

Exploration of Air Pollution Treatment Measures in Environmental Engineering

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Abstract: We need to adopt targeted measures for environmental protection based on specific environmental conditions, ensuring economic benefits while pursuing environmental benefits, and continuously implementing the strategic theory of sustainable development. In this process, considering that environmental protection not only requires knowledge related to environmental engineering as a foundation, but also puts forward high requirements in relevant policies and regulations. Only by fully leveraging the role of environmental engineering in environmental protection, can we fully build a resource saving and environmentally friendly society.

Key Words: Environmental Engineering; Air Pollution; Governance Measures

1. Introduction

Since the reform and opening up, China's heavy industry and chemical industry have both developed rapidly, while also promoting rapid growth of the national economy. However, the development of various industries has exhausted resources, and the generation of a large amount of waste has also polluted the atmospheric environment, seriously damaging the stability of the ecosystem and even threatening people's physical health. Therefore, in the current development situation, air pollution prevention and control has become both an important environmental issue and a hot topic for the entire society.

2. Causes of Air Pollution

2.1 Natural Factors

Natural factors are also a major factor in the composition of ecosystems that cause air pollution, such as volcanic eruptions, earthquakes, and other violent Earth movements that can lead to the emission and spread of pollutants such as dust particles and carbon dioxide. They will enter the atmosphere, not only affecting the environmental climate, but also affecting the entire air environment through flow. In addition, forest fires are also an important cause of air pollution. This is because forests provide corresponding guarantees for air circulation and purification to a certain extent. Once a forest is caught in a fire or destroyed, it will produce different pollutants and it is difficult to restore its original atmospheric state in a short period of time. According to relevant data statistics, 93% of global nitrogen emissions and 60% of sulfur oxide emissions come from natural sources.

2.2 Air Pollution Caused by Industrial and Agricultural Production

In the current stage of urban planning and construction, in order to meet the needs of economic development, its industrial structure has been significantly upgraded, and the production and processing of industry and agriculture are significantly different from the past. Firstly, in terms of industry, it includes different types such as petrochemical enterprises, metal enterprises, and coal mining enterprises. In the workplace, the emission of pollutants may lead to an increase in the

concentration of harmful substances in the air, and its pollution types have a certain degree of complexity, including carbon dioxide and other gases emitted by petrochemical enterprises, metal element smoke and dust emitted by metal smelting, and dust emitted by steel enterprises, which makes air pollution treatment difficult. In addition, in agricultural related activities, such as pesticides, if not effectively treated during use, their residues will enter the air through dust, and straw burning may also cause large-scale gas pollution.^[1]

2.3 Air Pollution Caused by Transportation and Urban Construction

In the actual construction operations of municipal engineering projects, different types of dust will be generated. In addition, with the development of the transportation system, the types and quantities of vehicles have significantly increased, and the emission of car exhaust has become the main cause of urban air pollution. Internal combustion engines emit substances such as nitrogen oxides and hydrocarbons during combustion, which does not meet the requirements of sustainable development.

3. Atmospheric Pollution Treatment Technology in Environmental Engineering

3.1 Dust Removal Technology

By analyzing the composition of air pollution, it is found that the content of smoke, fine particles, and dust is relatively high. Therefore, in the treatment of air pollution, attention should be paid to controlling various types of particulate matter from the source and fully leveraging the important role of dust removal technology. By using mechanical dust removal equipment, atmospheric pollution particles can be captured within a certain range. Commonly used dust removal equipment includes gravity settling chambers, cyclone dust collectors, and so on. Among them, the former has a relatively low dust removal efficiency, while the latter has a relatively high dust removal efficiency. In addition, electrostatic dust removal technology can also be used. In a high-voltage electric field, dust can accumulate in large quantities, which can effectively remove atmospheric pollution particles. In the current market, the types of dust removal equipment are gradually increasing and their functions are rich, requiring the selection of appropriate dust removal equipment according to the actual needs of air pollution treatment^[3].

