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Pollution through Automobile, Power Plant and Industries State of Art: A Review

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Abstract : Our activities affect the environment and. the environment affects our health or human being. As the number of people on earth increases, our agricultural and industrial activities have a greater impact on the environment, particular on the atmosphere. It becomes necessary to know what are the sources which affect the environment. In this paper ,first we introduce five main air pollutants such as carbon monoxide (CO), particulate, oxides of nitrogen (NOx), oxides of sulphur (SOx) hydrocarbons. Finally, we analyze the air emissions from five main sectors that are combustion sources: coal combustion, fuel combustion, oil combustion and industries waste . The emission factors are based on the present activity. With the innovation of processes and the implementation of clean production, the factors will decrease gradually. The atmosphere has been polluted, so far to take measures to control air pollution.
Keywords: carbon monoxide (CO), particulate, oxides of nitrogen (NOx), oxides of sulphur (SOx) hydrocarbons

Introduction

Air pollution is to be excite by development through the growing cities, , rapid growth in economic development, industrialization and higher levels of energy consumption and increasing traffic. The high infusion of population to the urban areas, increase in consumption patterns and industrial development have led to the problem of air pollution. Currently, in India, air pollution is widespread in urban areas where vehicles are the major source and in a few other few areas with a high concentration of industries and thermal power plants.

Table no.1
Hydrocarbon discharge 106t/a

Source	Discharge	Source	Discharge
Coal	2.9	**Dissolvent**	10
Thermal power	0.2	**Burning of rubbish**	25
Industrial	0.7	**Burning of lumber**	0.7
Resident and commerce	2.0	**Forest fire**	1.2
Petroleum	48.4	**Total**	88.2
Petroleum refinery	6.3		
Gasoline	34		
Diesel oil	0.1		
Heavy oil	0.2		
Evaporation of oil	7.8		

Also, vehicles contribute exact sense to the total air pollution load in many urban and rural areas. Air pollutants can be divided into two main groups—particulate and gaseous. The former group includes solid airborne particulates such as dust, fly ash, smoke, fog, soot, and fumes. Gaseous pollutants are include in carbon monoxide, , oxides of sulphur, hydrocarbon and oxides of nitrogen.

Table no.2
Source of air pollution

Pollutants	Source
Carbon monoxide(CO)	Incomplete burning of fossil fuel Tobacco smoke
Hydro carbon	Incomplete burning of fossil fuels Tobacco smoke, Chemical processes
Particulate	Burning fossil fuels, Construction operations Industrial waste
Oxide of sulphur (SOx)	Burning fossil fuels, Chemical processes Smelting ores
Oxide of nitrogen(NOx)	Burning fossil fuels, Oxide of N2 in atmosphere

Pollution Through Automobile

The motor vehicle related to air pollution in India is serious and worsening. During the problem of diesel smoke and particulates is the most manifest lead, nitrogen oxide, hydrocarbon and carbon monoxide, , and ozone levels exceed to the internationally accepted levels in several cities. The lead content in gasoline is very high and is the major source of lead contain in the air. The problem continues to worsen as the vehicle population, particularly motorcycles and, continues to grow and age, three-wheeled auto rickshaws; vehicles once introduced into use remain active much longer than in industrialized countries. The adverse outcome of air pollution are especially rigorous because the life style and climate are such that public exposure to high pollution levels is very high.

Table no. 3
2010 Emission inventory by (tons/year)

Tier 1	NOx	SO2	PM2.5	VOC	NH3
Fuel combustion electric utilities	2,587,285	6,440,630	542,138	54,307	3,239
Petroleum	138,528	339,890	30,765	388,168	10,517
Transport	1,511,87	5,345	32,503	54,701	6,441
Highway vehicle	4,682,989	27,439	91,719	93,283	341,532

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Off high vehicle	3,282,482	219,034	230,625	1,903,532	2069

Pollution Through Power Plant

Coal Combustion

Coal is the most readily available energy source throughout the world. Coal is important to the development of industry and power plant , it results in air pollution when burned. During combustion, the coal is subject to either or both reducing and oxidizing conditions because of the presence of carbon, oxygen, and carbon monoxide in the bed. The air pollutants from combustion of coal include SOx , NOx, HC, and CO. Amounts of each and every pollutant are dependent on the type of coal, operation of the process and combustion process,. The particulates consist mostly of the ash particles. They are also include unburned coal particle blown out during the turbulent combustion. Mainly pulverized coal-fired boiler flue gas are contains 2-10ppm , 14.3-15.3% CO2 ,CO and 3.9-5.1% O2. Gaseous emissions of sulphur oxides in process of coal combustion are largely SO2 and SO3 and gaseous sulfates. On average, 98% of the sulphur present in bituminous coal will be emitted from gaseous sulphur oxides, whereas somewhat less will be emitted when sub-bituminous coal is firing.

Generally firing configuration, boiler size, and boiler operations have little effect on the percent conversion of fuel sulfur to oxides of sulfur. Nitrogen oxides are produced in the combustion process by at least two different mechanisms such as the one is from the nitrogen in the fuel being burnt (fuel NOx), other source is from the molecular nitrogen in the form of combustion air (thermal NOx).The amount of nitrogen in the fuel is very much small compared with the combustion air, so that , fuel NOx is a small part of total NOx.. Large coal-fired boilers emit more NOx than any other combustion source. The combustion paradox is that the size increase of boilers will increase nitric oxide but decrease CO and HC. Volatile organic compounds (VOCs) and carbon monoxide (CO) are the unburned gaseous combustibles that are also emitted from coal-fired boilers, but in quite small amounts. The VOC and CO emissions per unit of fuel that is burned are normally lower from cyclone furnaces than from smaller stokers and hand-fired units and pulverized-coal where operating conditions are not as well controlled.

