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Literature Review On Fabrication, Advancement And Emission Analysis of Carbon Absorbing Devised With Catalytic Converter Used In Four Stroke Two Wheeler

P.M.Sangadiya[1], M.V.Mohite[2]

[1]P.G. Student, Mechanical Engineering Dept, M.I.T., Mehsana, India
[2]Asst. Professor, Mechanical Engineering Dept, M.I.T.S, Mehsana, India

Abstract- *Nowadays, one of the greatest challenges faced by the mankind is the increasing pollution at an alarming rate. It is causing an environmental imbalance, increase the green house effect & impact on health of human being. Environmental imbalance created by automobile due to tailpipe exhaust emission which mainly depends on changes in driving conditions engine performance, composition of fuel & air fuel ratio. As there are large number of two wheeler automobile hence they contribute more in automobile environment pollution. There are two methods for controlling pollution which are pre-pollution control & post pollution control methods. This study is based on the pre-pollution control method in four stroke two-wheeler. In Present work, modified OEM design attaching carbon absorbing device because some leaded fuel decreases the efficiency of catalytic converter & thus increases rate of pollution. To increase the retention period of exhaust gas in catalytic converter providing more time for its oxidation and also to reduce harmful effect of lead fuel on catalytic converter. To provide a pre-filter device to increases good effect of catalytic converter. The proposed method is very effective in the prevention of environmental pollution contributed from two wheeler automobiles and open a gate way to study the change in concentration of exhaust emission due to carbon absorbing device with three-way catalytic converter.*

Keyword- *Pollution; Two wheeler automobile; Pre-pollution; Catalytic converter; Pre-filters*

I. INTRODUCTION

During the last ten years, the use of motor vehicles has tremendously increased due to population growth and increased industrialization. The motorized two-wheeler market has been rapidly increased particularly in the urbanized area of Asia about 80 percent of the 300 millon two-wheeler worldwide are in Asia as are 90 percent of world two-wheeler sales. Fig.1 shows growth of vehicle & Fig .2 shows the population of two wheeler in India. And table-1 show the total emission from Indian Transport.[6]

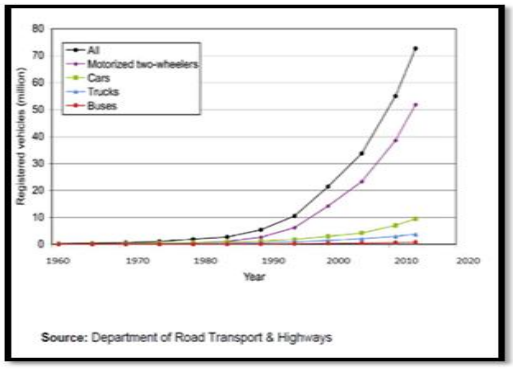

Figure 1. Growth of vehicle road transport & highway

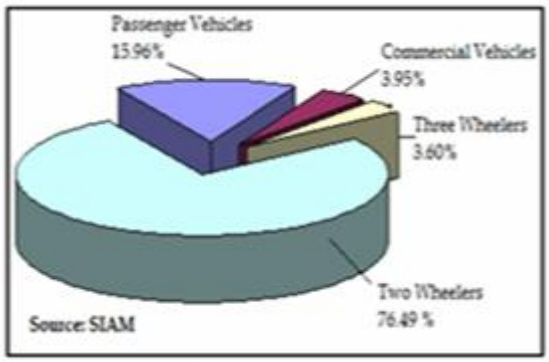

Figure 2. Population of two wheeler in India

	CO_2	CO	NO_x	CH_4	SO_2	PM	HC	N_2O
Shipping								
High speed diesel	782.28	10.66	8.5273	0.533	-	-	-	0.0064
Light diesel oil	162.18	2.21	1.7679	0.011	-	-	-	0.0013
Fuel oil	510.19	6.55	5.24	0.033	-	-	-	0.0039
Railways								
Coal	5.280	0.0155	0.0121		0.0421	-	-	
Electricity	Not considered				-	-	-	
High Speed diesel	5186.58	70.6712	56.54	0.353	-	-	-	0.0424
Light diesel oil	6.360	0.0867	0.0693	0.004	-	-	-	0.0001
Fuel Oil	25.04	0.3215	0.2572	0.0016	-	-	-	0.002
Aviation-								
High speed diesel	85.860	1.17	0.9359	0.0058	-	-	-	0.0007
Light diesel oil	6.360	0.0867	0.693	0.004	-	-	-	0.0001
Fuel oil	222.23	2.835	2.2828	0.0143	-	-	-	0.0017
Aviation turbine fuel	7294.14	2565.35	8.7331	6.549	-	-	-	-
Road transport	243816.6	3032.104	2213.85	126.78	709.09	153.127	723.409	-
Total	258103.14	5692.16	2298.29	133.8038	709.135	153.127	723.409	0.0568

Table 1. Total emissiom from India transport for 2011-2012 (Gg).

Vehicular emissions consist of the carbon dioxide, carbon monoxide, nitrogen oxide, hydrocarbons including lead, particulate matter etc. Inhaling of carbon monoxide and other pollutants hinders oxygen supply from blood into the tissues, as it combines with the iron in hemoglobin, leading to variety of ailments, viz. Cancer. Carbon dioxide causes the environmental problems related to global warming. The past decade has shown a sudden increase in the atmospheric concentration of heat-trapping gasses, due to human activity.

