

# Plastic Waste Management by Incineration Method

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Submitted: 05-07-2021

Revised: 17-07-2021

Accepted: 20-07-2021

**ABSTRACT:** With Rising Problems of Plastic Waste Management, there is a need for implementation of proper and advanced Plastic waste disposal methods such as Incineration Method. Unlike Landfilling which causes leachate and Ground water contamination, Incineration is combustion process in which plastic waste is treated at higher temperature and plastic volume is reduced by 80%-90%. And its end products such as flyash can be used in construction Industry.

**KEYWORDS:** Plastic Waste, Incineration, End Products, Recycle, Landfill, Leachate.

## I. INTRODUCTION

Incineration is a waste treatment measure that includes the ignition of substances contained in squander materials. Burning and other high-temperature squander treatment frameworks are portrayed as "warm treatment". Burning of waste materials changes over the loss into debris, vent gas and warmth. The debris is generally framed by the inorganic constituents of the waste and may appear as strong irregularities or particulates conveyed by the vent gas. The vent gases should be cleaned of vaporous and particulate contaminations before they are scattered into the environment. Now and again, the warmth created by burning can be utilized to produce electric force.

Burning with energy recuperation is one of a few waste-to-energy advances like gasification, pyrolysis and anaerobic processing. While burning and gasification advances are comparable on a basic level, the energy delivered from cremation is high-temperature heat though ignitable gas is regularly the fundamental energy item from gasification. Cremation and gasification may likewise be carried out without energy and materials recuperation. Incinerators diminish the strong mass of the first waste by 80–85% and the volume (effectively packed fairly in dump trucks) by 95–96%, contingent upon sythesis and level of recuperation of materials like metals from the debris for reusing. This implies that while cremation doesn't totally

supplant landfilling, it altogether decreases the fundamental volume for removal. Dump trucks frequently diminish the volume of waste in an implicit blower before conveyance to the incinerator. Then again, at landfills, the volume of the uncompressed trash bin be diminished by around 70% by utilizing a fixed steel blower, but with a critical energy cost. Cremation has especially solid advantages for the treatment of certain waste kinds in specialty regions, for example, clinical squanders and certain perilous squanders where microorganisms and poisons can be annihilated by high temperatures. Models incorporate synthetic multi-item plants with different harmful or extremely poisonous wastewater streams, which can't be steered to a regular wastewater treatment plant.

## II. INCINERATION PROCESS

### 1 Combustion:

The waste is combusted in the exceptionally planned heater at high temperature of > 85C for over 2 second with adequate inventory of air in order to guarantee total consuming of the waste and to forestall the development of dioxins and carbon monoxide.

### 2 Boiler/ steam turbine:

The heat from the combustion is used by the turbines which is coupled to the electricity generator.

### 3 Exhaust gas cleaning:

The gas from the boiler is cleaned by advanced pollution control systems to ensure safety to environment.

### 4 Dry or Wet scrubbers:

lime powder slurry is sprayed to neutralize and remove the acidic gases such as sulphur oxides, hydrogen chloride.

5 Activated Carbon Injection:  
Activated carbon helps to absorb and remove any heavy metals and organic pollutants.

6 Selective Non-Catalytic Reduction:  
To remove the oxide which can causes smog.

### III. METHODOLOGY

#### Incinerator Model Design

Design Capacity – 15 Litres.  
Total Height of Model – 3ft.

#### Model Construction

Box Incinerator is site welded with edge support of 0.5mm thick steel rod to held box together. And Incinerator is provided with 0.45mm thick GI Pipe for Exhaust.

Material Used –

GI Pipe (Diameter = 0.45mm) – Exhaust Pipe

GI Sheets – Incinerator Box

Flat Iron Bar – Support of GI sheets and held them together.

#### Test Performed

Plastic Grade/ Type = Mixed Grade

Plastic Waste Wt. in Kg = 10 kg

Method of Combustion = Manual

Target Temperature = 90<sup>0</sup>C – 110<sup>0</sup>C

Target Volume Reduction = 85% – 90%

Time = 45min. to 60 min.

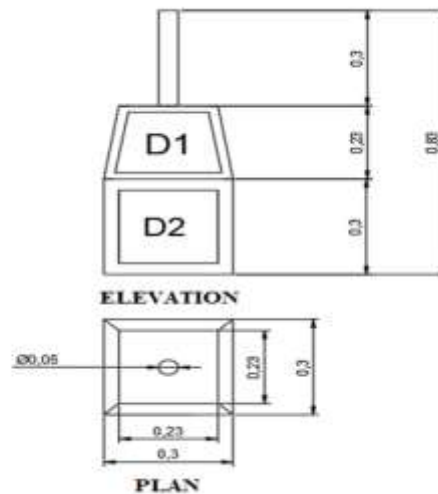
#### Results

Plastic Waste Residue Wt. in Kg = 1.12 kg

Volume Reduction = 88.8%

Residue type = Thick liquidated slurry hardened on cooling.

We had performed the test in normal conditions and the only thing which concern us is the gases produced during the incineration, but it can be treated by adding other processes to it.



MODEL INCINERATOR (ALL DIMENSIONS ARE IN METERS)

### IV. ADVANTAGES AND DISADVANTAGES

#### ADVANTAGES

1. Quantity of End-product is less.
2. Highly Efficient in Waste Management.
3. Production of Heat and Power
4. Soil pollution decreases.
5. Incinerators with help of Filters Traps harmful Pollutants.
6. It provides better control over odour caused by dumping waste in landfills.
7. It can be used as a raw material in cement Kilns and Power Plants.
8. Residue can be Reused.

9. It takes less space.
10. It helps in reduction of contamination of water.

#### DISADVANTAGES

1. It is Expensive.
2. Require Skilled personnel.
3. It Pollutes the Environment if filters aren't used.
4. There is possibility of long-term problems to people who inhale the smoke released.
5. End product such as fly-ash can potentially Harm People and the Environment.

## V. CONCLUSION

Incineration Process can help in Plastic waste Management as plastic waste is posing severe challenges on their disposal. According to test conducted in our Incinerator Model, we saw 88.8% volume reduction in plastic waste after incineration. The Thick liquidated slurry residue obtained after incineration process is different from the Outcome residue and thus cannot be used in construction.

and Groundwater Pollution Control (pp. 1029-1060).

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