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Dynamic Method to Control the Pollution from Heavy Vehicles

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ABSTRACT: Rapid urbanization and increase the number of motor vehicles, truck and buses impose a serious effect on human life and it's environment in recent years. Most of the cities of the India are affected by extremely high level of urban air pollution particularly in the form of CO, SO2, NO2, PM (particulate matter) and RSPM(respires suspended particulate matter). Transport sector a lot of share the environmental pollution (around 70%) . Among these pollutants CO is the major pollutants coming from the transport sector, contribution of 90% of the total emission. Hydrocarbon are next to CO. It is indeed interesting to observe that the contribution of transport sector to the particulate pollution is as less as 3-5%, most of the SPM (Suspended particulate matter) are generated due to re suspension of the dust out of which PM 10 is the most prominent air pollutant. NOx is another important air quality indicator. All these factor decides how much air is pollute. All these situation indicates that air pollution becoming a major problem in India. It also affects our health and due to pollution, million of people will die in the complete world. That's why it a very serious problem and it must be needed to control these pollution.

Key Words: pollution, RSPM, PM, SPM, CO, NOx, etc.

I. INTRODUCTION:

Air pollution is one of the serious environmental concern of the urban Asian cities including India where the majority of the population is exposed to poor air quality. Due to continuous movement of the vehicle either heavy vehicles or motor vehicles, they are responsible to pollutes our environment. So as a human we thought that how we can reduce the pollution. We are provides some specific concept by which after changing some modifications in vehicles, we can reduce the pollution not completely but so much of pollution and it's not dangerous as much, today is occurs. As Increasing in purchasing power means that more people can now affords car and this is bad for the environment but also we can not replace these things because it becomes part of our life. Vehicles pollution has grown at an alarming rate due to growing urbanization in India. The air pollution from vehicles in urban areas, particularly in big cities, has a become a serious problem. The pollution from vehicles has begun a tell through symptoms like cough, headache, nausea, irritation of eyes, various bronchial and visibility problems. We will provides specially for the heavy vehicles .

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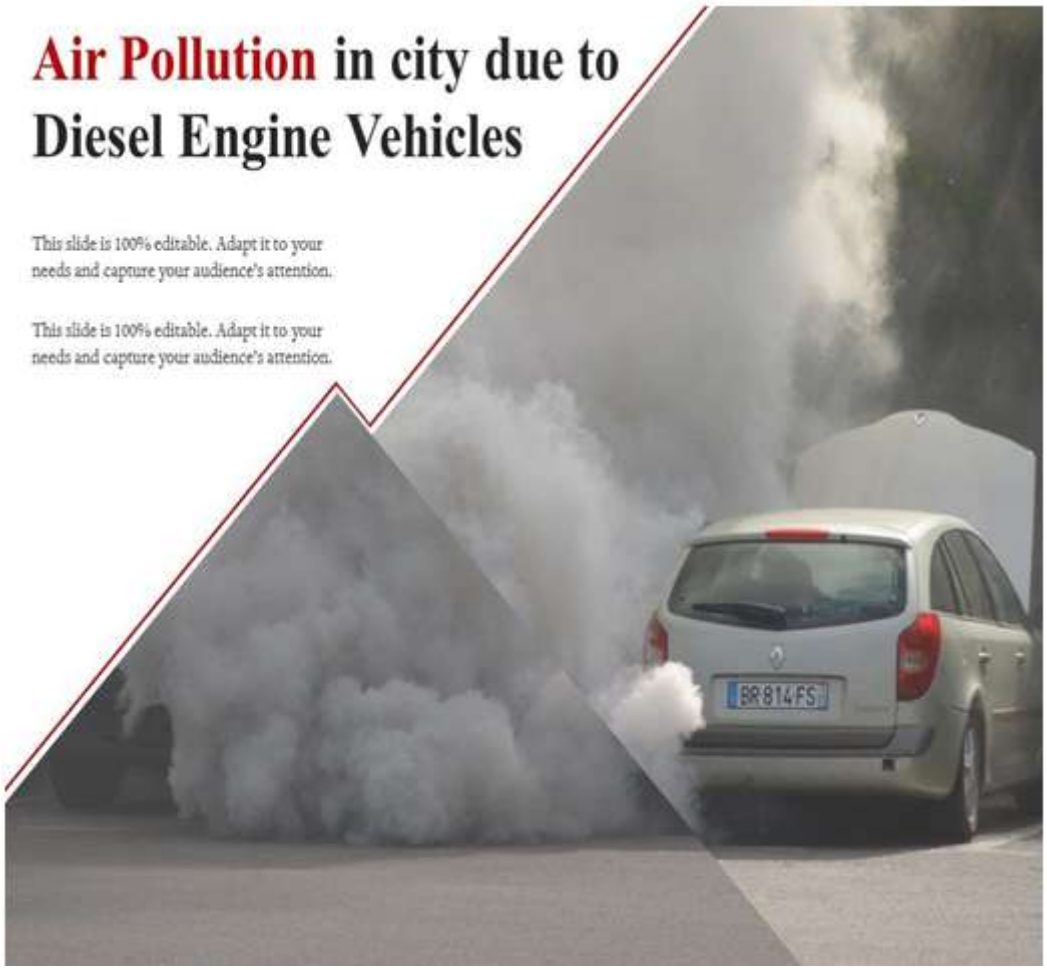

