

# ENVIRONMENTAL ENGINEERING MEASURES TO CONTROL AIR POLLUTION

## Abstract

People's health and the natural environment's air quality are intimately intertwined. However, the recent rapid economic growth has also indirectly contributed to the ongoing decline in air environment quality. Environmental engineering's effective management of air pollution is a crucial step in enhancing both the natural environment and the standard of living for people. Therefore, in order to thoroughly assess environmental protection strategies, this paper integrates the primary causes and dangers of air pollution.

**Keywords:** Environmental Engineering; Air Pollution; Measures to Control.

## Authors

### **Nandhagopal B**

Assistant Professor/Civil  
Annapoorana Engineering College  
Salem, Tamilnadu, India.  
boopathinandhu.ce@gmail.com

### **Dhipan Aravind S**

Assistant Professor/Civil  
Annapoorana Engineering College  
Salem, Tamilnadu, India.  
dhipanaravinds@gmail.com

### **Ayyanar P**

Assistant Professor/Civil  
Annapoorana Engineering College  
Salem, Tamilnadu, India.  
ayyanar004@gmail.com

## I. INTRODUCTION

The amount of pollution released into the atmosphere is growing as industrialisation progresses. If these pollutants are not successfully removed, the quality of the atmosphere will be jeopardized. A huge quantity of gas will be created during the process of industrial processing and manufacturing, thus comprehensive air pollution control measures must be implemented to effectively tackle the problem of air pollution.

The quality of life of people is significantly impacted by haze and other air pollution, thus relevant national environmental protection authorities have started to develop environmental protection objectives. Continuous work has allowed for the determination of the concentrations of harmful gases including sulfur dioxide and nitrogen dioxide, which has allowed for the gradual achievement of the emission reduction target. The vast majority of India's industrial firms still produce a significant quantity of waste gas, which has a detrimental effect on the environment.

The issue of air pollution has gotten worse and worse, mostly because of the development of forest resources, household sewage, incineration, and marine emissions, all of which have had a negative impact on the environment and the quality of the air, contributing to air pollution. There are still oversight and governance issues in the context of the present environmental quality management system. The commercial operations of the environmental protection department are constrained by the environmental governance process, making it challenging to successfully reduce air pollution. It seriously affects the preservation of the ecosystem. Therefore, we can only offer effective pollution control measures at the source by presenting the correct development plans for air pollution and environmental problems.

The administration of pertinent government agencies frequently chases financial gains, which has an impact on how the local economy grows. In addition, certain industrial facilities with serious air pollution are covered under local aid schemes. The government often works with the appropriate enterprise management staff during the inspection process, which presents certain challenges for the environmental inspection task. The government will also place limitations on the management and supervisory authority of the environmental inspection department's management staff.

## II. THE CAUSES OF AIR POLLUTION

**1. Auto Emissions:** The quality of living for Indians has significantly increased because to the country's swift economic growth. The notion, degree, and structure of human consumption have drastically changed. The majority of people now consider automobiles to be everyday needs and their top mode of mobility. Additionally growing is the quantity of individual variances. In addition to making travel easier for individuals, a growth in vehicles also has an adverse impact on the environment. Numerous itchy nitrogenous chemicals are present in auto emissions and are emitted into the atmosphere. Automobile emissions rise together with the progressive rise in car ownership, which has a detrimental effect on the effectiveness of urban management.

Therefore, the issue of automobile emissions should be taken seriously by the government, integrated into environmental governance, and given top priority for management.

2. **Industry Emissions:** The development of the national economy is significantly fueled by industry, which is also a significant component of the global economic system. However, industry not only helps the nation's economy grow, but it also has a negative impact on the environment and the quality of the air. Large-scale manufacturing is characterized by industrial production. Combustion techniques are typically used in industrial engines. It is challenging to regulate environmental and air pollution because of the significant number of hazardous and destructive gases that are immediately released into the atmosphere during combustion.
3. **Smog-Type Emissions:** The productivity and survival of humans depend on coal. Both industrial manufacturing and centralized urban heating require a lot of coal. The burning of coal will generate a lot of dust and toxic gases, which will drastically disrupt the ecological balance and seriously contaminate the air.

The government should promote the use of environmentally friendly heating and industrial development practices, such as paying attention to coal burning concerns and converting to natural gas in order to decrease the use of coal and effectively reduce air pollution.

### III.EFFECTS OF AIR POLLUTION

The effects induced by the atmosphere to the human body are classified as direct and indirect, and they are irreversible. Direct damage refers to the threat to human health caused by inhaling air containing toxic compounds, whereas indirect damage refers to harmful gases that destabilize the atmosphere. Spacecraft impact the earth's surface, inflicting radioactive damage to the human body and crops. The haze phenomenon is the most obvious manifestation of air pollution that people can perceive. People are more likely to suffer from respiratory ailments in a smoky atmosphere, which have a direct impact on human health. Furthermore, dangerous elements in the atmosphere reach rivers and soil as precipitation, creating water and soil contamination and, eventually, hurting society's sustainable development. Indirect harm has a significant impact on economic and cultural development. Even today, India's economic progress lags well behind that of wealthy countries.

