International Journal of Environmental Planning and Management
Vol. 7, No. 1, 2021, pp. 1-4
http://www.aiscience.org/journal/ijepm
ISSN: 2381-7240 (Print); ISSN: 2381-7259 (Online)

Indoor Emissions to Control Particulates Release in the Atmosphere

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Abstract

The air emitted from different factories contains high levels of pollutants that affect our health. Air pollution control needs to protect the public exposed to safe levels of different particulate sizes. This paper establishes a new design for the recycling of air pollution with no more outdoor emissions. Remove hazardous materials from the source and recycle all waste materials. Control indoor equipment removes all emissions and attempts to convert them into less harmful contaminants or recycle valuable materials for further use. In addition, the total quantity of pollutants emitted by each factory farm emission can be assessed by the particulate matter collected. The amount of outdoor air pollutant was reduced but the size of the particle released from factories in the atmosphere was still different. This was designed to stop all emissions by collecting all emissions before they were released into the air. The emission dispersion of short chimney discharges in the closed area passed to the difference room, each room has the control of wind valve. The number of rooms depends on the amount of substances emitted. In this design particulate such as smoke, fumes and dust removal by water, are used to capture particulate dust. The filtration process is used for the sampling of particulate matter and the collection of gases can be achieved by absorption and adsorption. The new design using two filtration rooms to collect suspended particles in the first part. In the enclosed area, the air passes through two water tanks before being released to the atmosphere to remove smoke, fumes and dust.

Keywords

Air Pollution, Emissions, Design, Recycle, Control

Received: November 27, 2020 / Accepted: December 28, 2020 / Published online: January 22, 2021

1. Introduction

Combustion of fuel is the one of the largest contributor to air pollution emissions caused by human [1]. The emissions from fuel combustion, that included carbon oxides (CO, CO2), nitrogen oxides (NO, NO2, N2O), hydrogen sulphide (H2S), sulphur oxides (SO3, SO2, SO), and VOCs. Differences particulate matter size emission from cement factory and carbon particles emitted from steel plants and power plants [2]. The chemistry of atmosphere and human health, which significantly affected by fossil fuels and other industrial processes [3]. The cement industry emits pollutants in the form of dust and gases that affected the soil [4]. The pH and accumulation of metals in the soil changed from dust produced by cement factories, which may affect microbial biomass and enzyme activities [5]. Soils enzymes playing important role in maintaining soil biological, physical and chemical properties [6]. The soil metabolic processes contain a group of enzymes [7]. That depends on its physical, chemical, microbiological, and biochemical properties.

Societies have long complained about the emission from cement industrial operations. Air impurities in many countries still risk on the human health above emission control standards from cement plant. The results of

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monitoring study of the livestock industry expose that the air at some cement operations at many sites is above standards levels [8]. The fine particle pollution was much higher than that limit peak exposure of the Federal air quality standards concentrations [8]. Emissions are different depends on different operations such as trade, industry, process, fuel burning equipment or industrial plant. The atmospheric dispersion emission affected by different parameters such weather condition (atmospheric stability), ground conditions, (building, water, trees) and momentum and buoyancy of the initial material released [9].

Table 1. Concentration of Heavy Metals in the Soil Samples obtained from the Surrounding of the Cement Factory.

site	Cd (µg/ g)	cu (µg/ g)	Ni (µg/ g)	Pb (µg/ g)	Zn (µg/ g)
1	0.98	4.18	0.08	5.08	0.04
2	1.17	3.20	0.06	8.07	0.03
3	1.08	3.16	0.09	10.07	0.05
4	1.04	4.16	0.08	6.06	0.02
5	1.66	2.19	0.08	6.10	0.02
6	1.03	3.14	0.9	11.8	0.04

Industrial processes to stop emission are based on observations, predictive equations or a combination of observations and predictions [10]. There are different activities can generate air pollution, which, required different equipment and methods to control these generated. The pollution control equipment shall be designed to comply with the allowable emission standards [9]. Because air monitoring study and the livestock industry reveal that, the air at some activities may be unsafe above the standards applied at many sites. The application of control technology requires knowledge of emissions; effluents from the source, with a new air pollution regulations and waste recycle from the technology to recycle the pollutant with some economic purposes [11]. Cement production is one of the sources of particulate matters (PM) and metals, which are generated from both of fossil fuels and processing of the raw materials [12, 13]. Studies of contaminated from cement factories have focused on levels of metals in the air [14, 15] or soil [16–17], and little on effective on plants [18, 19]. Very few studies have examined exposures of metals in human through inhalation or ingestion of dust near a cement factory [20].

