

A Study about Advanced Waste Management

S. Dhinesh Kumar, PG Scholar

=====

Abstract

Increasing solid waste management problems and its disposal strikes environment and health hazards. This training material covers the essential elements of solid waste management in Asian context. Prevailing scenario of waste handling practices and disposal is exhibited along with its associated problems. Valuable case studies are also discussed. An integrated solid waste management in sustainable approach is presented as a response to necessary waste management strategy needs. Waste minimization in the form of proper waste segregation and utilization, the importance of pre-treatment of organic waste and combustible waste fraction does not only manage the waste but also generates products such as compost and renewable energy. Direct land filling of commingled waste in Asian countries should be discouraged due to its high organic waste fraction which causes potential environmental emissions. The efforts of government to solve this problem from legal aspects through laws and regulations should be supported by an active participation of community, public and private agencies.

Key Words: Solid Waste Management, Urban Environment, Individual Field Visit, Photographic Evidence.

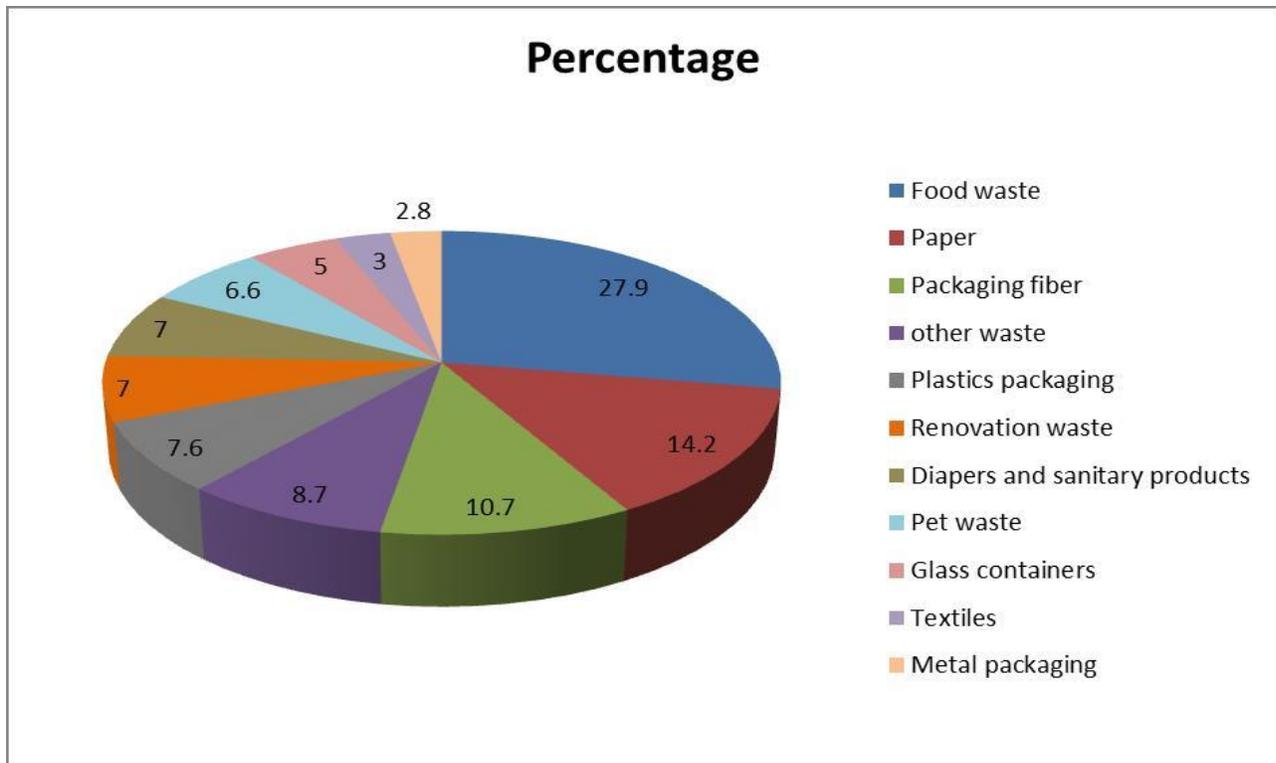
Waste Management

Waste management is all the activities and actions required to manage waste from its inception to its final disposal.^[1] This includes amongst other things, collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc.

The term usually relates to all kinds of waste, whether generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, or other human activities,^[1] including municipal (residential, institutional, commercial), agricultural, and social (health care, household hazardous wastes, sewage sludge). Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics.

