International Journal of Engineering Research
Volume No.7, Issue Special 4, pp : 592-593
ISSN:2319-6890 (online),2347-5013(print)
9,10 March 2018

A Case Study: Air Pollution and its Control Measures

Ankur Kulshreshtha[1], Dr Vinod Kumar Bais[2]
[1]Department Of Mechanical Engineering, Government Engineering College, Banswara
[2]Manav Bharti University, Solan(H.P.)

Abstract: ***Air pollution are basically the foreign material in the air—can be manmade or occur naturally, and are concentrated where people are concentrated. Pollution is injurious to health and its prevention places an economic burden on the citizen. Further emission reductions from automobiles, and transportation measures and programs will be more difficult to accomplish, but the challenge has been presented. The decision is up to the citizenry as to whether there shall be clean air for all—and at what price. Air pollution has been a menace in recent years posing serious threats to environmental and social wellbeing. Government, authorities and industry have been at the forefront to tackle air pollution with the help of policy reformation and technological innovation. The aim is to understand the innovation activity in the technology domain and the different ways to observe patterns in relation to diffusion of innovation in different jurisdictions. We emphasizes on prominent indian company active in air pollution control measure dewy innovative technology business and R&D practices. Paper highlights various countries on the priority list of industry technologies for protection and exploitation of developed technologies. Suggestions for future adopted technologies for air pollution control adopted under Indian criterion is also suggested.***

Keywords : NMVOCs, methane, Air pollution,

Introduction :

MAJOR PRIMARY POLLUTANTS GENERATES BY HUMAN ACTIVITY

Nitrogen oxides (NOx) - especially nitrogen dioxide are emerges from high temperature combustion. Nitrogen dioxide is the chemical compound with the formula NO2. It is one of the several nitrogen oxides.

Carbon monoxide (CO)- 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 - VOCs are an important outdoor air pollutant. In this field they are often divided into the separate categories of methane (CH4) and non-methane (NMVOCs).

Particulates, alternatively referred to as particulate matter (PM), atmospheric particulate matter, or fine particles, are tiny particles of solid or liquid suspended in a gas. In contrast, aerosol refers to particles and the gas together. Human activities, such as the burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of aerosols.

Persistent free radicals connected to airborne fine particles could cause cardiopulmonary disease.

Chlorofluorocarbons (CFCs) - harmful to the ozone layer emitted from products currently banned from use.

Odors — such as from garbage, sewage, and industrial processes

Radioactive pollutants - produced by nuclear explosions, nuclear events, war explosives, and natural processes such as the radioactive decay of radon.

Secondary pollutants include:

Ground level ozone (O3) formed from NOx and VOCs. Ozone (O3) is a key constituent of the troposphere. It is also an important constituent of certain regions of the stratosphere commonly known as the Ozone layer.

Peroxyacetyl nitrate (PAN) - similarly formed from NOx and VOCs.

MEASURES TO CONTROL AIR POLLUTION.

Activated carbon is one of the most popular forms of air pollution control. This type of control involves the use of a pollution filter, carbon, to reduce the amount of pollutants that are allowed to escape into the air. When in use, these filters absorb pollutants helping to cleanse the air of any possible toxins.

Biofiltration is another effective type of air pollution control. It uses microorganisms, often bacteria and fungi, to dissolve pollutants. Industries that employ biofiltration systems include food and waste plants, pharmaceutical companies, and wastewater management facilities. While this method of air pollution control works rather well, a large space is required in order to operate a biofiltration system. Many industries do not have this amount of available space, so this method is often disregarded.

Change in Fuel: This technique involves the use of less polluting fuel to reduce air pollution. Use of low sulfur fuel instead of high sulfur fuel by electric utilities is an example of this method. Remember that low sulfur fuel is much more expensive than high sulfur fuel.

The other choice for an electric utility can be the use of natural gas as a fuel. Fuel switching based on meteorological conditions or air pollution forecasts have been used to prevent air pollution problem in many areas.

Use of oil with low ash content or natural gas for a dryer at an asphalt plant to reduce particulate matter is another example of this method. Introduction of compressed natural gas, propane, ethanol and oxygenated fuels for automobiles have helped in the reduction of air pollutants

Nuclear power plants are relatively pollution free when compared to the coal fired power plants. However, they have been subjects of controversy in their overall environmental impact.

