International Journal of Advanced Technology in Engineering and Science
Vol. No. 09, Issue No. 04, April 2021
www.ijates.com
ijates
ISSN 2348 - 7550

ELIMINATION OF CARBON PARTICLES FROM SMOKE IN TWO WHEELERS

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ABSTRACT

Global warming is increasing on our earth due to major increase in the pollution. Air pollution is very serious on our earth. So it is required to solve these problems by taking various serious attempts. Hence to reduce these pollutants from Exhaust of Engine a new technology is introduced called Aqua silencer. Sound produced under water is less hear able than it produced in atmosphere. This mainly because of small sprockets in water molecules, which lowers its amplitude thus, lowers the sound level. Because of this property water is used in this silencer and hence its name aqua silencer. Aqua Silencer is a modified version of a conventional silencer aimed at the reduction of toxic emission. Aqua silencer is one of the attempt taken in reduce the air pollution. It I fitted to the exhaust pipe of engine or system. These Silencers is used to reduce the noise and control the emission of dangerous gases. An aqua silencer is an attempt in this direction which is mainly dealing with control of emission and noise. . The aqua silencer system is design for replace commonly used single unit silencers in engine with its slender structure and less weight.

Keyword: Pollution Free, Charcoal Layer, Perforated tube

I.INTRODUCTION

The aqua silencer reduces emission noise because, the sound produced in aqua silencer under water having less amplitude than the sound produced in open atmosphere .These is happen because of in water molecules there are small sprockets which lowers amplitude of emission gases and lower the sound level. In Aqua silencer the main component perforated tube which consists of number of different diameter holes. Generally these are 4 set of holes on perforated tube. The charcoal layer which is pasted over perforated tube can control the emission using the activated charcoal and highly porous extra free valences so these layer having high absorption capacity. It controls the noise & emission in an ic engine. It is fitted at the exhaust of the pipe; sound produced under water is less hear able than sound produced in the atmosphere. The emission of gases can be controlled by using the activated charcoal layer & lime water. The noise and smoke level is considerably less than the conventional silencer; there's no need of a catalytic converter and it is easy to install. In this silencer, the Charcoal and Water is used so it is called hybrid aqua silencer, and it is useful in automobile, industry, DG sets & DG machines, Marin and Boats also so, it is known as hybrid universal aqua silencer. Aqua silencer is easy to install and there is no need of catalytic converter. Aqua silencer is one of the important methods for effective

reduction of toxic gases and noise.

II. LITERATURE REVIEW

A lot of effort is being made to reduce the air pollution from petrol and diesel engines and regulations for emission limits are also imposed. Furthermore, developments in petrol and diesel engines, combined with improvements in the vehicles, will make fuel consumption reduction of 40% or more in the future cars. One such development is improvement of the silencer unit of an engine. This is where an Aqua Silencer comes into play.

An Aqua Silencer mainly deals with control of emission and noise in engine exhaust .It 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 using drilling. The other end of the perforated tube is sealed using a plug.

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. This unit is then placed in a container in which water is filled to a certain level. A small opening is provided on the lid of the inner box which carries the exhaust from it to the outside using a small diameter pipe. A U-bend of pipe is constructed at the end of perforated tube which doubles as a non-return valve which prevents the back flow of engine exhaust or lime water back into the engine. After passing over the charcoal layer, a portion of the gases dissolve into the water and finally the exhaust gases escape through the opening in to the atmosphere.

Emission is a term that is used to describe the totality of undesired gases and particulates which are released into the air or emitted by numerous sources. Its amount and type change with changes in the industrial activity, technology, and a number of other factors, such as air pollution regulations and emissions controls.

In addition to heat and water vapour, the pollutants formed in engine exhaust are,

- Carbon monoxide (CO)
- Carbon dioxide (CO2)
- Oxides of Nitrogen (NOx)
- Sulphur dioxide(SO2)
- Particulate and Unburned Hydrocarbons (UBHC)
- Respirable combustible Dust (RCD)

The above polluting contents in the engine exhaust are to be controlled by the Aqua Silencer.