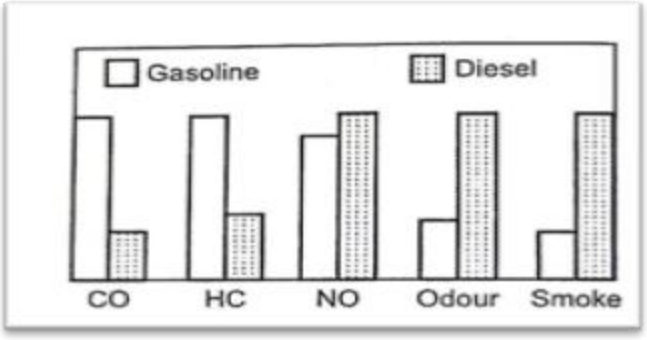

Figure 3. Comparison of emission from petrol and diesel engines

As Fig.3 shows the comparison of emission from petrol and diesel engines. It is clearly to be seen that there is a marked difference between the products of combustion of petrol and diesel engines. Where as petrol engines have somewhat similar emission pattern all diesel engines have different emission characteristics. One of these important heat-trapping gasses is carbon dioxide (CO_2). Carbon monoxide (CO) is considered as toxic pollutant, whose effective reduction can be achieved by using three-way catalytic converter[2] .This device is most effective to convert harmful gases due to engine exhaust into comparatively less harmful gases. Government of India has already made legislation for the use of Catalytic Converters in new passenger cars with effect from April 1995. But the day has come, where the number of two wheelers has overcome the four wheelers especially in Gujarat and thus it is required to reduce the amount of emission from these vehicles.[4]

II. LITERATURE REVIEW

Mukesh Thakur and Sailkhedkar N.K. [1] has developed "Reduction of pollutant emission from two-wheeler automobiles usingnano-particle as a catalyst". This paper is based on the post pollution control method in two-wheeler automobiles using nano-particle as a catalyst. To achieve the concentration of the pollutants is decreased, an innovative design of catalytic converterfor two-wheeler automobiles is proposed using nano-particle as a catalyst. The proposed method is very effective in the prevention of environmental pollution contributed from two-wheeler automobiles

Mukesh Thakur and N.K. Sailkhedkar [2] has introduce to "Improved and latest design of a nanosized catalytic converter for pollution prevention implemented to four stroke engine with experimental validationby modeling". In particular, new and better techniques for pollution control are emerging as nano-particles push the limits and capabilities of technology. In this research, modeling has been done for a four stroke spark ignition engine with nano-sized copper coated catalytic converter. It will throw a light on the reduction in emission achieved by nano-particle coating. This paper opens a gateway to study the changes in the concentration of exhaust emissionsdue to the nano-material coating. The modeling will help in understanding the mathematical nature of the process.

Shijinshuai[3] has developed "Optimization of automotive catalytic converter by numerical modeling and simulation with detailed mechanism."This paper .Based on a detailedsurface reaction mechanism of $CO–O_2$ reaction over rhodium.The effect of precious metal loading was analyzed and a significant improvement in CO conversionwas obtained at a typical low temperature .

Avinash Kumar Agarwal, [4] has studies "An evaluation of the emission profile for two-wheelers at a traffic junction".Including gravimetric and online measurementsat different engine speeds and a no load condition at a simulated traffic junction .In this experimental study, two-wheeler vehicles with different makes, technologies and engine capacities were tested for exhaust emissions .

Rustom Cursetjiwae [5] has introduce to "Catalytic converter design for two-wheeler."Design of catalytic converter, a catalytic converter has to perform efficiently under adverse conditions of fluctuating temperatures, space velocity and composition of the engine out emissions. This paper briefly reviews the different facets of catalytic converter design and demonstrates that mutual developmental activity between the automobile manufacturer and the catalyst designer is vital to achieve a common social goal of preserving the environment for future generations.

III. LITERATURE REVIEW SUMMARY

A number of studies during the 60s reported evidence that seventy-five percent of carbon monoxide come from automobile. In all studies different techniques are used to control harmful pollution from vehicles. As per the all previous research and review papers, majority of them focused use of nano particle as catalyst, improved & latest design of nanosized catalytic converter, studies on ROL profile in catalytic converter and also modification and optimization of catalytic converter . In present studies, with the use of different pre-filter (poisoning control device) for catalytic converter in four stroke two wheeler. Some leaded fuel reduce the oxidation process by catalytic converter and so decreased the efficiency of it. Also to increase the retention period of exhaust gas in catalytic converter providing more time for its oxidation and to reduce poisoning effect of lead fuel on catalytic converter. The proposed method is very effective in the prevention of environmental pollution contributed from two wheelers.

IV. OBJECTIVES

A huge amount of research and development activity has been devoted to control the pollution from these vehicles in recent years. In particular new and better technique for pollution control are emerging different pre-filter with three-way catalytic converter applied to a two wheeler.

In the presented work, with the use of thin wall non glaze porous ceramic filter, copper porous mesh filter and aluminum porous mesh filter as carbon absorbing devices are studies. It provides more time for oxidation of exhaust gases & is important for reducing harmful effect of leaded fuel with increase efficiency and life of catalytic converter in four stroke-two wheeler that are designed to meet the special requirement of India and other developing countries.

V FUTURE WORK

In this studies,

- To do Experimental measurement and the Emission analysis of pre-filter at different time and RPM of Hero Honda splendor plus engine.
- To find out capacity of each material to reduce CO & HC
- It's effect on catalytic converter.
- Life cycle of catalytic converter and pre-filter.

- And generate final statement of back pressure effect due to pre- filter in future work.

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