Heavy industry still contributes for a significant amount of India's economic development, and this proportion will keep India's environmental pollution concerns unsolved for a long time. As a result, this economic development model is a short-term or limited economic development process. To achieve environmental preservation and healthy economic development, it is required to begin with energy conservation and the employment of new technologies, eventually establishing a new type of economic and environmental development. In other words, early stages of heavy industry expansion sacrificed the environment, while air pollution negatively impacted and hindered economic progress. Furthermore, air pollution severely limits cultural growth. The concept of harmonious growth between man and nature is currently being presented. If this concept is not adequately applied, it will have a negative impact not only on people's everyday lives, but also on the diverse growth of Indian society and culture.

#### IV. MEASURES TO REDUCE AIR POLLUTION

- 1. The Creation and use of New Clean Energy:** Carbon-based energy will result in significant harm during combustion, hence the issue needs to be actively addressed using rational and scientific approaches. All regions should pay close attention to the present, conduct in-depth analyses of their energy consumption patterns, actively pursue the development of new, clean energy sources that are suited for the human environment, and work to eliminate air pollution. The state needs to prioritize the creation of clean new energy, integrate fully with current industrial output, and create a variety of new energy sources. Utilizing these fresh, clean energy sources can lessen emissions while having little effect on the atmosphere. The efficient and scientific use of all forms of clean energy would not only minimize the need for conventional energy but also help to reduce air pollution and preserve the planet's ecological equilibrium.
- 2. Correct Illegally Emitting Businesses:** The role of national ministries and governments in the effort to manage air pollution is crucial. Additionally, it's important to strengthen the all-encompassing management of pollution issues while identifying the primary causes of environmental contamination. Many industrial companies in India are still not treating exhaust gas emissions in a reasonable manner. The primary pollutant discharge enterprises are industrial ones. Enterprises that exhibit this tendency must be harshly punished and subject to proportional penalties, according to the relevant government departments. The appropriate environmental protection agencies should serve as the beginning point and take the lead in applying sanctions in compliance with pertinent policies, laws, and regulations in the corporate governance process.
- 3. Maintain a Healthy Balance between Environmental Protection and Economic Growth:** The first step is for the relevant departments to improve their examination and control of local businesses, register polluting businesses, and centrally manage them. Companies that don't comply with emission regulations have to stop down for rectification, set up particular overall measures, define rectification objectives, and monitor rectification success. In order to decrease the likelihood of air pollution, it is required to optimize and alter the industrial structure. Examples include enhancing manufacturing techniques and moving or terminating polluting businesses. Local governments should encourage more people and businesses to adopt clean energy at the same time they assist clean energy enterprises with laws and funding. This will help to minimize air pollution. Lastly, tighten the regulations governing urban vehicles' emissions. The use of vehicles with high emissions is rigorously restricted, and unqualified fuel is subject to tighter regulation.
- 4. Boost Monitoring and Install a System for Public Monitoring:** Environmental engineering's long-term, comprehensive project for air pollution mitigation. To sustain and improve the control effect, the long-term mechanism needs a number of pollution control strategies. In order to effectively treat air pollution, the environmental protection department must first fully understand its roles and responsibilities within the treatment process, use cutting-edge ideologies and concepts to direct treatment operations, and constantly improve and innovate its working procedures to comprehend the causes of air pollution. The characteristics and causes of air pollution were thoroughly analyzed in order to propose appropriate treatment measures, establish standardized treatment

procedures, treatment standards, and related management systems. This analysis was done in conjunction with the current state of air pollution in the field of environmental engineering.

On this premise, build a public monitoring system that shares information with the public and allows the public to engage in natural resource monitoring. Increase public awareness in order to encourage the public's sustainable use of resources, as well as to pay attention to and protect the ecological environment. Inspection teams should be organized by relevant departments in order to successfully implement natural resource and ecological environment management. The environmental protection department must conduct frequent inspections at specific businesses. The required units must be adjusted, and manufacturing cannot begin until the corresponding criteria are met. We are putting in place a pay-for-use system for natural resources. Whether as collective or as individual, resources must be used wisely and logically, and environmental damage must be kept to a minimum.

- 5. An Introduction of Cloud Computing Techniques:** Cloud computing technology is not only fast evolving, but it is also being used in air quality monitoring and early warning systems. The use of cloud computing technology can not only aid with existing environmental monitoring activities, but also increase air pollution control accuracy. Cloud computing technology can not only more precisely reflect the urban environment, but it can also improve atmospheric trend forecast based on previous environmental development and weather patterns[6]. At the same time, it can function normally and consistently in the air pollution control process. Only an in-depth study of existing data can provide more effective recommendations for air pollution reduction from a software standpoint.

## V. CONCLUSIONS

To summarize, severe air pollution has a negative impact on people's health and does not promote social and economic development or long-term social development. As a result, several long-term air pollution management methods are required. Long-term improvement and expansion of the benefits of air pollution control will result in a better living environment for people.

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