

## A STUDY OF CONVERSION OF WASTE URBAN MATERIAL (WUM) INTO ENERGY

*RAJNEESH KUMAR*  
*ASSISTANT PROFESSOR*  
*DEPARTMENT OF MECHANICAL ENGINEERING*  
*APOLLO INSTITUTE OF TECHNOLOGY, KANPUR*

*PRATEEK K. VERMA*  
*LECTURER*  
*DEPARTMENT OF MECHANICAL ENGINEERING*  
*APOLLO INSTITUTE OF TECHNOLOGY, KANPUR*

The waste materials which are produced by living areas, households, commercial operations, institutional operations, industries and from many sources generally called as municipal solid waste or waste urban material.

In the present era a solid waste management is the major problem in all over the world. Many government organizations and NGO are working to handle this problem effectively. There is several processes to manage this waste material some are given below-

- (1) Dumping of WUM in non living sites.
- (2) Releasing of WUM in the middle of sea.

Now we will discuss about our first point. When we want to dump WUM in non living areas first we have to select this type of sites which is very difficult due to continuous increase in population and their living places. When the site is selected the secondary function is to dig this site in large section so that in bulk the waste material is dumped in that place. After dumping the waste material in it this is fully covered with the soil.

When we are going to count demerits of this system we will found that after several years when all the sites will fill with the waste material, what will be happened? Where this waste is to be managed? The original place of the soil is occupied by the waste now what will be happened with this? In the rainy season the rain water will be grounded through this waste material and will pollute the ground water and will affect the fertility of the ground.

When we will discuss about the second point releasing of WUM in the middle of sea first we have to collect the solid waste in a proper area and by the transportation it has to be carried from that place to the ship which takes it to the middle of sea and release there.



FIGURE: - SHIP CARRYING WASTE MATERIAL

Now we have to discuss disadvantage of this process. When water waves comes from the sea to the coastal sides some of this waste material will also comes with the waves and affected the living areas near the sea. This waste material makes the sea water pollute which is harmful for aquatic life. There are many disadvantage of this process are available but we will not discuss here.



FIGURE:-WASTE MATERIAL RETURN FROM THE SEA

Now we have to move in our study over conversion of waste urban material into energy. We have two processes over our study-

- (1) Uses of solid waste to produce heat in brick making industries.
- (2) Uses of solid waste to produce electricity.

## USES OF SOLID WASTE TO PRODUCE HEAT IN BRICK MAKING INDUSTRIES

When a brick is formed by moldings process by the mixture of soil and binder (generally water) it requires to be heating to make a compact shape and this heat is generated by the use of coal which is transported from mines to the required place. This makes this cost high. If we use the solid waste in place of coal it will be approx free of cost and makes help to manage waste material. The coal provides a high grade energy which this waste never can. To overcome this difficulties a mixture of coal and waste materials should be used.

## CONCLUSION OVER THIS PROCESS

This process will help in waste material management system so it is suggested to government of India to compulsory for brick making industries to use this solid waste with coal according to their capacity for producing heat, so that the problem of solid waste management should be minimized.

## USES OF SOLID WASTE TO PRODUCES ELECTRICITY

A block diagram of WUM power plant showing the sequence of various steps. Before feeding the waste material into combustion chamber it is shredded into pieces of about 2.2 to 2.5cm diameter. An air stream separates the material into two parts one is able to burn and not able to burn (heavier metal and glass pieces). The material which is able to burn is burnt in a furnace at about 1000°C to produce steam in boiler. The combustion process may be assisted by a required amount of auxiliary fuel when the solid

waste does not burn properly by itself. The superheated steam obtained from the boiler is used to move the steam turbine which is coupled with an alternator to produce electrical output in the same way as in other power plants. The residual gases are discharged to the atmosphere through a stack after removal of pollutants such as  $\text{NO}_x$  and  $\text{SO}_x$ . The ash is removed and disposed of to landfills.

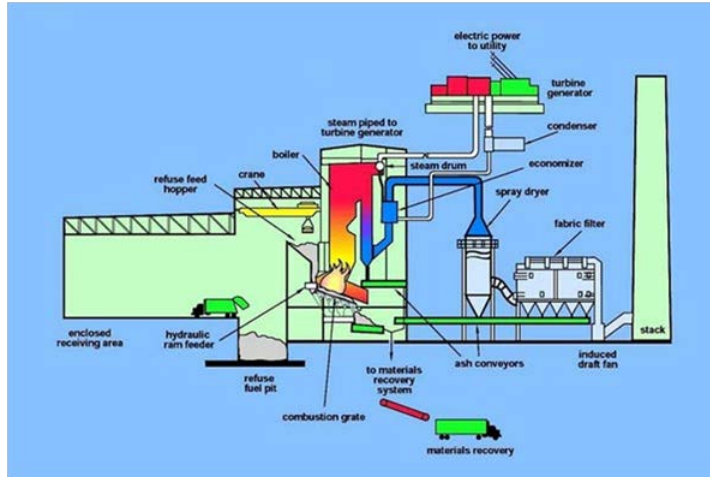


FIGURE:- WASTE URBAN MATERIAL INTO ENERGY CONVERSION PLANT

## CONCLUSION

The demand of energy is increasing day by day due to fast industrialization and hence only conventional fuel is not sufficient to meet the future demand of energy so we have to move towards these sources of fuels. Due to uses of this type of waste material a problem of handling waste material will be minimize.

## REFERENCES:-

- (1) NCER TMH publication (PROFESSOR B H KHAN)
- (2) Different sources from internet.