

Reduction of Harmful Gases from Exhaust by Using Perforated Tube

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Abstract: Air pollution is most vital from the general public health purpose of road, as a result of each individual person breathes or so 22000 times each day, apneic regarding fifteen to twenty two metric weight unit of air daily. Contaminated air causes physical unwell impact decides undesirable aesthetic and physiological effects. Pollution will be outlined as addition to our atmosphere of any material, which is able to have an adroit impact on life upon our planet. The most pollutants contribute by vehicles are carbon monoxide gas (CO), turn organic compound (UBHC), oxides of chemical element (NO_x) and Lead. vehicles aren't the sole supply of pollution, alternative sources reminiscent of power generating stations, industrial and domestic fuel consumption, refuse burning, industrial process etc. additionally contribute heavily to contamination of setting [our surroundings therefore it's imperative that serious tries ought to be created to conserve earth's environment from degradation.

I. INTRODUCTION

Current Indian Emissions Scenario:

Reduction of green house effects gases has taken to attention of researchers and scientists around the globe. In recent years, these concerns have risen than ever before. The large amounts of carbon dioxide being emitted in to the atmosphere could cause severe global climate changes. Recent atmospheric observations conform that the concentration of CO₂ in the atmosphere has increased by nearly 30% for the last 150 years, to an accelerating trend in last year's. In 1997, World community including India accepted Kyoto protocol. Its importance and possible implementation was emphasized in 2005. The objective was to address the problem of climate changes occurring due to human activities. Protocols were defined to flow the footwork of UN Framework Convention on Climate Change.

It has been long observed that diesel engines play a crucial role in the transport industry, agriculture, mining and many other industries. Considering the available fuel resources and the present technological development, diesel fuel is evidently indispensable. In general, the consumption of fuel is an index for finding out the economic strength of any country. In spite of everything, we cannot ignore the harmful effects of the large mass of the burnt gases, which erodes the purity of our environment every day.

Nowadays Air pollution is major problem. The main pollutants contribute by automobiles are CO, UBHC,

NO_x and Lead etc., Other sources such as electric power generating stations, industrial and domestic fuel consumption, refuse burning, industrial processing. So it's imperative that serious tries ought to be created to conserve earth's atmosphere from degradation. Associate greenish blue silencer is a shot during this direction; it's principally managing management of emission and noise. Associate greenish blue silencer is fitted to the pipage of engine.

II. LITERATURE REVIEW

Akhil Anil Kumar et.al (May 2016) had observed that the aqua silencer is successfully effective in reducing emission of gases from the engine exhaust. By using water as a medium, the sound levels have been reduced and by using activated charcoal in water, it produces almost pollution-free and smokeless emission and is also cheap considering long term use. The aqua silencer's performance is almost equivalent to the conventional silencer. It can be widely used in industrial engines and with a little improvisation, in heavy weight vehicles. This project analyzed the smoke content of the exhaust gas before and after treatment and it was found that there is a considerable reduction in the emission as pointed out by the test results.

G.Balasubramanian et.al (2014) had analyzed the contents of the exhaust gas before and after the treatment and it was found that there is a considerable difference in the percentage of harmful products in the emission. Sarath Raj et.al (March 2016) had found that it is more effective in the reduction of emission gases from the engine exhaust using perforated tube and charcoal, by using perforated tube the backpressure will remain constant and the sound level is reduced. It is smokeless and pollution free emission and also it is very cheap. It can be also used both for two wheelers and four wheelers and also can be used in industries.

Alen.M.A et.al (Aug.2015) had observed that by using perforated tube the back pressure will remain constant and sound level get reduced. The water contamination is found to be negligible in aqua silencer.

III.PARTS OF OUR SYSTEM:

- Perforated Tube
- Non- Return Valve
- Assembly
- Water lime stone powder

- Activated carbon pallets

1. Perforated Tube:

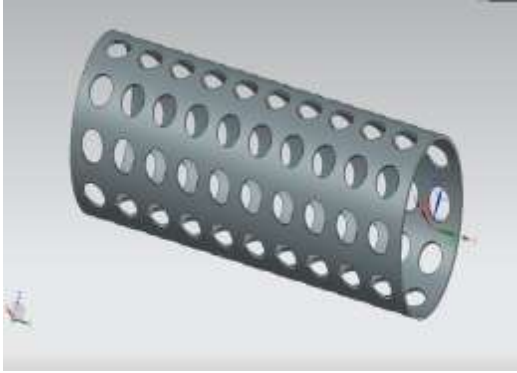


Fig: Perforated Tube

2. Non return valve:



Fig: Non return valve

3) Activated Carbon Pallets:



Fig: Activated Carbon Pallet

4) Lime Stone Powder:

ADVANTAGES

- No vibration when the engine is running.
- Start the engine easy.
- Control emission and noise in greater level.
- Carbon is precipitated.



