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ARTICLE

RESEARCH ON AIR POLLUTION PREVENTION AND CONTROL PRACTICES

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ABSTRACT

The rapid development of industry and the large-scale consume of various fuels discharge dust. And the nitrogen oxides, hydrocarbons, sulfides, ozone, and other substances into the air layer. Which seriously deteriorates air quality. The concentration of total suspended particulates in the air of cities across the country generally exceeds the standard, and the concentration of sulfur dioxide is relatively high. The serious excess of sulfide and nitrogen oxides in the air has led to acid rain in most parts of the country. The fall of acid rain not only damages the ecological environment, but also aggravates the corrosion and damage of buildings, railways, and bridges, causing huge losses to industry and agriculture. The greenhouse effect and ozone depletion caused by air pollution directly threaten the survival of human beings. How to protect the environment is our common concern. At present, the main pollutants brought by industrial production to the environment are industrial waste gas, industrial waste water, and industrial waste residue. At present, the discharge of industrial waste gas, industrial waste water and industrial waste residue is large. Among them, factories emit a large amount of various industrial waste gas into the air every day, which poses a great threat to human health. The major pollutants that industrial production brings to the environment must be minimized.

KEYWORDS

Aollution; environmental; protection

1. INTRODUCTION

1.1 Analysis of the causes of air pollution

Air pollution refers to the discharge of various pollutants into the air from human production, life, or the natural world. Bad influence and destruction. Pollution sources are divided into natural pollution sources and man-made pollution sources. Natural pollution sources refer to locations or areas where natural pollutants are emitted into the air, such as active volcanoes that emit dust, sulfur dioxide, hydrogen sulfide, and other pollutants, naturally escaping gas and places where natural disasters such as forest fires and earthquakes occur. Classification of man-made pollution sources: according to the spatial distribution of pollution sources, it can be divided into point pollution sources, surface pollution sources, body pollution sources, and line pollution sources; according to people's social activities, it can be divided into domestic pollution sources, industrial pollution sources, traffic pollution sources, etc.; according to its existing form, it can be divided into fixed pollution sources and mobile pollution sources.

1.2 The components of waste gas pollution have a great impact on the ecological environment and human health.

The waste gas with large emissions mainly includes NO_x , SO_2 , P, As, PH_3 , CO, HF, C_2HCl_3 , $\text{C}_2\text{H}_3\text{Cl}_3$, and other toxic gases and other gases.

1.3 Reason analysis

(1) Topographic and climatic factors are the basic reasons that affect

air quality.

Urban construction is an important factor affecting air quality, according to the classification and statistical analysis of main air pollution, its main sources can be summarized into three aspects: fuel combustion, industrial production process, transportation, etc. According to statistics, in the combustion of direct fuel, the amount of air pollutants emitted by combustion accounts for about 96% of the total emissions of fuel combustion, of which the amount of soot, SO_2 , NO_x , and CO emitted by coal combustion accounts for over 90% of the proportion of fuel combustion emissions. The air pollution emissions generated in the industrial production process account for about 20% of the total air pollution emissions, and the air pollution in industrial and mining areas or local areas is relatively serious. In some cities, natural gas has not yet become popular in residents' lives, and coal is still the preferred fuel for people. In coal supply, high-sulfur coal still dominates. Due to economic constraints, people still use high-sulfur coal instead of environmentally friendly low-sulfur coal, resulting in a large amount of SO_2 emissions.

The chemical and coal industries are the most polluting enterprises and the main sources of air pollution. At the same time, the development of transportation has also brought serious environmental pollution. The exhaust gas of automobiles contains a large amount of CO, which is extremely harmful to the human body, especially in some diesel trucks and smoking vehicles. The exhaust gas emitted is mixed with a large amount of inhalable particulate matter, which is an important factor leading to diseases.

2. MEASURES TO CONTROL AIR POLLUTION

2.1 Monitor the air quality

There are various harmful substances in the air, and the types of pollution and pollutants discharged in different regions are different. Therefore, when conducting an air quality assessment, the air environment indicators that need to be detected should be determined according to the actual situation of each place. Common pollutants in the air are total suspended particulate matter, dust fall, respirable particulate matter, sulfur dioxide, nitrogen oxides, total hydrocarbons, lead, fluoride, ozone, and benzo[a]pyrene. Determination of Particulate Matter: particulate matter is one of the air pollutants with the largest quantity, complex composition, diverse nature, and greater harm. It can be the carrier, catalyst, or reaction bed of other toxic and harmful substances in the air. In some cases, particulate matter combined with adsorbed gaseous or vaporous species can produce synergistic toxic effects greater than the individual components. Therefore, the study of particulate matter is an important part of air pollution control. The detection items of particulate matter in the air include determination of total suspended particles, determination of inhalable particle concentration and particle size distribution, determination of dust fall, and determination of chemical components in particles. Among them, the most commonly used method for the determination of particle concentration is the gravimetric method. Determination of sulfur dioxide: The sulfur-containing pollutants in the air mainly include H₂S, SO₂, SO₃, CS₂, H₂SO₄, and various sulfates. They mainly come from the combustion of coal and petroleum fuels, the smelting of sulfur-containing ores, and the waste gas emitted from the production of chemical products such as sulfuric acid. As one of the main indicators of air pollution, sulfur dioxide is the most widely distributed among various air pollutants and has the greatest impact. Therefore, sulfur dioxide is often represented in the detection of sulfur oxides.

