DEPARTMENT OF CIVIL ENGINEERING

PROJECT REPORT ON

"DUST AND CARBON DI OXIDE COLLECTOR"

SPONSORED BY

"KARNATAKA STATE COUNCIL FOR SCIENCE AND TECHNOLOGY"

Submitted in partial fulfilment of the requirement for the award of degree of

BACHELOR OF ENGINEERING

IN

CIVIL ENGINEERING

2018-2019

Under the guidance of

Prof S.M.PATIL

Submitted by

1. Mr NIHIL M JALAPUR 2BL15CV724
2. Mr AMITRAJ JAMBURE 2BL16CV403
3. Mr AATA-UR-RAHAMAN KAZI 2BL16CV407
4. Mr MOHAMMAD FAHEEM GHORI 2BL16CV417
KEY WORDS: DRY STRAW, FILTRATION, ABSORPTION, DIFFUSER, CLOTH BAFFLE

1. INTRODUCTION:

1.1 AIR POLLUTION: It may be defined as presence of one or more contaminants like dust, mist, smoke and colour in the atmosphere that are injurious to human being, plants, animals and structures.

1.2 CAUSES OF AIR POLLUTION:

1. Rapid Industrialization
2. Fast urbanization
3. Increase in number of vehicles
4. Activities of human being have disturbed the natural balance of atmosphere

1.3 SOURCES OF AIR POLLUTION: Mainly we can classify sources of Air Pollutants by

1. Natural sources
2. Artificial sources

1.4. PROBLEM IDENTIFICATION:

Air pollution is a most serious problem of the current time all over the world, especially in the large cities because of the increasing level of industrialisation, urbanisation, technologies, etc.

The release of such air pollutants in heavy concentration such as CO₂, smog, particulates etc. are getting settled over the cities, causing air pollution. Air pollution affect on human health, environment, monuments, etc. Constant exposure to pollution may cause Asthma, eye and ear irritation, lung cancer, etc. Air pollution is main cause for acid rains causing harms to monuments, people, plants, animals, etc. Air pollution also affect on wildlife, ozone depletion, vegetation damages, global climatic changes etc.

2. OBJECTIVES:

The main objective of “Dust and CO₂ collector” is to collect particulate dust & CO₂, then collected matter is treated in treatment unit. The collector includes separate compartments of dust and CO₂ collection. The idea is to collect dust and CO₂ from atmosphere and to reduce the amount of CO₂ in atmosphere using this working model.

Some objectives of Dust and CO₂ Collector are:

1. To reduce the Dust content in atmosphere effectively, by Filtration method.
2. To collect CO₂ from atmosphere by Absorption method.
3. To collect the Dust and CO₂ from road side and colonies.

3. METHODOLOGY:

3.1. MATERIALS USED

- Inlet fan
- Screen
- Dry straw
- Cloth Baffle
- Filter Paper
- Diffuser
- Outlet
3.2. METHODS ADOPTED

1. FILTRATION

2. ABSORPTION

1. FILTRATION

Filtration is one of the most common techniques to collect particulate matter from Atmosphere, here the Dry Straw is used to collect Dust particles. Use of Dry Straw is based on the principle of filtration, which is reliable, efficient and economic methods to remove particulate matter (dust) from atmosphere by collection. A separate module is made for collection of dust particles.

2. ABSORPTION

The removal of one or more selected components from gas mixture are removed by absorption process, dissolving the gas into proper liquid the gaseous pollutants are removed and absorption is probably the most important operation in the control of gaseous polluant emission. Generally the gas stream is made to mass through the liquid, that liquid absorbs the gas in much the same way that sugar is dissolved in glass of water when stirred, here in this device the atmosphere air after passing through the filter module, it is made to hit cloth baffle, then directed to pass through absorbent solution there aeration is done with help of Diffuser in order to make air react with absorbent.

3.3. DETAILS OF FABRICATED MODEL

DIMENSION OF BODY

1. Length = 2’
2. Breadth = 9”
3. Height = 9”

FANS

1. Inlet fan = 2400 Rpm
2. Outlet fan = 2700 Rpm

BAFFLE

1. Height = 6”
2. Breadth = 9”
3.4. **TEST CARRIED OUT FOR ABSORPTION OF CO$_2$:-**
We can find out absorption of CO$_2$ by indirect method of taking weights of solution, initially we have to take weight of solution then after running the model for 1 hour then take weight of solution the difference in weight will give the amount of CO$_2$ absorbed by solution.

4. **RESULT AND CONCLUSION:-**
   - Potassium Hydroxide absorbs CO$_2$ at Room temperature, whereas Potassium Carbonate reacts with CO$_2$ at 70 – 80 °C.
   - Potassium Hydroxide readily reacts with CO$_2$.
   - Dust is effectively collected by Filtration Method using Dry Straws.

5. **SCOPE FOR FUTURE WORKS:-**
   i. We can install this “Dust and CO$_2$ collector” device along road side on medians, along with street lights to draw the dust kicked up by vehicle wheels and vehicle exhaust.
   ii. Dust and CO$_2$ collector device can be installed near hospitals.
   iii. This device can be installed near schools and colleges.
   iv. This device can be installed in Batching plants, Stone crushers and Mining.
   v. This device can be installed in Public parking areas.

**USES OF POTASSIUM CARBONATE AND BI-CARBONATE (PRODUCT)**
   a. Used in fire Extinguishers (Suppressed).
   b. In Agriculture (Neutralizing Acidic Soil).
   c. Used in Organic Farming.
   d. Acidity Regulator (pH).
   e. Used in manufacture of Soaps and Detergent.