Fig. 01 (Air pollution due to motor vehicle)

FACTOR AFFECTING THE POLLUTION: Cars, trucks and buses produce air pollution through out their life cycle, including pollution emitted during vehicle operation and fuel production. Additionally emissions are associated with refining and distribution of fuels and to a lesser extent, manufacturing and disposal of the vehicles. There are following major pollutants from motor vehicle.

Pollutants	Contributions	Reference
Carbon monoxide	~ 90%	EPA(2000)
PM (2.5)	~ 25-30%	DEFRA (2012)
Nitrogen Oxides	~ 40%	EPA (2000)
Average air toxic	~ 21%	EPA (1999)

Fig.02 (estimate average contribution of motor vehicle emission to ambient level of major air pollutants)

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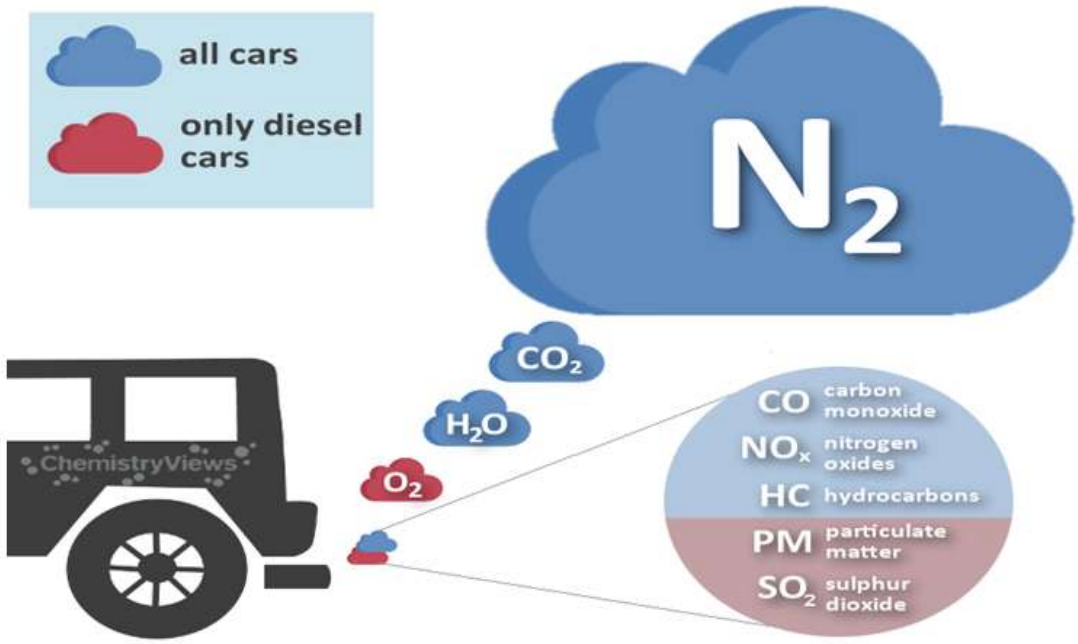

