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Ambient Air Quality Monitoring in the Automobile Manufacturing Plant

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ABSTRACT:

Industries are one of the major reason for the Air pollution that causes damage to humans and other living organisms. It causes several disorders and respiratory problems to humans so, it is necessary to control air pollution. The project analysis the air quality in the industrial areas and examine that air pollution can be controlled by source correction, pollution control equipment, diffusion of pollutant in air, vegetation, zoning. The main aim of my project is to control air pollution with national air quality standards with suitable methods.

Keywords– cyclone separator, scrubbers, electrostatic precipitator, baghouse filter.

1 Introduction

Air pollution worldwide is a growing threat to human health and the natural environment. Air pollution may be described as contamination of the atmosphere by gaseous, liquid, or solid wastes or by-products that can endanger human health and welfare of plants and animals, attack materials, reduce visibility caused by air pollution can affect visibility or produce undesirable odours. Although some pollutants are released by natural sources like volcanoes, coniferous forests, and hot springs, the effect of this pollution is very small when compared to that caused by emissions from industrial sources, power and heat generation, waste disposal, and the operation of internal combustion engines. Fuel combustion is the largest contributor to air pollutant emissions, caused by man, with stationary and mobile sources equally responsible

The air pollution problem is encountered outdoor as well as indoor. The indoor air pollution came to our attention during 80's while outdoor air pollution has been around for some time. The major pollutants which contribute to indoor air pollution include radon, volatile organic compounds, formaldehyde, biological contaminants, and combustion by-products such as carbon monoxide, carbon dioxide, sulphur dioxide, hydrocarbons, nitrogen dioxides, and particulate.

2. LITERATURE REVIEW

A lack of ventilation indoors concentrates air pollution where people often spend the majority of their time. Radon (Rn) gas, a carcinogen, is exuded from the Earth in certain locations and trapped inside houses. Building materials including carpeting and plywood emit formaldehyde (H_2CO) gas. Paint and solvents give off volatile organic compounds (VOCs) as they dry.

Health effects

The health effects caused by air pollution may include difficulty in breathing, wheezing, coughing, asthma and worsening of existing respiratory and cardiac conditions. These effects can result in increased medication use, increased doctor or emergency department visits, more hospital admissions and premature death. The human health effects of poor air quality are far reaching, but principally affect the body's respiratory system and the cardiovascular system. Individual reactions to air pollutants depend on the type of pollutant a person is exposed to, the degree of exposure, and the individual's health status and genetics. The most common sources of air pollution include particulates, ozone, nitrogen dioxide, and sulphur dioxide.

Children aged less than five years that live in developing countries are the most vulnerable population in terms of total deaths attributable to indoor and outdoor air pollution.

Infants

Ambient levels of air pollution have been associated with preterm birth and low birth weight. A 2014 WHO worldwide survey on maternal and perinatal health found a statistically significant association between low birth weights (LBW) and increased levels of exposure to PM2.5. Women in regions with greater than average PM2.5 levels had statistically significant higher odds of pregnancy resulting in a low-birth weight infant even when adjusted for country-related variables. The effect is thought to be from stimulating inflammation and increasing oxidative stress.

3. METHODOLOGY

Some of the effective methods to Control Air Pollution are as follows: (a) Source Correction Methods (b) Pollution Control equipment (c) Diffusion of pollutant in air (d) Vegetation (e) Zoning.

(i) Substitution of raw materials:

If the use of a particular raw material results in air pollution, then it should be substituted by another purer grade raw material which reduces the formation of pollutants.

(ii) Process Modification:

The existing process may be changed by using modified techniques to control emission at source.

(iii) Modification of Existing Equipment:

For example, smoke, carbon-monoxide and fumes can be reduced if open hearth furnaces are replaced with controlled basic oxygen furnaces or electric furnaces.

(iv) Maintenance of Equipment:

An appreciable amount of pollution is caused due to poor maintenance of the equipment which includes the leakage around ducts, pipes, valves and pumps etc. Emission of pollutants due to negligence can be minimized by a routine checkup of the seals and gaskets.

Spray Tower

Water is introduced into a spray tower (Fig. 5.5.) by means of a spray nozzle (i.e. there is downward flow of water). As the polluted gas flows upwards, the particulates (size exceeding 10 μm) present collide with the water droplets being sprayed downward from the spray nozzles. Under the influence of gravitational force, the liquid droplets containing the particulates settle to the bottom of the spray tower

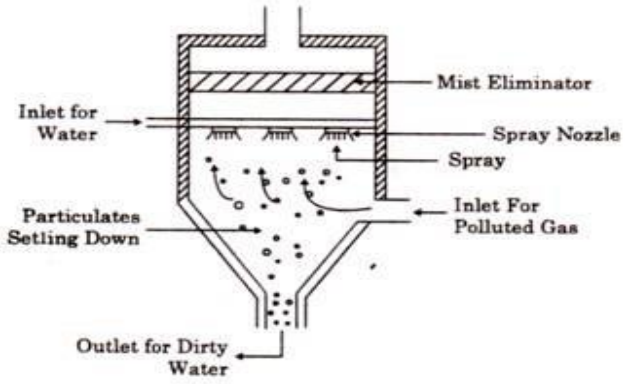

Fig. 5.5. Spray Tower

4. CONCLUSION

On implementing the spray tower in the manufacturing industries creates a safer working to human and also environment that is continuously monitoring. Having these components installed reduces the risk of people and environment pollutant in future are discussed then improved. It helps to reduce the pollutant level and develop air quality in working environment to people in future after obtaining better result.

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