Table 2. Particle size distribution (%) round cement factory.

site	sand	slit	clay
1.	78.6	16.8	4.7
2.	89.3	9.3	1.5
3.	96.7	3	0.3
4.	79	12	9
5.	76.4	19.7	3.9
6.	65.4	27.2	4.7

2. Theory of the Design

In the last twenty years, outdoor air pollutant concentrations were decreased but still different size particle such as nanoparticles and new particle formation released in the atmosphere. The aim in this designed are stop all emissions outdoor from cement factory, that because it is possible to collect all these releases before they are issued to the air. While it is difficult to collect every single particle of gas or solid materials after release it in the air. Reduced the emission of air pollution is the adopted for a new science designed. Exhaust gases from the pollution control equipment should not be emitted into the atmosphere through a discharge stack to ensure safe air condition, which means no more pollution emission. The dispersion of the air must be change to indoor and stop dispersion air pollution even through a discharge stack of a height approved control.

Emissions shall be dispersion indoor through short chimneys discharge. Emissions will be dispersion inside closed building, where emissions passed from one room to another with different collection equipment. Decrease air emission from cement plant by convert emissions (particulates size, ammonia, hydrogen sulphide, and volatile organic compounds) to solid or liquid materials (reduces- reuse and recycle). There manufactured by add different materials to these emissions in different process. This operation will produce thousands tens of different materials (gases, solid, and liquid).

3. The Design Method

Dispersion and transport of air pollution effects by wind speed and direction, atmospheric stability, plume rise and topography when release outdoor but all these aspects are under control inside closed building. Pollutant dispersion modelling was created at stable condition of wind speed and direction and plume rise. This design tries to control a dynamic and complex environmental phenomenon exhibiting large temporal and spatial variation, which provides the mechanisms for chemical reactions of pollutants in inside closed building and for the control and removal pollutants.

This design is review contribution to stop dispersion air emission outdoor from cement factory. The emissions dispersion indoor by short chimneys discharge in closed area passed through differences rooms. Every room has wind valve control. The number of the rooms are depending on the amount of emissions substances. Dispersion models describe the airborne transport of materials emissions from the source site into indoor place. After release, the airborne materials are carried indoor by control wind (valve) into different filtration rooms. The filtration used for sampling particulate matter, and collecting gases be accomplished by absorption, adsorption. Two filtration rooms using fiberglass in the first stage and cotton in the second room. In the part two of the design collecting small size particulate such as smoke, fumes

and dust removal by water, is used to capture particulate dust. The air passes through two-water tank before release to atmosphere. The contaminated water resulted from passes air pollution, filtered through filtration tank before heated in evaporation tank.

All materials emissions equipment shall be designed to comply with the emission indoor with short chimneys discharge. Even we had different materials emission with different resources and operations such as trade, industry, process, fuel burning equipment or industrial plant. This needs different control devices such as gravitational setting chamber, centrifugal separators (cyclones), wet scrubbers, filters and electrostatic precipitators to collected air pollution emission indoor. The recycle of air emission means convert all emissions dispersion indoor to different form (gases, solid or liquid) materials. Indoor control equipment indifferent rooms absorption for every materials emission. The problems in this scenario produce large quantities of solid or liquid materials. These materials should collect or trapped by using different devices such electrostatic or bag houses.

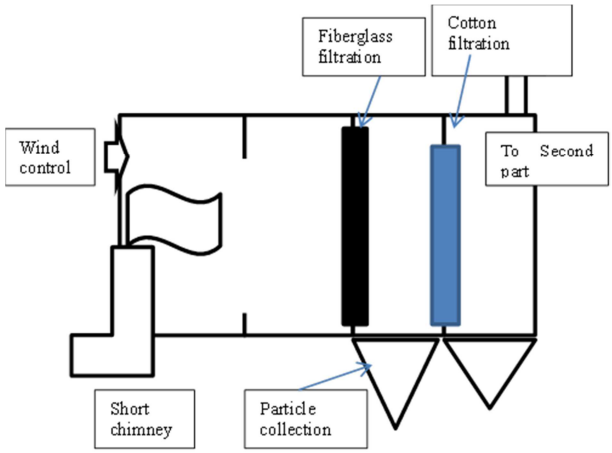

Figure 1. Indoor emissions with short chimneys discharge and wind control valve, using two filtration rooms to collected suspended particle, in the first part.