3.2 Gas Pollutant Treatment Technology

In atmospheric pollution, there are three main types of gas pollutants, including carbides, nitrides, and sulfides. Various pollutants remain in the atmospheric environment in their molecular state. For some pollutants, they cannot be efficiently captured by dust removal equipment. Therefore, the atmospheric environment can be purified according to physical and chemical principles. The types of purification technologies are constantly increasing, including condensation, adsorption, catalysis, etc., which can transform atmospheric pollutants into other types of substances, thereby exerting the effect of air environment purification. During the combustion process of fossil fuels, a large amount of sulfur dioxide can be generated. For both fuel and flue gas, desulfurization technology can be used for treatment to deeply purify the atmospheric environment.

3.3 Automotive Exhaust Control Technology

Firstly, it is necessary to optimize and process the fuel of the car to a certain extent. The occurrence of pollutants can be reduced through the substitution of fuels or the application of new energy. Secondly, starting from the generation mechanism of automobile exhaust, we should strengthen research and optimization of automobiles, adjust the use of fuel in automobiles, including its combustion method and combustion time, and avoid the impact on air through this internal purification technology. In addition, in the control technology of automobile exhaust, certain innovations and optimizations can be made at the exhaust port to enable it to fully burn. Thermal reactors and other methods can also be applied, which is more environmentally friendly compared to ordinary exhaust emissions.

4. Specific Ways and Methods to Improve Air Pollution in Environmental Engineering

4.1 Use Clean Energy to Reduce Carbon Emissions

At present, China still relies on the combustion of fossil fuels in terms of energy, and the greenhouse gases generated are an important reason why environmental engineering is difficult to achieve certain governance effects. Therefore, facing a new stage of development, China needs to continue to increase research and investment in clean energy, and emphasize macro policies and development strategies. In response to the current energy structure dominated by fossil fuels, China needs to optimize and deal with it, accelerate the popularization of clean energy, such as solar energy, nuclear energy, and wind energy, reduce the proportion of fossil fuels in the overall energy structure, and then slow down the deterioration of air pollution by reducing the sources of air pollution. Only by advocating the use of clean energy and achieving certain results in reducing carbon emissions, can we more effectively respond to the severe situation of air pollution faced in environmental engineering, and thus ensure that the atmospheric environment is in a green and ideal state.

4.2 Develop Phased Targets for Air Pollution Treatment

From the perspective of air pollution treatment in environmental engineering, it has a certain degree of long-term and continuity. In order to improve the efficiency and quality of air pollution treatment, relevant departments need to strengthen the control of the air pollution treatment process, integrate it with the actual situation, and formulate targeted treatment goals. Firstly, in atmospheric treatment work, relevant personnel need to analyze relevant data, clarify the specific situation of pollution sources and the harm caused, and timely receive relevant data and information from atmospheric monitoring, clarify the main situation of current atmospheric environmental quality, and establish specific goals. In addition, in the formulation of goals, relevant departments also need to consider current economic, environmental and other limiting factors, try to control the goals within a certain range, avoid being too high or too low, and improve the initiative of staff^[4].

4.3 Promoting Green Engineering Construction

In the management of air pollution prevention and control, green afforestation can effectively improve the ecological environment. In green plants, trees can effectively reduce wind speed, timely adsorb harmful dust and suspended particles in the atmosphere, thereby minimizing the harm of dust. In addition, plants can also engage in photosynthesis, absorbing carbon dioxide from the air while releasing the oxygen needed by the human body, improving the greenhouse effect and ultimately improving the quality of the atmospheric environment. In recent years, China has continuously increased its investment in green afforestation construction, which has contributed to the prevention and management of air pollution. Therefore, cities should also incorporate green engineering into their urban construction plans and strengthen efforts in air pollution prevention and control. It is necessary to increase the green area of the city to varying degrees, build a scientific and reasonable green ecological network, and improve the urban environment.