Fig: Lime Stone Powder

DISADVANTAGE

- Need to alter the silencer which may increase the total weight of the vehicle.
- Lime water filling is required once in a year
- Silencer weight is more comparing to conventional silencer.
- Additional space is required.

IV. CONSTRUCTION AND WORKING PRINCIPLE

1. Construction: An Aqua Silencer basically consists of a perforated tube which is installed at the exit of the exhaust from the engine, which may have holes of variable diameters. This is done to divide the gas molecules of large proportions to form gas molecules of smaller diameter. Theoretically, four or more sets of holes are made on the perforated tube by drilling. The opposite end of the tube is sealed by a plug. Lime water is stored inside the perforated tube, which chemically reacts with the exhaust coming from the engine. A small coating of activated charcoal is provided all around the perforated tube using an inner box which holds the charcoal in place and separates the charcoal and lime water from the water in the Aqua Silencer.

2. Working: When the exhaust from engine enters the Aqua Silencer, gas molecules of large proportions are converted into gas molecules of smaller diameter using the perforated tube and then they chemically react with the lime water solution and ultimately passes through the charcoal layer, which again purifies the exhaust gases. The activated charcoal is highly porous and has a quite high absorption capacity due to possession of extra free valences in it. Since the inner box containing the charcoal layer is immersed in water, noise produced is damped and reduced to a low level. Hence, the Aqua Silencer reduces noise and air pollution to an acceptable level. C. Experimental Setup Engine Specifications 1. Engine : Kirloskar 2. Fuel : H.S.Diesel 3. B.H.P : 12 KW 4. RPM : 1500 5. Lubricating Oil : SAE 30 Fig 9: Experimental Set Up Outlet of the generator is connected to the inlet of the aqua silencer by using CPVC pipe.

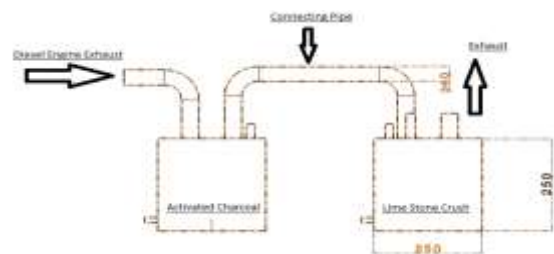


Fig : Schematic Diagram

V. RESULTS

	Prescribed Standard CO ₂	Measured Level CO ₂	Prescribed Standard HC	Measured Level HC
Ordinary Silencer	3.50	0.83	6000	400
Aqua silencer	3.50	0.10	6000	340

Table for CO & HC Level at Idling (% volume)

	Sound level without Silencer	Sound level with Aqua Silencer
Without any load	104.5 db	75.0 db
50% load	106.5 db	76.5 db
100% load	107.5 db	78.0 db

Table For Sound Characteristics in db

VI. CONCLUSION

The blue silencer is simpler within the reduction of emission gases from the engine exhaust gas exploitation perforated tube. By exploitation water as a medium the sound are often down and conjointly by exploitation C in water. we will management the exhaust emission to a bigger level. The water contamination is found to be negligible in blue silencer, as a result of the quantity of acidity level in blue silencer is predicted to be below the damaging acidity. i.e. 250mg/lit. it's smoke-free and pollution free emission and conjointly the lowest. The blue silencer's performance is sort of reminiscent of the traditional silencer.

In No load condition, by using AQUA Silencer the NO_x will be reduced to 29.9%, the Particulate Matter will be reduced to 70%. In the Smoke Density will be reduced to 67.36%.

VII. ACKNOWLEDGEMENT

We express my special thanks of gratitude to my guide Prof. S.R. Kulkarni as well as our (Head of Department) Prof. S.M Alge and Dr. R K Lad (Principal) who gave us the golden opportunity to do this wonderful project on the topic "REDUCTION OF HARMFULL GASES FROM EXHAUST BY USING PERFORATED TUBE" which also helped us in doing a lot of Research and we came to know about so many new things we really thankful to them. Secondly we would

also like to thank our parents and friends who helped us a lot in finalizing this project within the limited time frame.

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