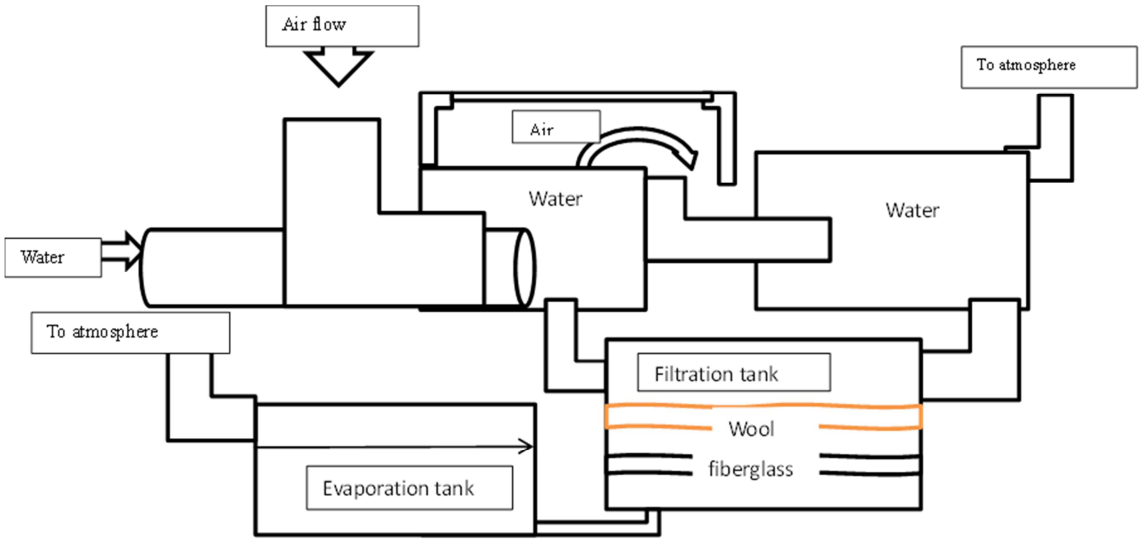

Figure 2. Part two after release air in closed area and filtration process, air passes through two water tank before release to atmosphere. The contaminated water resulted from passes air pollution, filtered through filtration tank before heated in evaporation tank.

4. Conclusion

The scenario in this design stops dispersion air emissions outside from factories because it is possible to collect all these releases before they are issued to the air. While it is difficult to collect every single particle of gas or solid materials after release it in the air. The design focused It cannot collect every gas atom or all of the different sizes after its launch into the air. In addition, it is difficult predictions the direction of these particle after release it in the air and where will deposit. On the other hand, thousands tens of different materials (gases, solid, and liquid) can transport, storage and recycled. This designed to stop all emissions by collect all emissions before they are issued to the air. The emissions dispersion by short chimneys discharge in closed area passed to difference room, every room has wind valve control. The number of the rooms are depending on the amount of emissions substances. In this design particulate such as smoke, fumes and dust removal by water, is used to capture particulate dust. The filtration process is used for sampling particulate matter, and collection of gases can be accomplished by absorption and adsorption. The new design using two filtration rooms to collect suspended particle, in the first part. in closed area after that air passes through two water tank before release to atmosphere to remove as smoke, fumes and dust.

This design will stop all particulate matter size release to the environment by the different operations will stop release more compounds which harm to the environment. Which collected and convert to solid or liquid (acid or water

contaminate) such as convert all (carbon oxides to carbonate and bicarbonate- sulphur oxide to Capriati- Nitric oxide to nitrate)? This design will stop release particulate materials (fine and large) in the atmosphere. Features of reducing the proportion of carbon dioxide in the atmosphere and convert it into carbon oxides and carbonic acids, carbonate and bicarbonate different elements. The challenge of this method lies in the millions of tons of versions that have been converted to the form of liquids (acids and liquid residues) and solid waste from small particles and large and that are difficult to deal with in terms of recycling in a period of short resulting in the storage of these quantities for long periods.

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