

CASE STUDY ON SMOG FREE CITY

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Abstract - In one of the world's most polluted cities smog pollution in form of gases like CO(carbon mono-oxide) , NO (nitrogen oxide) and hydrocarbon are very harmful for human beings. It is one of the most serious public health concerns in the worldwide. We are in need of oxygen supply that too in pure form. Smog is a kind of visible. Photochemical smog i.e. man-made smog derived from forest and agricultural fires. This may cause health problems like difficulty in breathing and can be dangerous for cancer. So, for reducing the smog from the air there are various structures like Smog free tower. These towers are more effective in most of polluted cities. This study aimed to aware and give some preventive practices of smog pollution and also shows the design of smog free tower.

Key Words: smog, pollutions, nitrogen oxide, carbon mono-oxide, nitrogen di-oxide

1.INTRODUCTION

Air pollution is "contamination of the indoor or outdoor environment by any physical, chemical, or biological particles that changes the natural behavior of the atmosphere". Smog hits most of the regions of the world which includes India, USA, United Kingdom. World Health Organization (WHO) calculates that nearly 4.5 million deaths occur from breathing problem due to environmental problems i.e. smog pollution. Smog forms a photochemical reaction of air pollutants and the sunlight which affects millions of civilians. Which causes critical impact on lifecycle of human. Environment pollution is a state of the environment which due to air, water, or solid, liquid, or gaseous and energy which may affect human health, climate of nature. Recent most dangerous polluting factors are:

- Carbon dioxide (CO₂) causes of the greenhouse effect;
- Carbon monoxide (CO);
- Sulphur dioxide and nitrogen dioxide (SO₂ and NO₂)

At the same time, many risks arise from the cigarette smoke, and oxygen deficiency, polluted drinking water, and food. Air pollution called smog has increased in recent years. It mostly affects human being who lives in large cities where levels of energy consumption are very high. Currently the most impact is done through the transport that may form the photochemical

smog in the air. The burning of fossil fuels are the most major causes of global warming. In simple language smog can be defined as the combination of air pollutant and fog present in the atmosphere. Word "smog" is derived by combination of two words, smoke and fog. This project of smog states problem evolved through smog their solution. Smog can be referred as the type of fog which has various forms of smoke in it. Smog is a yellowish or blackish fog formed mainly by a combination of pollutants in the atmosphere. Air that makes breathing difficult is called smog. Burning of fuels release gases that form smog. When these pollutants react with sunlight and sue to sunlight its heat and smog forms. That time various Photochemical reactions between oxides, nitrogen oxide and Sulphur oxides which release fine particles. To reduce such smog pollution from the air Smog free tower concepts come into picture. This smog free tower is largest air purifier in the world. The structure of Smog free tower is 23 for tall. This tower clean maximum 35,000 cubic meter of air per hour of smog to create smog free city for this process it uses green energy. This tower needs charging for cleaning the nearby air. A single ring can hold pollution equivalent to 1000 cubic meters of city air. The uses very low power i.e. 1400 watts for cleaning the air. Very low power of 1400 watts and creates bubble of clean air. Photochemical smog consisting of it is a modern solution on this growing smog problem.

2. RESEARCH METHODOLOGY

2.1 PROBLEM STATEMENT

The major causes of air pollution are result of emissions from a number of sources, industrial and domestic fossil fuel combustion and vehicles emissions. These days increase in the amount of industrial and technical advancement has led to deterioration of the environmental conditions. These pollutants cause severe human health problems, including asthma, pneumonia and irritation of lungs, bronchitis and premature death.

There are various types of smog like Sulfur smog, Photochemical smog and Chemical smog. When ultra violet lights from the sun reacts with nitrogen oxides in the atmosphere it produces photochemical smog. It is consisting of mixture of bad chemicals. This project is related to problems and solution

of smog caught in various places and affects human being's health. Smog pollution is mostly produced in cities and it may stay there for long period. Smog can be formed faster and be more severe in cold areas.



2.2. SOURCES OF SMOG

1. Wood & coal burning for heating homes & cooking.
2. NO(Nitrogen Oxide) & NO₂(Nitrogen Di-oxide) .
3. Smoke from suddenly unexpected fire of forest & farm.
4. From power stations mainly coal burning plants.
5. Gasoline and diesel run vehicles.
6. Industrial plants and activities & human activities.
7. Heavy traffic in cities.
8. High temperature, sunshine & calm winds.
9. Fog in winter season increase the visibility & effect of smog.

