

AIR POLLUTION AND ITS CONTROL MEASURES IN CONSTRUCTION SECTOR

Bhadresh Modi¹, Dr. Syed Khurseed Ahmed²

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ABSTRACT -

We should always measure, monitor and take required implementable steps to keep our SPM levels and other foreign pollutants present in the atmosphere within the standard permissible range then and then only we can have the sustainable, safe and healthy environment for all of us and for the future generations as well.

To achieve the desired SPM levels and other pollutants within the standard permissible limits we can use different technologies, different fuels to a great extent in construction sites which will help us in meeting the required air pollution control norms so that we can do the construction activities without any legal hurdles.

1. INTRODUCTION -

Air pollution is basically the foreign material present in the air like Oxides of Nitrogen (NO_x), Sulphur Dioxide (SO₂), CO₂, Carbon Monoxide (CO), Particulate Matters (PM₁₀ and PM_{2.5}), Volatile Organic Compounds (VOCs).

This occurs due to human activities or naturally.

The sources of air pollutants include vehicles, various types of industries, Construction sector, Domestic and Natural sources. Vehicle Pollution has a significant effect on the environment and on the human health also.

Further emission reductions from automobiles and transportation vehicles is difficult to achieve, but we have received the task and threat before all of us to control it, otherwise we are and we will face the consequences arising from the air pollution.

This is not possible without the involvement of every citizen of our country, which will help in taking adequate steps to mitigate this problem in order to have the clean Air for all of us and for the future generations as well.

Government bodies, various authorities and industry should also get involved properly to tackle air pollution with the help of policy reformation, along with the technological innovation and timely strict implementation of the Air pollution mitigation measures.

Difference between the Primary and Secondary Pollutants in the Air.

Primary pollutants are those pollutants that get added directly into the air while **secondary pollutants** are formed as result of chemical and physical reactions between primary pollutants and other atmospheric components.

1.1 Major Primary Pollutants generated by Human Activity:-

- Nitrogen Oxides (NO_x) - especially nitrogen dioxide 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 resulting from incomplete combustion of fuels 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. They are divided into two separate categories namely methane (CH₄) and non-methane (NMVOCs).

- Particulates, alternatively referred to as particulate matter (PM10 and PM2.5) - Atmospheric particulate matter or fine particles are tiny particles of solid or liquid suspended in a gas.
- Persistent free radicals connected to airborne fine particles can cause cardio pulmonary diseases.
- Chlorofluorocarbons (CFCs) - harmful to the ozone layer emitted from products currently banned from use.

1.2 Secondary Pollutants include:-

Ozone (O₃); Sulfuric acid and Nitric acid (component of acid rain); Particulate Matter; Nitrogen Dioxide (NO₂); Peroxy Acetyl Nitrates (PANs).

- Ground level Ozone (O₃) formed from NO_x 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.
- Peroxy Acetyl Nitrate (PAN) - similarly formed from NO_x and VOCs.

1.3 Objective for the present study:-

To minimize the effect of urban air pollution on the surrounding Environment and the human beings, which motivates us to take various air pollution control measures from time to time by every individuals, Government bodies, various authorities, institutions, industries, Construction sector as well.

1.4 Air Pollution in Construction Sector:-

The back-bone of economic development is infrastructure. All construction sites generate high levels of pollution and this can carry for large distances over a long period of time. As per the Delhi Pollution Control Committee (DPCC) officials, 30 percent of air pollution is caused due to dust which generates from the construction sites.

1.5 Sources of pollution at Construction Sites:-

Excavation causes major particulate pollution in the entire lifecycle of constructing a building or a Project. Drilling and mining activities generate air particulates (dust) that remain in suspension for a longer duration.

The Construction Industry involves various activities like Excavation which spreads fine dust particles in the air, Batching Plant used for RMC production also spreads fine cement particles in the air, Fabrication Works, Construction works, Dump Trucks, Tractors used for shifting sand, spreads sand particles in the air and various Structural steel materials, finishing activities need to be spray painted which has VOCs in them also causes VOC related air pollution.

In construction works for doing the concrete, many equipments are used namely Transit Mixers, Boom Placers, Concrete Pumps all uses Diesel and the pollutants like CO, CO₂, SO_x, NO_x etc. are emitted in to the environment due to these Vehicles and Equipments.

Finishing activities include fixing of dry sand boards which is made up of fine gypsum materials. To overcome power shortages DG Sets are used which emits air pollutants like CO, CO₂, SO_x, NO_x etc. Also pneumatic compressors are used which causes major Air and Noise pollution.

For breaking hard concrete, while doing chipping activities, small breakers along with the pocklein machines are used which creates dust pollution along with vibration in that particular area.

For doing various mechanical works Hydras, Crawler mounted Cranes, Excavators, Dodgers, Dump Trucks are used in which diesel is consumed which emits Air pollutants like CO, CO₂, SO_x, NO_x etc.