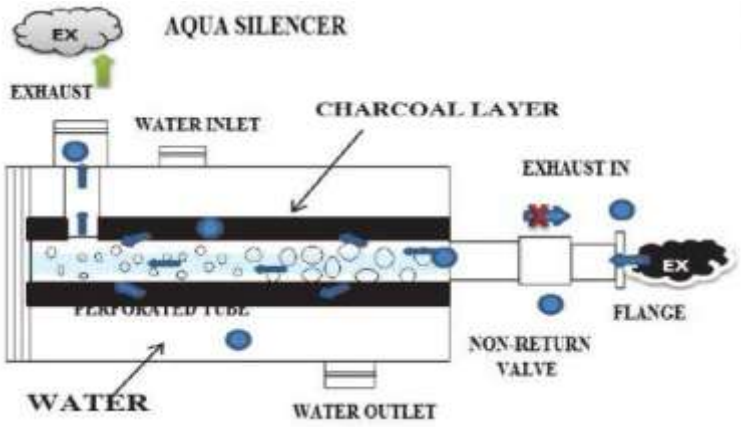
III.OBJECTIVE OF THE PROJECT

There has been an increasing concern in recent years over the increasing of transportation and discharge of industrial waste waters into environment. The engine emission contains air pollutants and other species. Almost all pollutants are toxic in nature. Some of the examples are CO, CO2, NOX, and Hydrocarbon. Hence, removal of these pollutants was selected as the primary concern. There are several expensive techniques available in developed countries.

Though in developing countries (for instance, India), adsorption technique which is less expensive and economically feasible is used. It has been selected for the present study using some cheap cost chemicals as an effective adsorbent. Therefore the objective of the present work is to test the ability of an Aqua Silencer in removing air pollutants and reduce noise of emission from engine.

IV.WORKING PRINCIPLE

The exhaust gases from engine enters from inlet to aqua silencer then perforated tube convert high mass of bubble to the low mass of bubbles. Then this gases passes through charcoal layer which again purify the gas. This charcoal layer is highly porous and possess extra free valence so it having high absorption capacity. During that gases get contact with lime water they chemically react with it. The charcoal layer is covered with outer shell which is filled with water due to that emission noise is reduces. The sound produced in the water having less amplitude than the sound produced at atmosphere. It happen because of water molecule which lower its amplitude. After passing over charcoal layer some of the gases may be get dissolved into the water. Finally exhaust gases escape through opening at the top of container into the atmosphere hence from above working principle aqua silencer reduces noise and pollution



Chemical Reactions:

$$Ca(OH)_2 + 2HNO_2 = Ca(NO_2)_2 + 2H_2O$$

$$Ca(OH)_2 + 2HNO_3\ Ca(No_3)_2 = 2H_2O$$

When the carbon-di-oxide present in the exhaust gas comes in contact with the limewater, calcium carbonate will precipitate. The calcium carbonate when further exposed to carbon-dioxide, calcium carbonate will be precipitated. The following is the chemical reaction.

$$Ca(OH)_2 + SO_2 = CaSO_3 + H_2O$$

From calcium carbonate, calcium sulphite will precipitate and CO_2 will be by-product. Because of the small percentage and SO_2 presence, the liberation of Carbon dioxide is very less. But the liberated CO_2 will again combine with $CaCO_3$ to form calcium bicarbonate.

V.MERITS

- No vibration when the engine is running.
- Cost is reduced 60 to 70% compared to ordinary silencer.
- Sound is reduced
- Low cost
- Start the engine easy.
- Control emission and noise in greater level.
- Carbon is precipitated.

VI.DEMERITS

- Lime water filling is required once in a year.
- Silencer weight is more comparing to Conventional silencer.
- Additional space is required.

VII.APPLICATIONS

- It is used in marine & boats.
- It is applicable for DG sets & DG machine.
- It is used in industrial sector.
- It is also used in automobile sector.

VIII.CONCLUSION

The aqua silencer is more effective in the reduction of emission gases from the engine exhaust using perforated tube, lime water and charcoal. By using perforated tube the back pressure will remain constant and the sound level is reduced. By using perforated tube the fuel consumption remains same as conventional system by using water as a medium the sound can be lowered and also by using activated charcoal in water we can control the exhaust emission to a greater level. Due to use of water as a medium sound reduces these system having pollution free emission and smokeless. These systems are very cheap. This system is used for both four wheelers and two wheelers. It plays important role in industries.

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