4.4 Reasonable Utilization of Coal

In the development process of industrial enterprises, energy consumption is relatively high. Coal, as a fuel, emits a large amount of exhaust gas during the combustion process, which has a certain impact on the surrounding air environment. Therefore, it is necessary to actively promote the application of industrial briquette and coal washing technology, in order to scientifically and efficiently manage the resource utilization of coal. At the same time, clean energy should also be used to reduce the impact on the environment. Moreover, in both rural and urban areas of China, coal is used for heating. Therefore, relevant air pollution monitoring departments should develop targeted air pollution monitoring plans based on the use and regional distribution of coal to improve energy utilization efficiency. For example, advanced technological means can be utilized to promote coal combustion more fully, thereby reducing the emission of atmospheric pollutants. At the same time, it is also necessary to strengthen the importance of green energy, such as replacing coal with natural gas in appropriate circumstances, which will greatly ensure air quality.

4.5 Strengthen Pollution Prevention and Control of Motor Vehicle Exhaust

With the improvement of people's living standards, the number of household cars continues to grow, leading to a continuous increase in car exhaust emissions. But by increasing the governance of motor vehicle exhaust, it can effectively improve the pollution situation of the environment and achieve the goal of emission reduction. For example, strict, standardized, and scientific inspections of vehicles throughout the city are necessary, and relevant departments also conduct spot checks after the first and second inspections. For motor vehicles with excessive exhaust emissions, it is necessary to strictly prohibit them from passing on the road, and to use scientific and standardized governance methods to promote the exhaust emissions of motor vehicles to meet relevant regulatory requirements. In addition, it is necessary to strengthen the control of vehicle fuel, so relevant environmental protection departments need to conduct strict supervision to fundamentally control the problem of substandard automobile exhaust emissions.

4.6 Enhancing Public Environmental Awareness

Due to the worsening environment while China's economy is developing, sustainable development strategies have been proposed in recent years. Sustainable development is green development, achieving rapid economic development without damaging the ecological environment. In order to implement the concept of sustainable development, the country and government should continue to advocate environmental protection and ecological balance, raise people's environmental awareness, and make the public realize that a truly high-quality life is a pollution-free life, and a pollution-free life requires everyone to work together to create it. With the improvement of people's quality of life, people are increasingly concerned about their physical and mental health and living environment, and have gained more understanding of environmental protection. The state should guide the public to develop low-carbon and green living habits in daily production and life, implement basic national policies of resource conservation and environmental protection, and create a green, environmentally friendly, and healthy home^[6].

5. Conclusion

In summary, during the 14th Five Year Plan period, efforts should be made to strengthen environmental engineering work, focus on air pollution control, and improve the quality and efficiency of environmental protection work. In this process, it is necessary to clarify the connotation of air pollution and grasp the specific reasons for producing air pollution. It is necessary to conduct detailed analysis from different perspectives such as industrial construction, transportation development, and natural environment protection, and adopt reasonable pollution treatment technologies, such as purification methods, dust removal treatment, and exhaust control, to actively improve the problems in air pollution control. At the same time, it is necessary to build a sound management system, constantly strengthen the awareness of air pollution prevention prevention of the whole society, and effectively ensure the sustainable development of the economy and the comfortable living environment of people. On the basis of prevention and control, we will work together to create a better tomorrow.

References

- [1] Rui Wang. The Causes and Control Measures of Urban Air Pollution [J]. Value Engineering, 2020,37(7):201-202.
- [2] Shi-Lei Li. The Harms and Treatment Plan of Air Pollution in Environmental Engineering in China [J]. Resource Conservation and Environmental Protection, 2020(1):27-28.
- [3] Zhi-Guo Zhuang. Analysis and Treatment Measures for Air Pollution in Environmental Engineering [J]. Resource Conservation and Environmental Protection, 2020(01):5-6.
- [4] Ying Zhang. Analysis and Treatment Measures for Air Pollution in Environmental Engineering [J]. Modern Property (midten-day issue), 2019(01):249-250.
- [5] Hong Tang, Xian Wei. Research on the Response Mechanism of Atmospheric Pollution Monitoring in Zhenjiang under Sustainable Development [J]. Resource Conservation and Environmental Protection, 2021(11):56-58.
- [6] Wei-Ning Shen, Zi-Ying Xia, Shuang Su. Quantitative Study on the Policy Text of Air Pollution Control - Taking the Beijing Tianjin Hebei Urban Agglomeration as an Example [J]. Resources and Industries, 2022,24(01):65-72.