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A PATH FOR HORIZING YOUR INNOVATIVE WORK

ADVANCED EMISSION REDUCER SYSTEM (AERS)

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Abstract: Many new technologies are emerging and developing in the automobile sector. Serious efforts are made to develop the pollution control technologies such as Exhaust Gas Recirculation (EGR), Catalytic Converter etc. as pollution has become the biggest problem in the world. Thus it is imperative that the serious attempts should be made to conserve earth's environment from degradation. ADVANCE EMISSION REDUCER SYSTEM (AERS) is one such better solution system which has been introduced to control the pollution due to vehicular emissions effectively. This system helps to reduce emission of I.C Engine to about 80% to 85%. This system is mounted in the emission manifold of the vehicle. This system mainly depends on venturi and uses the principle of venturi to reduce pollution. The venturi effect is a jet effect is that in the convergent section, the pressure of the jet decrease as the area decreases with increase in velocity of that jet, in the throat section the pressure and velocity is constant proper mixture is prepared. A fine spray of ammonia or urea with distilled water solution is allowed to pass into venturi with the help of 12 volt DC motor and injectors in the throat of venturi. When the emission gases passes through the two respective ventures, the harmful sulphur gas react with ammonia with distilled water and nitrogen oxide react with purified urea with distilled water solution to reduce emission. The pollutants from emission before and after test are measured with help of Pollution under control (PUC) tester. This system reduces carbon monoxides and hydrocarbons on large scale whereas sulphur and nitrogen oxide as well. In this system as the pollutant molecules in the emission increases, the reaction rate increases as well. This system has most advantages over the other pollution control techniques.

Keywords: Pollution Control, Venturi, Urine of Sheep, Silencer, Reservoirs.



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INTRODUCTION

One of the greatest problems that the world is facing today is that of environmental pollution, increasing with every passing year and causing grave and irreparable damage to the earth. Pollution concentrations have been rapidly increasing in the major urban areas caused mainly by the increasing use of vehicles. Vehicular Pollution contributes to 72% of the total air pollution according to "Environmental Pollution Control Board". And thus we as humans need to confront this. Thus technologies should be introduced and made use of to control the vehicular pollution on a high.

I. CONSTRUCTION

It consists of 2-stroke engine running on petrol, silencer, two venturies fitted in to the silencer, two 12 volts wiper DC motors and solution reservoirs or tanks. The two venturies are fitted into the silencer dimensionally. Two injectors are placed over the two respective venturies to spray the solution.

Venturi consists of three parts i.e. convergent cone, throat, and divergent cone.

Dimensions of venturi are as follows:

1. Convergent cone diameter = 2cm
2. Divergent cone diameter = 4cm
3. Length of convergent cone = 3cm
4. Length of divergent cone = 9cm
5. Length of throat = 2cm
6. Length of spray pipe = 7cm

A. Venturi

A venturi is device which gives the constant pressure and constant temperature. It consists of following three parts.

- 1) Convergent cone
- 2) Throat
- 3) Divergent cone

B. Venturi Effect

The Venturi effect is a jet effect; as with an (air) funnel, or a thumb on a garden hose, the velocity of the fluid increases as the cross sectional area decreases, with the static pressure correspondingly decreasing. According to the laws governing fluid dynamics, a fluid's velocity must increase as it passes through a constriction to satisfy the principle of continuity, while its pressure must decrease to satisfy the principle of conservation of mechanical energy. Thus any gain in kinetic energy a fluid may accrue due to its increased velocity through a constriction is negated by a drop in pressure. An equation for the drop in pressure due to the Venturi effect may be derived from a combination of Bernoulli's principle and the continuity equation.