Fig. 03(gas present in exhaust emissions from vehicle)

Particulars matter(PM) : One type of particulate matter is the sootseen in vehicle exhaust. Fine particles less than one tenth the diameter of a human hair, pose a serious threat to the human health, as they can penetrate deep in to the lungs. PM can be primary or secondary pollutants from hydrocarbon and nitrogen oxides and sulfur dioxide. Diesel exhaust is a major contributor to PM pollution.

Carbon monoxide(CO) : This odorless, colorless and poisonous gas is formed by the combustion of the fossils fuels such as gasoline and is emitted primarily from the cars and trucks. When inhaled, CO blocks oxygen from the brain, heart and other vital organs.

Nitrogen oxides (NOx) : These pollutants from ground level ozone and particulate matter (secondary) . Also harmful as primary pollutants, NOx can cause lungs irritation and weaken the body's defenses against the respiratory infections such as pneumonia and influenza.

Sulphur dioxide (SO2) : The power plants and the motor vehicles create this pollutant by burning the Sulfur containing fuels , especially diesel and coal. Sulfur dioxide can react in the atmosphere to form fine particle and as, other air pollutants, poses the largest health risk to young children and asthmatic.
Greenhouse gases : Motor vehicles also emit pollutants predominantly carbon dioxide that contribute to global climate change. In fact, tailpipe emissions from cars, trucks and buses account for over one fifth of the United States 'total global warming pollution.

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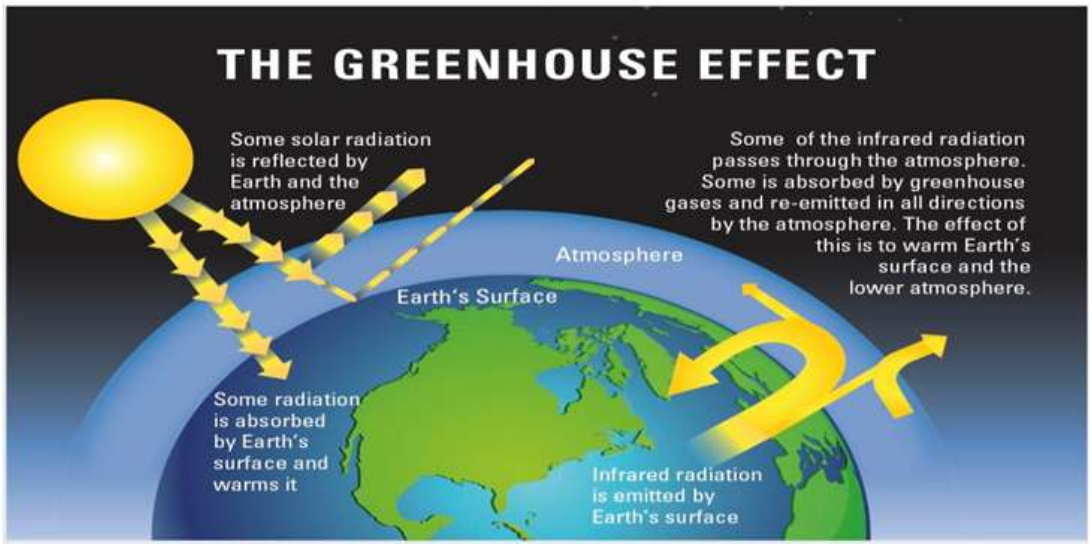