Contents of the Solid Waste Stream

Most people do not spend time wondering about what types of materials they throw away or what exactly comprises a garbage truck's contents. But if you were to ask someone what category of material might make up the biggest portion of the truck's contents, you would probably get many different responses. Perceptions of the makeup, or characterization, of the solid waste stream are affected by many factors, including personal consumption, media reports, and visual impressions of litter and overflowing trash cans. The EPA and other government agencies periodically compile data on the contents of our national municipal solid waste (MSW) stream. Figure 1 summarizes key information from a 1996 EPA report that provides data about the characterization of U.S. MSW broken down by products and material.



Methods of Waste Disposal

Landfill

The Landfill is the most popularly used method of waste disposal used today. This process of waste disposal focuses attention on burying the waste in the land. Landfills are found in all areas. There is a process used that eliminates the odors and dangers of waste before it is placed into the ground. While it is true this is the most popular form of waste disposal it is certainly far from the only procedure and one that may also bring with it an assortment of space.

This method is becoming less these days although, thanks to the lack of space available and the strong presence of methane and other landfill gases, both of which can cause numerous contamination problems. Many areas are reconsidering the use of landfills.

Incineration/Combustion

Engineering & Technology in India www.engineeringandtechnologyinindia.com

ISSN 2472-8640 1:5 December 2016

Dr. C. Swarnalatha, Ph.D. (Ed.) Entrepreneurship and Management:

Innovative Construction Techniques and Ecological Development. *Vol. 1 Management*

S. Dhinesh Kumar, PG Scholar

A Study about Advanced Waste Management

Incineration or combustion is a type disposal method in which municipal solid wastes are burned at high temperatures so as to convert them into residue and gaseous products. The biggest advantage of this type of method is that it can reduce the volume of solid waste to 20 to 30 percent of the original volume, decreases the space they take up and reduce the stress on landfills. This process is also known as thermal treatment where solid waste materials are converted by Incinerators into heat, gas, steam and ash. Incineration is something that is very in countries where landfill space is no longer available, which includes Japan.

Plasma Gasification

Plasma gasification is another form of waste management. Plasma is a primarily an electrically charged or a highly ionized gas. Lighting is one type of plasma which produces temperatures that exceed 12,600 °F . With this method of waste disposal, a vessel uses characteristic plasma torches operating at +10,000 °F which is creating a gasification zone till 3,000 °F for the conversion of solid or liquid wastes into a syngas.

During the treatment solid waste by plasma gasification, the waste's molecular bonds are broken down as result of the intense heat in the vessels and the elemental components. Thanks to this process, destruction of waste and dangerous materials is found. This form of waste disposal provides renewable energy and an assortment of other fantastic benefits.

Composting

Composting is a easy and natural bio-degradation process that takes organic wastes i.e. remains of plants and garden and kitchen waste and turns into nutrient rich food for your plants. Composting, normally used for organic farming, occurs by allowing organic materials to sit in one place for months until microbes decompose it. Composting is one of the best method of waste disposal as it can turn unsafe organic products into safe compost. On the other side, it is slow process and takes lot of space.

Waste to Energy (Recover Energy)

Engineering & Technology in India www.engineeringandtechnologyinindia.com

ISSN 2472-8640 1:5 December 2016

Dr. C. Swarnalatha, Ph.D. (Ed.) Entrepreneurship and Management:

Innovative Construction Techniques and Ecological Development. *Vol. 1 Management*

S. Dhinesh Kumar, PG Scholar

A Study about Advanced Waste Management

Waste to energy process involves converting of non-recyclable waste items into useable heat, electricity, or fuel through a variety of processes. This type of source of energy is a renewable energy source as non-recyclable waste can be used over and over again to create energy. It can also help to reduce carbon emissions by offsetting the need for energy from fossil sources. Waste-to-Energy, also widely recognized by its acronym is the generation of energy in the form of heat or electricity from waste.

Reduce, Reuse, Recycle

Methods of waste reduction, waste reuse and recycling are the preferred options when managing waste. There are many environmental benefits that can be derived from the use of these methods. They reduce or prevent greenhouse gas emissions, reduce the release of pollutants, conserve resources, save energy and reduce the demand for waste treatment technology and landfill space. Therefore, it is advisable that these methods be adopted and incorporated as part of the waste management plan.

Waste Reduction and Reuse

Waste reduction and reuse of products are both methods of waste prevention. They eliminate the production of waste at the source of usual generation and reduce the demands for large scale treatment and disposal facilities. Methods of waste reduction include manufacturing products with less packaging, encouraging customers to bring their own reusable bags for packaging, encouraging the public to choose reusable products such as cloth napkins and reusable plastic and glass containers, backyard composting and sharing and donating any unwanted items rather than discarding them. All of the methods of waste prevention mentioned require public participation. In order to get the public onboard, training and educational programmes need to be undertaken to educate the public about their role in the process. Also the government may need to regulate the types and amount of packaging used by manufacturers and make the reuse of shopping bags mandatory.

