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# Air Pollution Control A THEORITICAL INVESTIGATION AND THEORITICAL INVESTIGATION AND PERCEPTION

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**Abstract—***The world has gone high up in the field of advancement and thus has created more pollution .As a matter fact after water ,air is the second Fluid that human engulfs the most in a lifetime .People after being aware of the fact stated above and the germs contained in it gave birth to the Control Measures of the pollution .Plantation drives are carried out worldwide to reduce air pollution, According to studies it states that total number of plants planted in these drives creates a difference in the impact of the air pollution. Titanium oxide rod are used to capture CO2 as its emission in nature is a matter of concern while in factories equipment like electrostatic precipitator, sand bags are used as required the selection is made for the correct equipment. The air pollution is factor of major concern as its protection and control measure would indicate the existence of life on earth we have also discussed about the disturbance and cure for the betterment of livelihood and mankind. A very effective means to reduce air pollution is the transition to renewable energy.*

## 1. INTRODUCTION

Air Pollution: This is basically the presence of foreign or unwanted particles in air. it means that the presence in the outdoor atmosphere of one or more contaminants, like dust, fumes, gas, mist, smoke, odor or vapour. This irregularity may be injurious to human, plant or animal life.

Air Pollutants: They are the substances which pollute the air. Some of the common pollutants are dust, soot, ash, and carbon monoxide, excess of carbon dioxide, sulphur dioxide, oxides of nitrogen, hydrocarbons, chlorofluorocarbons (CFC), lead compounds, asbestos dust, cement dust, pollens and radioactive rays.

Sources of Air Pollution: The pollution of air can be caused by natural processes or by human activities.

The sources of air pollution are classified into two groups:

Natural Sources

Man made sources

62,000 premature mortalities per year and about 42,000 in 2050, if no biomass were used. This would save about $600 billion in health costs a year due to reduced air pollution in 2050, or about 3.6% of the 2014 U.S. gross domestic product. A detailed investigation was carried out on Air Pollution Control to find out it's various positive impacts for the betterment of life on earth.Reports also show 4 cities in India residing in the list of Top 10 polluted cities.

Natural Sources of Air Pollution: They are dust storms,forest fires,ash from smoking volcanoes, decay of organic matters and pollen grains floating in air.

Manmade Sources of Air Pollution: They are population explosion, deforestation, urbanization and industrialization whose effects can be explained as follows:

- Burning of fuels like wood, cow dung cakes, coal and kerosene in homes pollute the air.
- Exhaust gases emitted by motor vehicles which pollute the air are the major source of air pollution in big cities.
- Industries pollute air by releasing various types of pollutants such as sulphur dioxide oxides of carbon,nitrogen oxide,chlorine,asbestos dust and cement dust.
- Thermal power plants pollute air by emitting sulphur dioxide and fly-ash.
- Nuclear power plants pollute air by releasing radioactive rays.
- Use of fertilizers and pesticides in agriculture pollute the air.
- Mining activities releases particulate matter into the air and pollutes it.

- Indiscriminate cutting of trees and clearing of forests increases the amount of carbon dioxide in the atmosphere and thereby pollutes it.
- Use of chlorofluorocarbons in refrigeration, fire extinguishers and aerosol sprayers pollutes air by depleting the ozone layer.
- Smoking pollutes air by emitting carbon monoxide and nicotine.

Sulfur oxides (SOx) - particularly sulfur dioxide, a chemical compound with the formula SO2. SO2 is produced by volcanoes and in various industrial processes. Coal and petroleum often contain sulfur compounds, and their combustion generates sulfur dioxide. Further oxidation of SO2, usually in the presence of a catalyst such as NO2, forms H2SO4, and thus acid rain.[2] This is one of the causes for concern over the environmental impact of the use of these fuels as power sources.

Nitrogen oxides (NOx) - Nitrogen oxides, particularly nitrogen dioxide, are expelled from high temperature combustion, and are also produced during thunderstorms by electric discharge. They can be seen as a brown haze dome above or a plume downwind of cities. Nitrogen dioxide is a chemical compound with the formula NO2. It is one of several nitrogen oxides. One of the most prominent air pollutants, this reddish-brown toxic gas has a characteristic sharp, biting odor.

Carbon monoxide (CO) - CO is a colorless, odorless, toxic yet non-irritating gas. It is a product by incomplete combustion of fuel such as natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide.

Volatile organic compounds (VOC) - VOCs are a well-known outdoor air pollutant. They are categorized as either methane (CH4) or non-methane (NMVOCs). Methane is an extremely efficient greenhouse gas which contributes to enhanced global warming. Other hydrocarbon VOCs are also significant greenhouse gases because of their role in creating ozone and prolonging the life of methane in the atmosphere. This effect varies depending on local air quality. The aromatic NMVOCs benzene, toluene and xylene are suspected carcinogens and may lead to leukemia with prolonged exposure. 1,3-butadiene is another dangerous compound often associated with industrial use.

Control of Air pollution:

If we come respectively part by part from natural causes to manmade causes we can see that the air pollution is made by nature is so less than the pollution ade by human beings.