Fig. 04 (greenhouse effect process)

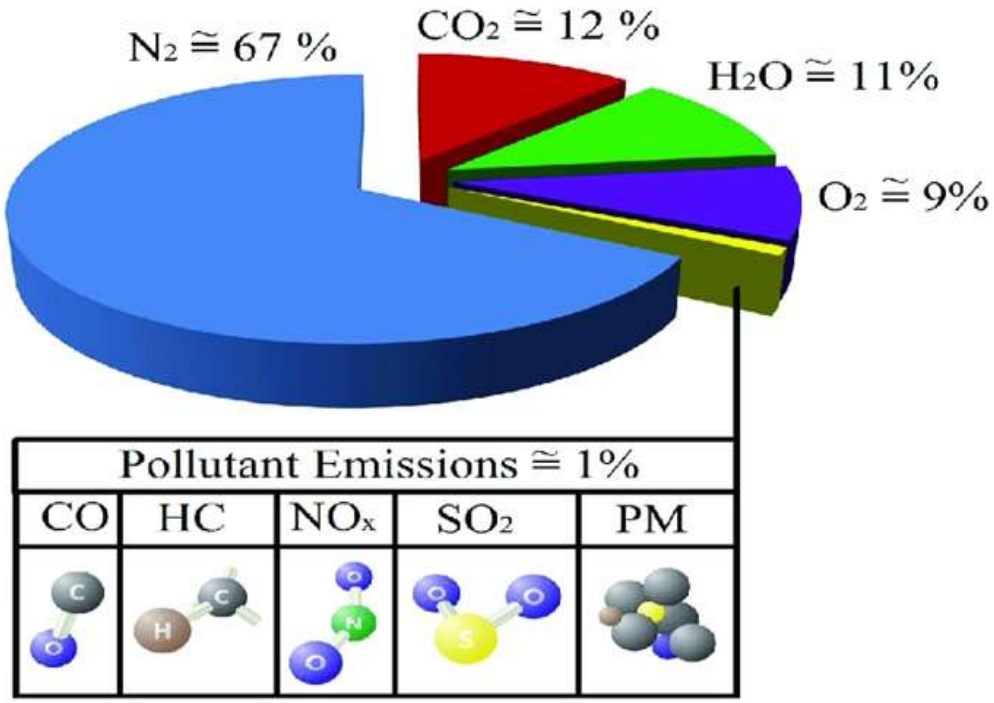

Fig. 05 (Amount of pollutants present in exhaust of diesel engine)

PROBLEM STATEMENT:

- Main problem which are to be coming in to the sense is that is the how we will remove pollution. Because it must necessary to reduce.
- A lot of disease will occurs due to pollution which are mentioned above, That's why it must necessary to reduce these pollution.
- The quality of our environment is day by day continue decrease due to pollution and that's why climate change problem will come in to the sense.

MAIN OBJECTIVE OF THE PRESENT WORK:

- Main objective of our project is to remove the pollution at any cost
- Make a such inbuilt device that counter the pollution.

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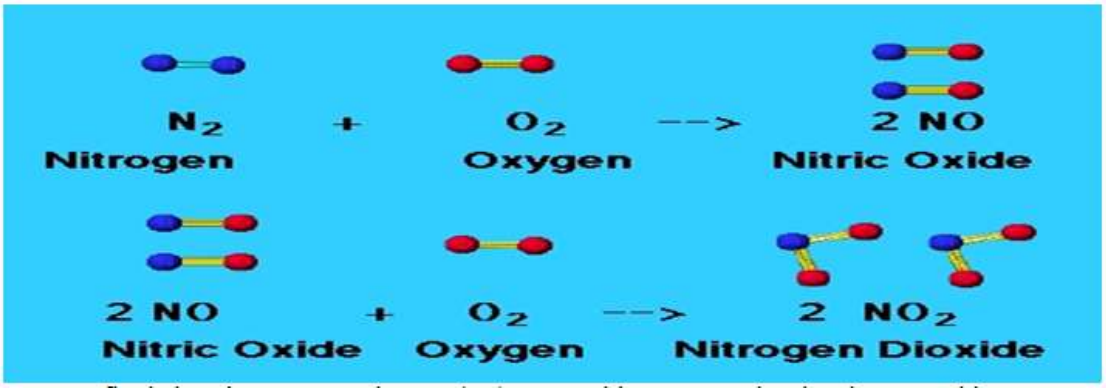
- To control the exhaust emissions.

