

Solid Waste Management

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The term solid waste is associated with material in solid or semi solid in nature that are considered to be useless, discarded and throwawayable by household communities, commercial and other municipal activities after serving its intended purpose. A huge amount of varied nature of solid waste is also generated in industries. The nature and characteristics of solid waste are industry specific such as fly ash in coal based thermal power plant, mycelia waste in antibiotic plants, slag in iron and metallurgical smelting operation etc. Municipal solid waste (MSW) is urban solid that includes predominantly household (domestic) waste and they are generated in following areas:

- House hold
- Commercial area
- Community Centre
- Shopping Complex
- Markets
- Eating place such as restaurant, hotels
- Street sweeping and cleansing of underground drain

The MSW can also be categorized as:

- Biodegradable e.g. Food and kitchen waste, green waste, rich in nitrogen, Phosphorus and potassium.
- Recyclable material e.g. glass, bottles, papers, tin cans etc.
- Inert waste e.g. street dirt, ashes, debris, construction and demolition wastes.
- Hazardous waste e.g. e-waste, bulbs, spray cans, hospital and medical waste, batteries, thin plastics, pesticides, containers, etc.

The waste that are decomposable in nature and putrescible consisting mostly food and vegetable items with garden trimmings are known as garbage whereas other portion of solid waste is known as rubbish. The latter is also classified as combustible rubbish (paper, wood, plastics) and non combustible (construction, tin cans, stones, glass, debris). Though direct relevance is not proved but solid waste is source of communicable disease through vector transmission (fly, mosquito, and rodent nuisance). The disease like plague is one of solid waste borne disease. In addition to aesthetic nuisance is caused due to improper handling

and solid waste disposal. Besides this problem, huge amount of land is required for disposal of municipal solid waste which compels a negative economics. To curb down this complex problem, it is encouraged to apply an efficient solid waste management system (SWMS). The SWMS comprise of waste generation, storage, collection, processing, transfer, and disposal. In case of house waste wastes, the solid wastes are first taken outside from the houses and dumped aside in a public place by jute/plastic sacks or hand cart system. The waste dumps in the public place is known as community bins. The collection from household to the community bins is called primary collection. The second phase involves transportation of wastes from community bins to the processing centre or disposal site by motorized vehicle. This phase is referred as secondary collection.

The developing countries generates about 250 – 500 gm of solid waste per person per day where as developed country generates about 1.2 – 2.0 kg of waste / person / day. In India, average waste production in metro poleis is about 0.50 - 0.75 kg / person / day. Community bins are generally designed to handle for 500 – 2000 persons. The processing of solid waste refers to separation, size reduction, volume alteration for ease of operation of subsequent handling of waste. The processing helps to recover recyclable material and to decide upon type of final disposal. Normally, for garbage portion rich in nutrients (N,P), composting is the economical process. The composting is a biological process utilizing a group of microbial community for decomposing a solid waste to produce a stabilized product known as 'humus'. The compost contains N,P,K and micro nutrients essential for plant growth and used as both fertilizer and soil conditioner. Different type of worms are now a days are used to degrade organic solid waste along with kitchen and market vegetable waste with cow dung as seeding. The resulting products are more useful for nursery and plant nurturing purpose. The process is known as "Vermi Composting". The combustible rubbish such as paper, wood, garden trimmings, plastics, rags having good fuel value which can be burnt off to produce gases and ashes as end products in presence of oxygen. The process is known as incineration. The incineration process is not common for municipal waste but it is used for disposal of biomedical and hospital waste. The incinerators are used in disposing hazardous waste. The biological method of solid waste processing can also deliver useful biogas methane which can be utilized for generation of non conventional power / electricity. However, the incineration process generates some air pollutants. Proper air pollution control device must be installed for preventing air pollution. The ultimate fate of all solid wastes is land filling or land spreading. The land fill may be open dumping in uncontrolled manner or in scientific manner which is known as sanitary landfill. Some toxic liquid wastes are generated in such land fill site which is known as 'leachate'. Leachates can pollute soil and groundwater resources for which preventive measures are to be taken.