Recycling

Engineering & Technology in India www.engineeringandtechnologyinindia.com

ISSN 2472-8640 1:5 December 2016

Dr. C. Swarnalatha, Ph.D. (Ed.) Entrepreneurship and Management:

Innovative Construction Techniques and Ecological Development. *Vol. 1 Management*

S. Dhinesh Kumar, PG Scholar

A Study about Advanced Waste Management

Recycling refers to the removal of items from the waste stream to be used as raw materials in the manufacture of new products. Thus from this definition recycling occurs in three phases: first the waste is sorted and recyclables collected, the recyclables are used to create raw materials. These raw materials are then used in the production of new products. The sorting of recyclables may be done at the source (i.e. within the household or office) for selective collection by the municipality or to be dropped off by the waste producer at a recycling centers.

The pre-sorting at the source requires public participation which may not be forthcoming if there are no benefits to be derived. Also a system of selective collection by the government can be costly. It would require more frequent circulation of trucks within a neighborhood or the importation of more vehicles to facilitate the collection. Another option is to mix the recyclables with the general waste stream for collection and then sorting and recovery of the recyclable materials can be performed by the municipality at a suitable site. The disadvantage however, is that the value of the recyclable materials is reduced since being mixed in and compacted with other garbage can have adverse effects on the quality of the recyclable material

Classifications for Hazardous Materials

Many hazardous materials may fall into more than one category. Descriptions of the hazards posed by these materials are classified into seven basic types:

Flammable/Combustible—ignites easily and burns rapidly.

- Explosive/Reactive—explosive chemicals produce a sudden, almost instantaneous release of pressure, gas, and heat when subjected to abrupt shock, high temperature, or an ignition source; reactive chemicals vigorously undergo a chemical change under conditions of shock, pressure, or temperature.
- Sensitizer—on first exposure causes little or no reaction in humans or test animals; but on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form; respiratory sensitization to a few chemicals also occurs.

- Corrosive—causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact.

Labels for Associated Risks

By law, hazardous products must bear labels that explain the hazards associated with them and how to prevent injury or damage. The following signal words determined by law express the relative risk associated with a product.

- No signal word—relatively nonhazardous
- Caution or Warning—generally mildly to moderately hazardous or toxic; can cause temporary adverse health effects, such as skin irritation or vomiting
- Danger—more severely hazardous or toxic; can cause permanent serious health effects, such as skin burns or stomach ulcers
- Poison—highly toxic; can be fatal if ingested The term “nontoxic” is an advertising word that has no legal meaning except when used to describe art supplies.

Conclusion

The effect that waste has on our natural environment and ultimately on the quality of our life has been made public in worldwide debates. The problems related to waste have many dimensions. In economically challenged communities, the scope and magnitude of the problem may often exceed the capacity that local authorities have to effectively resolve issues of waste collection and disposal, in addition to other difficult city managerial tasks. In the 1950's the influence of human activities on the natural environment became more evident to scholars. Urban ecology theory embodies the idea that human influence on the natural environment has evolved into an integrated field in which scientists look at solving problems in regard to nature in cities by using different tools. Bearing in mind the complexity of nature and cities, the ecological conditions of urban areas are viewed as the necessary measures for environmental protection and recovery. Land, water, vegetation and other living organisms fill cities and interact with people. In consequence their protection and care reflect upon the quality of human life. There are several factors related to improving ecological conditions in cities. Environmental benefits are noticeable

Engineering & Technology in India www.engineeringandtechnologyinindia.com

ISSN 2472-8640 1:5 December 2016

Dr. C. Swarnalatha, Ph.D. (Ed.) Entrepreneurship and Management:

Innovative Construction Techniques and Ecological Development. *Vol. 1 Management*

S. Dhinesh Kumar, PG Scholar

A Study about Advanced Waste Management

through the reduction of pollutants, since consequences of air contamination are both local and global. Another parameter is to preserve the natural condition of land and its ability to sustain life. Also accessibility to clean water supports not only the existence of all living organisms but also contributes heavily to production processes, irrigation and transportation purposes.

References

1. Ahsan, N., 1999. Solid waste management plan for Indian megacities. Indian Journal Of Environmental Protection 19 (2), 90–95
 2. Duston, T.E. Recycling Solid Waste: The First Choice for Private and Public Sector Management; Quorum: Westport, CT, 1993.
-
-

S. Dhinesh Kumar, PG Scholar
Department of Management Studies
Anna University Regional Campus
Madurai 625 019
Tamilnadu
India
Dhineshkumar3595@gmail.com

Engineering & Technology in India www.engineeringandtechnologyinindia.com

ISSN 2472-8640 1:5 December 2016

Dr. C. Swarnalatha, Ph.D. (Ed.) Entrepreneurship and Management:

Innovative Construction Techniques and Ecological Development. *Vol. 1 Management*

S. Dhinesh Kumar, PG Scholar

A Study about Advanced Waste Management