WORKING PROCESS OF REMOVING THE POLLUTANTS :

Step1: In exhaust emission there are various pollutants will be emitted like as

- N2
- CO2
- CO
- Sox
- O2
- Moisture
- N2 etc.

Step2: The exhaust which will come out from the silencer (which are specially use for heavy vehicle) goes in to the chamber, in this chamber Oxygen (O2) is already present in the sufficient amount at all time .



Step3 :firstly in exhaust gases, nitrogen (N2) reacts with oxygen and make nitrogen oxides

Step 4 : Now in chamber 2 , nascent oxygen and water will reacts at a specific temp and make hydrogen peroxide. These hydrogen peroxide supplies at a very high pressure at the next stage and due to high pressure it converts in to vapour. Now these H2O2 will stored in the chamber and flow these in to form of the spray droplets.

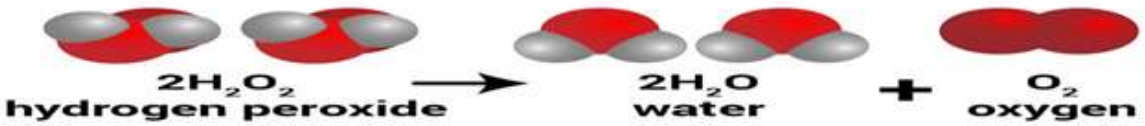


Fig. 7

Step 5: Now then H2O2 reacts with NO2 in next chamber and make of HNO3 which is collected in a chamber in liquid form. And remaining gases will flow through a varying cross sectional pipe.

Fig. 8

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Step 6 : Now the remaining gases (CO2, CO, Moisture and a very small amount of NO) will flows through a varying (reducing) cross sectional area pipe . By continuous reducing the area, velocity of the gases will continuously increases and pressure will goes to decreases.

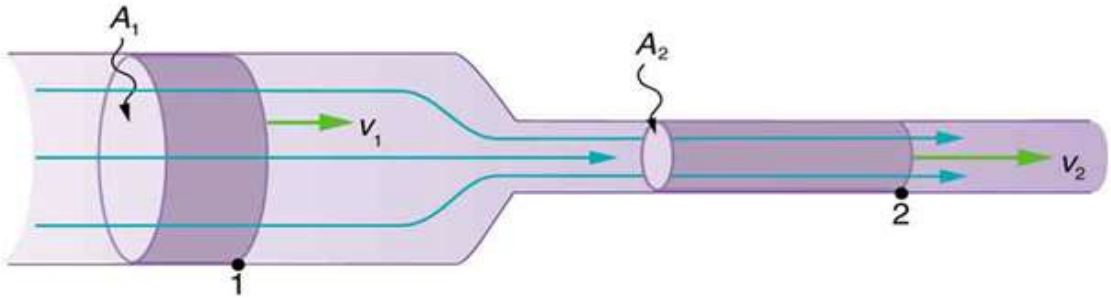

Fig. 9

Step 6 : At a high pressure, gases will enter in to the Water jacket of the engine cylinder. During combustion of the fuels a lot amount of heat is generated and these heats will flow in to the water jacket that's why the temperature of water jacket is so much high.

