et al (2013), *"Data collection and processing tools for naturalistic study of powered two-wheelers users' behaviours",* Accident Analysis and Prevention, Vol.58, pp. 330-339.

[4] MurugesanVenkatapathi (2012), *"Emitter near an arbitrary body: Purcell effect, optical theorem and the Wheeler–Feynman absorber",* General of Quantitative Spectroscopy &Radiative Transfer, Vol.113, pp. 1705-1711.

[5] Maria V. Prati et al (2011), *"Influence of driving cycles on Euro 3 scooter emissions and fuel consumption",* Energy Conversion and Management, Vol.52, pp. 3327-3336.

[6] K.S. Nesamani (2010), *"Estimation of automobile emissions and control strategies in India",* Science of the Total Environment, Vol.408, pp. 1800-1811.

[7] Pasquale Spezzano et al (2009), *"Gas- and particle-phase distribution of polycyclic aromatic hydrocarbons in two-stroke, 50-cm3 moped emissions",* Atmospheric Environment, Vol.43, pp. 539-545.

[8] Clare L.S. Wiseman and FathiZereini (2009), *"Airborne particulate matter, platinum group elements and human health: A review of recent evidence",*Science of the Total Environment, Vol.407, pp. 2493-2500.

[9] Pasquale Spezzano et al (2008), *"Particle- and gas-phase emissions of polycyclic aromatic hydrocarbons from two-stroke, 50-cm3 mopeds",* Atmospheric Environment, Vol.42, pp. 4332-4344.

[10] Claudia Colombo et al (2008), *"The estimation of the bio availabilities of platinum, palladium and rhodium in vehicle exhaust catalysts and road dusts using a physiologically based extraction test",* Science of the Total Environment, Vol.389, pp. 46-51.