Dust storms :This is one type of storms which generally consists of dust particles and sand. It basically can be observed in desert area. The significance of this is

Sign :Dust rising in the air.

Type:Mild

Effect:May cause coughing and spread dust.

Prevention of Dust storms:

Currently, the focus on preventing dust storms by preventing desertification has achieved great progress through measures such as controlling blown sand movement, reverting cultivated land to forestry and grassland, and the enactment of laws such as the “Law of Land Administration,” “Soil and Water Conservation Law,” and “Law on the Prevention and Control of Desertification.” However, because of the various causes and origins of dust storms, the prevention and remediation of dust storms is still limited. Recent research provides compelling evidence of a saline alkaline dust storm, and more research will be required to examine the extent of its chemical impact as well as methods for its prevention and control. Additionally, most of the success achieved in preventing and remediating dust storms resulting from desertification are only temporary solutions and do not solve the root of the problem.

Forest fires:

Causes of Forest Fire

Forest fires are caused by Natural causes as well as Man-made causes

- Natural causes- Many forest fires start from natural causes such as lightning which set trees on fire. However, rain extinguishes such fires without causing much damage. High atmospheric temperatures and dryness (low humidity) offer favorable circumstance for a fire to start.
- Man made causes- Fire is caused when a source of fire like naked flame, igarette or bidi, electric spark or any source of ignition comes into contact with inflammable material.

Prevention of Forest fire:

Control of manmade air pollution:

- The burning of cow dung, wood coal in chullah should be reduced which produce smoke to pollute air. The hydrocarbons present in Organic wood contaminate in air vastly and it pollutes the whole environment and air.
- People should be used the renewable energy in their purpose. like battery cell energy, Induction oven etc for their cooking purpose instead of chullah.
- Carbon monoxide, nitrogen oxides and hydrocarbons are released when fuel is burned in an internal combustion engine and when air/fuel residuals are emitted through the vehicle tall pipe.

To prevent this type of pollution Zero emission vehicles include battery-electric vehicles, plug in hybrid-electric vehicles, and hydrogen fuel cell-electric vehicles. These technologies can be used in passenger cars, trucks and transit buses. Proper maintenance of car and truck emission control systems not only limits harmful emissions, but also can

improve fuel efficiency and vehicle performance extending the life of the vehicles.

- Control of air pollution from industrialisation:
- The height of the chimney should be high so that the emitted gas can't spread throughout the society or locality.
- Different techniques are used for controlling air pollution caused by "gaseous pollutants' and that caused by 'particulate pollutants'

Methods of controlling Gaseous pollutants: The air pollution caused by gaseous pollutants like hydrocarbon,$so_2$,ammonia,carbon monoxide etc can be controlled by using three different methods combustion, absorption and adsorption.

Combustion is applied for the pollutants like organic air pollutants are subjected to flame combustion or catalytic combustion when they are converted to less harmful co2 and harmless water.

Absorption is the method where the polluted air containing gaseous pollutants is passed through a scrubber containing a suitable liquid absorbent. The liquid absorbs the harmful gaseous pollutants present in air.

Adsorption is the method where the polluted air is passed through porous solid adsorbents kept in suitable containers. The gaseous pollutants are adsorped at the surface of the porous solid and clean air passes through.

Methods of controlling particulate emissions: The air pollution caused by particulate matter like dust, soot, ash, etc can be controlled by using fabric filters, wet scrubbers, electrostatic precipitators and certain mechanical devices.

Mechanical Devices: It works on the basis of following:

Gravity: In this process, the particulate settle down by the action of gravitational force and get removed.

Sudden change in the direction of air flow: It brings about separation of particles due to greater momentum.

2. Fabric Filters: The particulate matter is passed through a porous medium made of woven or filled fabrics.

The particulate present in the polluted air are filtered and gets collected in the fabric filters, while the gases are discharged.

The process of controlling air pollution by using fabric filters is called 'bag filtration'.

3. Wet Scrubbers: They are used to trap SO2,NH3 and metal fumes by passing the fumes through water.

4. Electrostatic Precipitators: When the polluted air containing particulate pollutants is passed through an electrostatic precipitator, it induces electric charge on the particles and then the aerosol particles get precipitated on the electrodes.

Some other methods of controlling Air Pollution:

- Tall chimneys should be installed in factories.
- Better designed equipment and smokeless fuels should be used in homes and industries.
- Renewable and non- polluting sources of energy like solar energy,wind energy, etc should be used.
- Automobiles should be properly maintained and adhere to emission control standards.
- More trees should be planted along roadsides and houses.

## 2. CHANGE OF RAW MATERIAL:

Using of different and more efficient raw material is more preferred like these days the consumption of LNG has increased drastically in modern times it reduces the emission of $CO_2$ by 80% and reduces the content of $SO_2$ and $NO_x$.

## 3. CONCLUSION:

Air pollution needs to be curbed for the betterment and sustainable development of the society.

It can be achieved by spreading awareness and taking a step towards prevention of the environment in which we live our life.

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