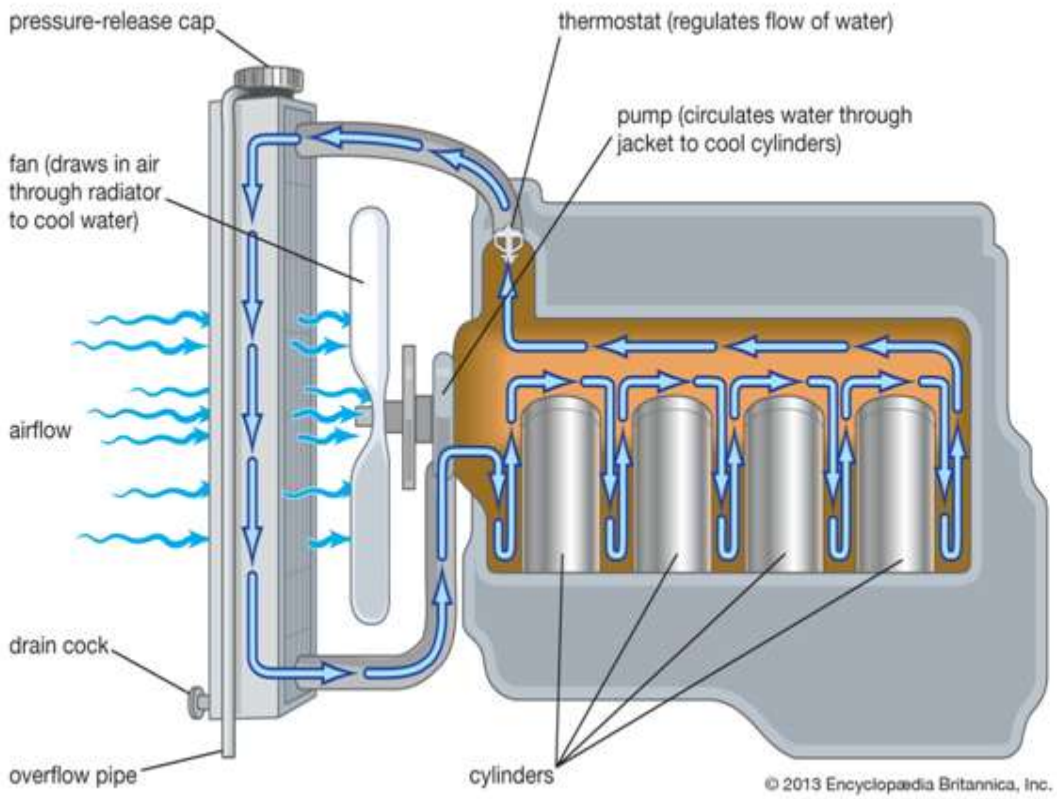

Fig. 10

Step 7 : due to high temperature of cylinder, a small diameter pipe which are in direct contact to the surface of water jacket, will be very high . By which temperature of the flowing gases will be very high .

Step 8: At a very high temperature (~ 800-900 C) , CO2 will convert in to CO and O2 And at that time

we make flow steam by which they reacts and finally they make CO and H2.

Step 9: Finally we get CO and H2 which is also known as water gas or syn gas.

APPLICATIONS :

- Water gas is used for making Methanol.
- It is also used for making Ammonia.
- HNO3 is collect and used for industrial purpose.
- Pollution can be reduced after making such types of inbuilt device.

II. CONCLUSION:

Various studies revealed that motor vehicle emission are the combination of various pollutants which have the potential to result in adverse health effect, including carcinogenic, mutagenicity, cardiovascular mortality and the aggravation of the health of the vulnerable group such as people with compromised health conditions like the asthmatic, children and elders. Now after doing such arrangements we make sure that we can reduce the most of the pollution and we can save the life of its own and the others life. We can also save our environment because due to pollution, it make deep impact on environment and by doing this climate change possibility can be reduced.

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