Improve Dispersion: This approach is based on the concept that dilution of air contaminants before they reach ground will

ISSN:2319-6890 (online),2347-5013(print)
9,10 March 2018

lower the concentrations to which the population is exposed. The use of this approach for industry is discouraged by the US EPA.

The emissions from the plant are passed through a control device before releasing to atmosphere. The pollutants are removed, destroyed or transformed in the control device before discharging into ambient air.

The scrubbing or flue gas desulphurization (FGD) processes can be classified as (i) Throwaway or regenerative processes or (ii) wet or dry processes.

USE OF FUELS

Table 1

Fuel	Advantages	Disadvantages
Electricity	Potential for zero vehicle emission.	Current technology is limited
Ethanol	Very low emission of ozone-forming hydrocarbon and toxics	High fuel cost
Methanol	Low emission of ozone forming hydrocarbon and toxic substance	High fuel cost
Natural gas	Can be made from variety of feed stokes Very low emission of ozone forming hydrocarbons, toxics ,and carbon monoxide.	High vehicle cost
Propane	Somewhat lower emission of ozone forming hydrocarbon and toxics.	No energy security or trade balance benefit.

USE OF CONTROL DEVICES

The devices are discussed in the following sections.

The major FGD processes are:

- Limestone scrubbing Lime scrubbing
- Dual Alkali processes Lime-spray drying
- Wellman-Lord process

The SO2 is removed by inducing exhaust gases to react with a chemical absorbent as they pass through a tower.

CONTROL OF VOC

Control and treatment of VOC and organic hazardous air pollutant emissions are generally accomplished by Adsorption, Incineration, Condensation Gas absorption.

This is one of the most commonly used methods, especially for controlling emissions from small sources. It can be physical adsorption or chemisorptions. The later is rarely used for the VOC emission control because, it involves a less-reversible chemical bonding of the adsorbate (pollutant) and the adsorbing solid (packing) and is relatively expensive. Physical adsorption uses the Van der Waals force, giving the advantage of reversibility and regeneration due to the weaker bonding of the gas and adsorbent material. The adsorbed material can be either recovered or incinerated. Regeneration is usually accomplished by heating or extraction/displacement. Activated carbon is a commonly used adsorbent.

FUTURE ADOPTED TECHNOLOGIES FOR AIR POLLUTION CONTROL ADOPTED UNDER INDIAN CRITERION

The following items are commonly used as pollution control devices by industry or transportation devices. They can either destroy contaminants or remove them from an exhaust stream before it is emitted into the atmosphere.

Nox Control
Low NOx burners

Selective catalytic reduction (SCR)
Selective non-catalytic reduction (SNCR) Catalytic converter (also for VOC control)
Scrubbers
Baffle spray scrubber
Cyclonic spray scrubber
Spray tower Wet scrubber
VOC control
Catalytic converters Biofilters
Absorption (scrubbing) Cryogenic condensers Vapor recovery systems
Acid Gas/SO2 control
Wet scrubbers Dry scrubbers
Flue-gas desulfurization
Mercury control
Sorbent Injection Technology
Electro-Catalytic Oxidation (ECO) K-Fuel

CONCLUSION

From this it is clear that we have numerous ways of controlling air pollution. The only thing require is to use it inappropriate form. This paper represents the different technologies that are employed in various industryand the use of different fuels that are immanent for the solution of air pollution.Air pollution involves spate of pollutants which creates a lot of chronic and acute diseases in human being so we have to put the foreign particles within the constraint of standard limit. So we have come under a conclusion that the best technologies given for controlling NOX,VOC,SO2, Mercury are given in the above article.

REFERENCES

i. *wikipedia.org/wiki/Air_pollution*
ii. *en.wikipedia.org/wiki/Pollution*
iii. *www.ncbi.nlm.nih.gov › ... › Am J Public Health › v.61(1); Jan 1971*
iv. *nptel.iitm.ac.in/.../Environmental%20Air%20Pollution/air%20pollution%...*
v. *www.ilo.org/oshenc/...pollution-control/.../507-air-pollution-management*