The determination of nitrogen oxides in the air can be divided into two categories: chemical method and instrument method. The most commonly used chemical methods are the Saltzman method (GB/T15435-95), acid potassium permanganate solution oxidation method, and chromium trioxide-quartz sand oxidation method. Among them, the Saltzman method is only suitable for measuring the content of nitrogen dioxide, and the acid potassium permanganate solution oxidation method and the chromium trioxide-quartz sand oxidation method can detect the total amount of nitrogen oxides in the air.

2.2 Comprehensive control of air pollution

The comprehensive improvement plan is to make functional zoning according to the current situation and development trend of urban air quality and to calculate the maximum allowable emissions and reductions in each functional area according to the proposed environmental goals, so as to formulate a pollution control plan. The control of air pollution should be based on the energy structure and traffic conditions of the city to determine the primary pollutants, that is, the pollutants with high concentration, wide range, and great harm, so as to adopt measures that suit the actual situation. At present, air pollution in most cities in my country is mainly caused by the use of backward combustion methods of coal combustion and automobile exhaust. The primary pollutants from this are sulfur dioxide and total suspended particles. Therefore, the long-term goal of the plan should be to improve the outdated coal-burning method, improve the combustion efficiency, try to use non-polluting or less-polluting energy such as gas fuel, briquette, solar energy, and geothermal, implement regional central heating, eliminate thousands of small households' chimneys, improve road hardening rates, and create smoke-free control areas by strengthening pollution source governance and improving pollution control technologies. In addition, the plan will adjust the industrial layout, scientifically and rationally utilize the air environment capacity according to the law of air self-purification, strengthen the control of pollution sources and reduce the emission of pollutants, reduce the pollution of automobile exhaust through technical

and administrative means, improve the urban greening rate, choose tree species with good pollution resistance, and vigorously develop plant purification.

2.3 Treatment of industrial dust

The high-pressure pulse bag filter using the air box is the most innovative dust collector currently implemented in China. It is mainly composed of an upper box (clean room), middlebox (filter room), lower box (ash room), ash discharge valve, blowing mechanism, and electrical control. During operation, the dust gas passes through the diversion trough. Due to the sudden expansion of the volume, the coarse-grained dust is slowed down to below the suspension speed due to the wind speed and loses the required suspension force. Under the action of gravity, it first falls into the ash hopper. The fine dust changes direction and flows upwards and is trapped on the surface of the filter bag, while the exhaust gas penetrates the filter bag to the clean air chamber and is discharged by the fan. Due to the formation of a dust layer on the surface of the filter bag, on the one hand, the purification efficiency of the filter bag is enhanced, and on the other hand, the resistance is increased and the air extraction capacity is reduced. In order to maintain the normal operation of the system, when the internal resistance increases to the set limit, the soot blowing mechanism can automatically open the pulse valve and automatically open and close the lifting cylinder, blow air in turns, and enter the bag mouth in a spiral manner to expand and contract the filter bag. Vibration is generated, and the dust hanging around the bag wall is shaken off, so that the resistance of the filter bag is reduced and returned to normal. In the first room where the soot is blown, the upward airflow is first cut off, and the pulse cleaning is performed without interference, which can eliminate the secondary adsorption of dust, so the cleaning is thorough and the dust removal efficiency is improved. To extend filter bag life, a burr-free galvanized filter frame is used.

The atmospheric environmental impact prediction method is to simulate the physical and chemical mechanisms of the transport, diffusion, transformation, and removal of pollutants in the atmosphere under various meteorological and topographic conditions by establishing mathematical models.

2.4 Air pollution control technology

- (1) Sulfur dioxide control technology. Combustion desulfurization, combustion desulfurization, and flue gas desulfurization are carried out before combustion.
- (2) Nitrogen oxide control technology. Catalytic reduction method, absorption method, solid adsorption method, and clean combustion technology.
- (3) Smoke (powder) dust control technology.
- (4) Improve combustion technology.
- (5) Adopt dust removal technology. Gravity dust removal, inertial force dust removal, centrifugal force dust removal, washing dust removal, filter dust removal, electrostatic dust removal, sonic dust removal, etc.

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