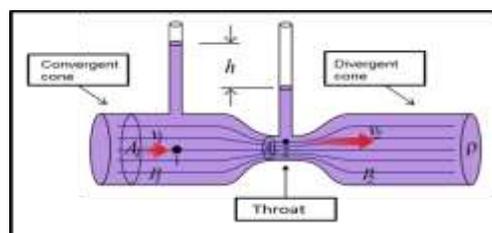


Fig. 1 Venturi Effect

Solutions used: Ammonia with distilled water or purified urea with distilled water and Urine of sheep. The primary Layout of the Advance Emission Reducer System AERS is shown in the figure below:

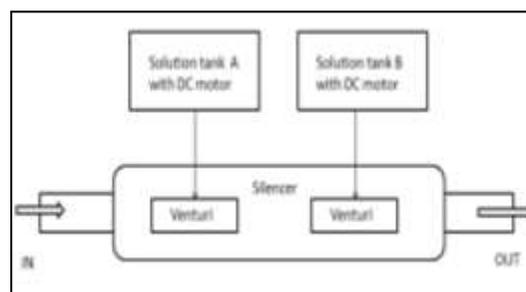


Fig. 2 Primary Layout of Advance Emission Reducer System (AERS)

II. WORKING

AERS works on the principle of venturi effect .The Venturi effect is a jet effect; as with a funnel the velocity of the fluid increases as the cross sectional area decreases with the pressure correspondingly decreasing .The venturi constitutes the most important role in this system. Venturi is designed for swirling motion of gases. The venturies create a back pressure at its

middle section. When the exhaust gases passes through the venturi the constant pressure of the gases accommodate into the throat and the swirling takes place. At this stage the purified urea with distilled water is passed through one venturi while sheep urine from other. Ammonia or sheep urine reacts with sulphur and purified urea with H_2O . Thus this reduces the percentage of carbon dioxide, nitrogen oxide, hydrocarbons and sulphur. The solution is sprayed by means of 12 volt DC motor. Thus AERS works for reducing the smoke emission and pollution created due to the emission harmful gases.

III. ADVANTAGES

1. AERS helps to reduce the carbon monoxide and hydrocarbons contents from the emission smoke by 80-90% and reduces the pollution.
2. This system can be implemented in any vehicle i.e. two wheeler, three wheeler and four wheeler.
3. The solutions used are cheap.
4. If mass production is done , it can be very economical system
5. This system doesn't possess any harm to human beings and animals.
6. It can be used for diesel as well as petrol engine.
7. Sheep urine is used in this system. Thus the poor people who pets animals like sheep's can get the mean for earning.

IV. DISADVANTAGES

1. Corrosion can take place inside the silencer as liquid solution can react with smoke when passed through it.
2. Back Pressure can be created in the silencer.

V. RESULTS of TEST

After taking test of AERS on PUC Tester following results take place.

A. Results of First Test

When solution of ammonia is used with distilled water and urine of sheep the results are as follows:

TABLE I: Results of first Test:

| Gases | Before test % in Volume | After test % in volume | Difference between % in volume |
|-------|-------------------------|------------------------|--------------------------------|
| CO | 6.887 | 0.996 | 5.272 |
| HC | 6266 ppm | 574 ppm | 5692ppm |

B. Results of second Test:

When solution of purified urea is used with distilled water and urine of sheep the results are as follows:

TABLE I Results of second Test

| Gases | Before Test % In Volume | After Test % In Volume | Difference between % In Volume |
|-------|-------------------------|------------------------|--------------------------------|
| CO | 2.719 | 0.528 | 2.192 |
| HC | 2033 ppm | 313 ppm | 1720 ppm |

VI. CONCLUSIONS

From this paper we conclude that pollution can be controlled by using the Advance Emission Reducer System (AERS) on a global level as it is the need of hour. If pollution goes on increasing it will cause an irreparable damage to the earth and thus this system can prove to be effective to control the vehicular pollution.

Thus following are the other major conclusions that are made:

- 1) We can achieve BS-5 norms with the help of Advance Emission Reducer System (AERS).

- 2) Results obtained are better than that of other systems such as Catalytic Converter, Exhaust Gas Recirculation etc.
- 3) It is more efficient and reliable system for pollution control.

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