

Disposal of Solid Municipal, Gram Panchayat, Domestic and Hospital Biomass Waste Through use of *Incinerator*, And Energy for Heating Water

Introduction :-

In present condition solid waste management is a big issue, the solid waste is generated at domestic, commercial and agricultural levels which is to be managed and treated in a proper manner so that it can be used as energy source and also be less polluting. The traditional systems of dumping solid waste causes land pollution and the process of burning solid waste causes air pollution which is not desirable. Solid waste incinerator is the most useful device for managing wastes and it is the desirable technique which can be used for disposing all types of hazardous wastes. At domestic level such as house, the waste such as plastics, clothes, packing materials, cardboard, paper, garden wastes, Coconut wastes, etc. are not disposed properly. And if this is the condition of a single house then what would be of one city and that of whole country we cant imagine. This waste is just taken and dumped at the places out of city which causes the land pollution or burned which causes the air pollution. This condition can become critical if proper steps are no taken before its too late.

Technology Intervention :-

This traditional method of burning is modified in such a way that the burning process is carried out in a closed compact system called Solid Waste Incinerator. A Solid Waste incinerator, which is used for domestic hot water generation was designed, successfully constructed and tested. The natural draft system, primary and secondary air system is introduced along with it for clean burning. Performance testing of the system was carried out on large observation basis and concluded that the system is reliable for daily use. It could be very useful for urban and rural areas as well, especially in school/college hostels where papers and other non toxic solid wastes are generated in large quantities. It can prove to be useful in hospitals and villages for domestic use.

Components of Incinerator :-

- Fuel loading door
- Combustion chamber
- Hot water tank (Heat Exchanger)
- Cold water Inlet tube.
- Pressure release valve
- Ash box
- Combustion hot flew gases passing chamber

- Chimney

1. **Fuel loading door** : 400 mm x 300 mm Angle : 50 mm x 50 mm. Thickness : 5 mm
2. **Combustion Chamber** : Diameter : 400 mm. Height 400 mm.
Cast Iron (CI) grate 300 mm x 300 mm. Thickness 16 mm. Construction in fire bricks
3. **Hot water Tank (Heat Exchanger)** : Stainless steel (SS). Grade 302. Thickness 3 mm. Capacity 50 ltrs. Size : Diameter 400 mm. Height 450 mm.
4. **Cold water Inlet tube** : Stainless Steel (SS). Diameter 25 mm. Inserted into heat exchanger at center. 25 mm above the bottom of the heat exchanger.
5. **Pressure release valve** : At the top of heat exchanger. Stainless Steel (SS)
6. **Ash Box : 280 mm x 280 mm** : Constructed in bricks.
7. **Flue gasses chamber** : Diameter 600 mm. Height 650 mm.
8. **Chimney Height** : 4.5 m. Diameter 150 mm. Thickness 3 mm (Mild steel)

Operation :-

1. Load fuel from fuel chamber to combustion chamber.
2. Fuel burning in combustion chamber.
3. Combustion process takes place due to combination of primary and secondary air.
4. Hot flue gases formed in combustion chamber, which passes in the flue gas chamber which is insulated by fire bricks.
5. Hot flue gases passing around the heat exchanger.
6. Thus heated tank surface heats the water.

Study Results :-

Burning rate	20-25 kg/hr
Temperature in combustion chamber	600 to 700 ⁰
Hot water capacity	300-350 ltrs
Hot water temperature	50-60 ⁰

Efficiency	25%
Particulate Matter	>350 pm(mg/mjd)
CO	5g/mjd

Extension of Technology :-

Solid waste disposal incinerator was successfully demonstrated and installed at corporate sector canteens, hospitals, Institutes training centres, Hostels, agro-tourism centres, industries, village level gram panchayat and domestic use.

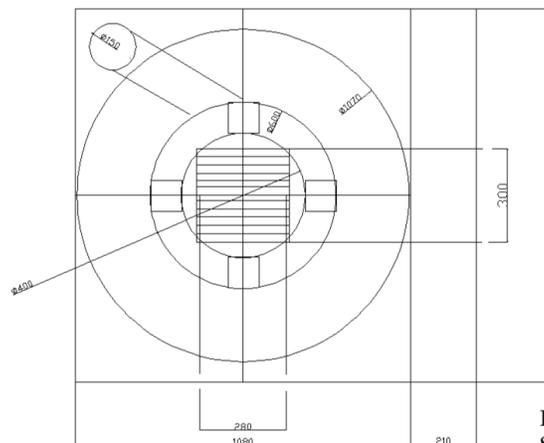
Care should be taken while using incinerator

- Ash near combustion chamber should be cleared regularly.
- Chimney should be cleaned once in a month and carbon particulates should be removed by opening the chamber and then close the chamber.
- Top hood of bricks should be opened and cleaned once in 3 months and then close the hood as before
- Incinerator should be cleaned from inside by opening the drain valve once in three months
- When dry solid wastes catches the fire load half dry waste inside combustion chamber
- Before burning the hospital waste first burn the dry waste or wood and the load hospital waste.
- Combustion chamber should be loaded by light weight waste of 2 to 5 kg and then burn it
- It takes about 30 min to get hot water
- Pressure wall used in the system, should be used regularly
- Combustion chamber door should be always closed.
- After removing hot water from the system cold water should be filled in the system

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Incinerator for domestic hot water generation

Top View



By:-
Somesh

Incinerator for domestic hot water generation

Section view