Table no. 4 : list of the uncontrolled emission factors from different types of furnaces such as particulate, SOx ,NOx , CO, and HC

Furnace			**Uncontrolled Emission, g/kg coal**				
Boiler category	Heat input 106kcal/hr	Type	Particulatematterra	SOxb	CO	HCc	NOxd
Utility or large industrial	＞25	Pulverized	8A	19S	0.5	0.15	9
Commercial or industrial	2.5-25	Underfeed	2.5A	19S	1	0.5	7.5
Small commercial or domestic	＜2.5	Overfeed	1A	19S	5	5	3.0

Oil Combustion

The most common liquid fuel is used in utility processes is fuel oil derived from crude petroleum. Fuel oils are generally classified into distillate kerosene and residual fuel oils. The former is generally used for domestic and small commercial applications; the oil is used in utility and industrial boilers. Emissions from fuel oil combustion depend on the grade and the type and size of the boiler, composition of the oil, the firing practices used, and the level of equipment maintenance. Properly operated and designed oil-fired boilers produce less uncontrolled air pollution emission than coal-fired boilers but more than gas-fired boilers.

Table no. 3.2 : Typical uncontrolled emission from oil combustion

Boiler	**Fuel oil**	**Uncontrolled Emissions, g/l of Fuel**				
		particulate	SOxa	CO	HCb	NOxc
Utility or large						
Industrial	Residual	1	19.2S	0.4	0.25	0.12
Commercial	Residual	2.75	19.2S	0.5	0.35	0.12
Industrial	Distillate	1.8	17.2S	0.5	0.35	0.25
Small commercial						
Domestic	Distillate	1.2	17.2S	0.6	0.35	0.25

Pollution Through Industries

Due to the wide variety of industrial processes, reliable determinations of industrial emissions have been found to depend on type of plant and different processing in the during working condition. This is very expensive and time consuming, as it involves detailed study and testing of specific plants and processes. In some cases, data on industrial emissions can be obtained by air cleaning equipment, individual plants requesting information on processes, and fuel consumption types and quantities of process exhaust. Information on air emissions can also be obtain by using engineering prediction which are based on the raw materials or fuel consumed in a given process. The whole detailed procedure is making an industrial survey which involves the use of a computer card identifying each establishment and its location. A detailed information sent to each establishment to collect information, , which includes data on plant size, operating schedule, fuel usage processes, and solvent usage. This procedure may provide more reliable results in pollution.

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Emission factors, which have been applied to source data to yield emission data for particulates ,SOx, NOx, HC, CO, and so on, exist for a wide variety of industrial processes such as fuel burning, chemical production, manufacturing processes, and solvent usage.

Table no. 5
Classification of pollution through industries

Source type	Category	Examples	Pollutants
Dust production Process	Crushing, grinding screening,demolition milling	Road mix plants Urban renewal Grain elevators	Mineral and organic particulates
Manufacturing Processes	Metallurgical plants	Smelters, steel mills, aluminum refineries	Metal fume, Fluorides SOx
	Chemical plants	Petroleum refineries, pulp mills, super phosphate fertilizer plants, cement plants	H2S, Sox, F,organic vapor,particle, odors
	Waste recovery	Metal scarp yards, auto body burning, rendering plants	Smoke, soot, organic vapor,odors
Solvent	Spray painting	Furniture and appliance Finishing	Organic phosphates,chlorinated
	Inks	Photogravure and printing	hydrocarbons, As,Pb
	Solvent cleaning	Dry cleaning, degreasing	

Measures to Control Pollution

Carbon is most popular forms of air pollution control. This type of control involves in the use of a pollution filter, carbon, to reduce the amount of pollutants which i are involed in air throughout pollution. When in use, these filters absorb pollutants helping to clean the air of any possible toxins and poison.

Bio Filtration Process:- Bio filtration is another effective type of air pollution control. It uses in bio organism to dissolve pollutants often from bacteria and fungi. Industries that employ bio filtration systems include food and waste plants, and wastewater management facilities pharmaceutical companies. While this method of air pollution control works rather well, a large space is required in order to operate a bio filtration system.

Fuel type : This technique is use for less polluting fuel to reduce air pollution. Use of low sulfur fuel rather than high sulfur fuel by electric utilities is an example of this method. But the low sulfur fuel is much expensive than high sulfur fuel.

Natural gas:- This electric utility can be used natural gas instead of fuel. Fuel switching based on air pollution forecasts or meteorological conditions or have been used to prevent air pollution problem in many areas.

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

Use of Control Devices

The major FGD processes are:

1. Limestone scrubbing
2. Lime scrubbing
3. Dual Alkali processes
4. Lime-spray drying
5. Wellman-Lord process

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

Conclusion

In this paper we found that air pollution is very harm to every person and our atmosphere. Pollution through automobile and power plant are the major source of air pollution such as coal combustion , oil combustion and fuel utilities and industrialization. We discuss the gaseous component which polluted the atmosphere such as particulates ,SOx, NOx, HC, CO. Also provide the method to control the air pollution through automobile and power plant such as bio filtration and control device, change in fuel ,natural gases. It will help to measure the dust particle and gaseous particle which is present in atmosphere. The emission factors are based on the present processes. With the innovation of processes and the implementation of clean production, the factors will decrease gradually.

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