2.3. OPTIMAL METHODS TO SMOG FREE TOWER

1. WET DEPOSIT

In this process artificial rain is applied on the affected city by smog, spreading potassium iodide, liquid propane & silver iodide in existing cloud by help of rocket or plane. These chemicals create ice particles in present cloud that get heavier and fall on the earth in the form of rain. These artificial rain washes the smog over city such as the water molecules collect the toxic particles and bring them on ground by action of gravity

2. SPRINKLING OF WATER

In this method sprinklers are fixed at the high buildings and water spread on the city but this method has limitations of water and positions of sprinklers also in this method wastage of water & energy is done

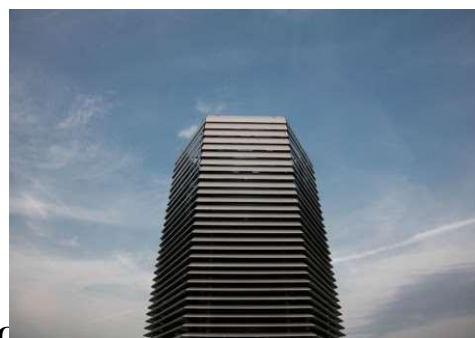
3. APPLYING SMOG RESISTANCE PAINT

In this method paint is applied on the outer side of building. The paint is made up of titanium dioxide which react with the nitrogen dioxide present in smog and convert it into nitric acid which is generally harmless and breakdown the formula of smog. But this

solution is not applicable on open public places in cities.

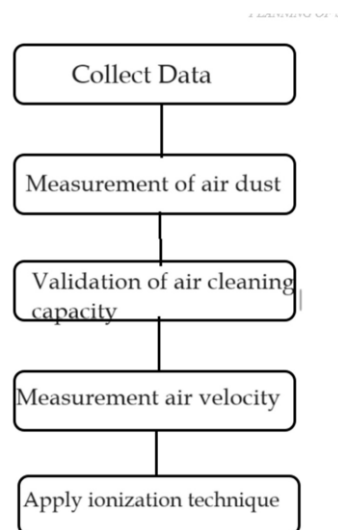
4. SMOG FREE TOWER

The smog free tower collects the smog present in air and arrest smog particles. It runs on electricity. It can be applicable on buildings, public places & workplaces. The smog free tower works independently with the high voltage electricity supply. It does not need any other material and no wastage is obtained in the result.



2.4. METHODOLOGY

Places in cities have more contact with more numbers of people in open area having directly air contact are affected by smog. These smog free towers intake the smog inside it by action of vacuum and give product as separate carbon and elements. Smog Particles smaller than 10 micro meters in diameter can be arrested in this tower. The Smog Free Tower is designed to allow people to breathe clean air in a city. The highlight of this project is too aware the use of Smog free tower and how to reduce the air pollution due to smog.



2.5 COLLECTING DATA

Table 1.1 collection of data

Air Quality IndexParticulate Matter	Minimum value	Safe At under	Maximum value
AQI For O3 (Ozone)	29	50	114
AQI For NO2 (Nitrogen dioxide)	36	50	81
Humidity	32%	50%	92%

2.6 VALIDATION OF THE AIR CLEANING CAPACITY OF THE AIR PURIFICATION SYSTEMS

Air purification systems were designed and developed for the efficient elimination of fine and ultrafine dust from large volumes of air. To validate the efficiency of the air purification system systems that are located in the SFT, concentrations of fine dust measured in the ingoing and in the outgoing air streams of the individual air purification system systems. By calculating the difference between the fine dust concentration in the ingoing versus the outgoing air, the percentage reduction can be calculated. During all measurements, the systems wear operating at full capacity.

Table 1.2 Validation of air cleaning capacity

System	Orientation	Reduction(%)
Aufero-1	North	54
Aufero-2	South-East	53
Aufero-3	South-West	52

2.7. MODEL DESIGN

1. The tower works in simple way, it sucks in dirty air like a giant vacuum cleaner.
2. Due to applied potential voltage difference, all the particles get positively charged, and the ground is negatively charged, resulting in downward dragging force on the pollutants in air. This is called as ionization technique.

3. Ionization technique then filters it. The technology is safe and there are no secondary by products causing any pollution.

2.8 BASIC WORKING OF TOWER

Smog tower containing a basic work method of vacuum, at the top of tower polluted air filtered by the action of ionic filtration with the help of high voltage current (1400kw). Dust particles are get positively charged after colliding with positive ions this positive charged dust particles are collected at the grounded electrode which attract that positive dust particles. ionic filters will charge and remove smog particles, blowing fresh air out of the tower's vents which are provided in tower.

3. CONCLUSIONS

The smog free tower is way to the new globalization for human. Human are constructing the history at every time with every subject with some drawbacks, but the next generation should be prepared for that drawback to resist them & convert them in history again so in this case the human is constructing the history about this period, which drawback are pollution and their effect in present & future also now days the humans are don't think about environment while they are running his lifecycle not everyone do this but most of people does not take care about environment, this smog free tower is effective solution for this type of problems after completion of their rule. The Smog Free Project aims to raise awareness about the global problem of air pollution and serves as an inspiration for a clean future. The Smog Free Tower is used to actively purify city air and may therefore contribute to solve the fine dust problem in cities worldwide. The awareness of states, cities, and even the public allows for the introduction of new, feasible, and usable solutions. Buildings, facilities, and infrastructure alone will not bring about complete clean-up. Changes in other areas are also needed. It is not enough to build anti-smog buildings to reduce smog. Nor is it enough to change heating systems. It is also necessary to phase out cars that produce a large amount of pollution and switch to hybrid and electric cars. Renewable energy sources should be used, waste should be reused, and filters should be installed on chimneys. We should begin to eliminate the causes of pollution, which to a large extent include low emissions.

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