The main construction contaminants that spread around by wind include PM10 (particulate matter with a diameter less than 10 microns generating polluted dust), VOCs (volatile organic compounds), asbestos, gases such as carbon monoxide, carbon dioxide, and nitrogen oxides, etc.

1.6 Construction Dust:-

Construction and demolition operations contribute to windblown dust problems - sometimes called fugitive dust onto nearby roadways which can remain in the air for days or even weeks.

Big source of PM 2.5 on construction sites come from the diesel engine exhausts of diesel generators, heavy vehicles and equipments.

Noxious vapors from oils, glues, thinners, paints, treated woods, plastics, cleaners and other hazardous chemicals that are widely used in construction sites, also contribute to air pollution.

1.7 C&D Waste:-

The C&D Waste comprises of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure.

Also considerable waste is generated due to operation of the Batching Plants used for producing the RCC and different grades of concrete used for the various construction activities which over a period of time results in the accumulation of the C&D waste in the site.

Construction industry in India generates about 10-12 million tons of C&D Waste annually.

Rules and clearances for Construction Projects:-

The Ministry of Environment, Forest and Climate Change has made it mandatory to obtain environmental clearances for construction projects having covered built-up area greater than

20,000 Sq. Mtr.

Indian Government has also set forth guidelines and made it mandatory for construction site owners to implement dust preventive/ mitigation measures in order to minimize the impact on environment.

Pollution Control Measures in the Construction Sector:-

1. Dust/wind breaking walls of 6 Meters height are provided all around the periphery of construction site. This helps in keeping the SPM within the construction site only and as the site is vast it will not go on to the public roads or in our neighborhood areas, by this way we are contributing in keeping the SPM within the safe zone.
2. Anti-smog guns are provided in the site premises which sprinkles the water in the mist like form i.e. fine water droplets in the air which helps in bringing the air born particles down to the surface and keeps the environment free from SPM.
3. By providing green colour garden net in all the stair cases where the workmen movement is more to keep them healthy as the Delhi weather is such that at any time wind blows and affects the health of the workmen. This also helps in reducing the SPM in the atmosphere.
4. Whenever any vehicles transports the construction material to the required location it is covered with the green colour garden net to stop the flow of pollutants in to the atmosphere.
5. C&D Waste is broken and reused in the areas where there is the filling requirement and the remaining quantity is given to the authorized recycler back for further use.

6. Any leftover C&D Waste in the site is stored properly at a designated place and covered with the green cloth to prevent the flow of any SPM in to the atmosphere.
7. In our construction site we have mostly covered the usable areas with bitumen roads as well as we are planting adequate quantity of trees to prevent the flow of SPM in to the atmosphere.
8. The unpaved roads are laid with GSM materials, rolled properly with the rollers and time to time water sprinkling is done using water sprinkling tankers using the DJB STP water to prevent the suspension of air borne particles in to the environment, by this way we are maintaining the health and hygiene of our construction site workforce.
9. We are using the wheel wash facility which is provided at the main gate where the outside vehicles enters and leaves the construction to prevent the carryover of the dust particles on to the public roads and in this way we help in maintain the environment.
10. We are providing the workmen working in the Batching plant with the Dust Masks to prevent health hazards to the construction workmen.
11. Heavy vehicles used in the site are required to strictly follow the fitness and PUC certificates to control the air pollution.
12. We are using different types of Granite stones in our project which also contributes to the stone dust and to take control of the same we are using wet jet spray techniques to control the stone dust pollution.
13. Time to time health checkup as well as first aid centers are established in our site to tackle health related problem if any but we are maintaining the environment in a very clean and green zone so there is a very less need to use these facilities at all.
14. Regularly we are submitting the environmental data of our construction site in the online DPCC Portal which is an Environmental monitoring body for the Delhi-NCR Region and they are supporting and appreciating our efforts by way of giving positive remarks through the portal.

2. CONCLUSION:-

With this I would like to conclude that by measuring, monitoring and by taking various implementable steps we can control SPM levels and other foreign pollutants present in the atmosphere within the standard permissible range which will help in sustainable, safe and healthy environment for all of us and for the future generations as well.

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5. BIOGRAPHIES –

First Author – Bhadresh Modi.

BE - Chemical Engineering, Post Graduate Diploma in Business Management, Post Diploma in Industrial Safety, Post Diploma in Environment Technology & Management, NEBOSH Certified EHS Professional having experience of 24 Years in various industries.

Has worked in various industries which includes Chemical, Pharmaceutical Industry, Piped Natural Gas Distribution Company, Thermal Power Plants, and the Construction Sector among all.

Second Author – Dr. Syed Khurseed Ahmed.

Al Falah University Civil HOD is a renowned personality in the field of Civil and Environment Engineering. He is having a very vast experience in the academic field.