SOLID WASTE MANAGEMENT

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Abstract

Solid waste may be defined as "unwanted material disposed by man which can neither flow into streams nor escapes immediately into the atmosphere". These cause pollution in water, air and soil. Integral solid waste management (ISWM) is a comprehensive waste preservation, recycling and disposal program. An effective ISWM system considers how to prevent, recycle and manage solid waste in ways that most effectively protect human health and the environment. ISWM involves evaluating local needs and conditions and then selecting and combining the most appropriate waste management activities for those conditions. Technologies should be used for minimizing, recycling and treating wastes. Everyone should be informed about the advantages of solid waste management. General public and government should come forward to keep our earth clean and green.

Introduction

"Waste" is everything that no longer has a use or purpose and needs to be disposed of. So Solid wastes are any discarded (abandoned or considered waste-like) materials. The statutory definition of a solid waste is completely irrespective of the physical form of the waste. A "solid" waste can be just as easily liquid or gas.

Classification of Solid waste-

Solid wastes typically may be classified as follows:

- Garbage: decomposed wastes food.
- Rubbish: decomposable wastes, either combustible (such as paper, wood and cloth) or noncombustible (such as metal, glass and ceramics)
- Ashes: residues of the combustion of solid fuels.
- Large wastes: demolition and construction debris and trees.
- Dead animals.

- Sewage-treatment solids: materials retained on sewage-treatment screens, settled solids, and biomass sludge.
- Industrial wastes: such materials as chemicals, paints and send.
- Mining wastes: slag heaps and coal refuse piles.
- Agricultural wastes: farm animal manure and crop residues.

Waste management concepts

Diagram of the waste hierarchy

There are a number of concepts about waste management which vary in their usage between countries or regions. Some of the most general, widely used concepts include:

Waste hierarchy –

The waste hierarchy refers to the "3 Rs" reduce, reuse and recycle, which classify waste management strategies according to their desirability in terms of waste minimization. The waste hierarchy remains the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste .

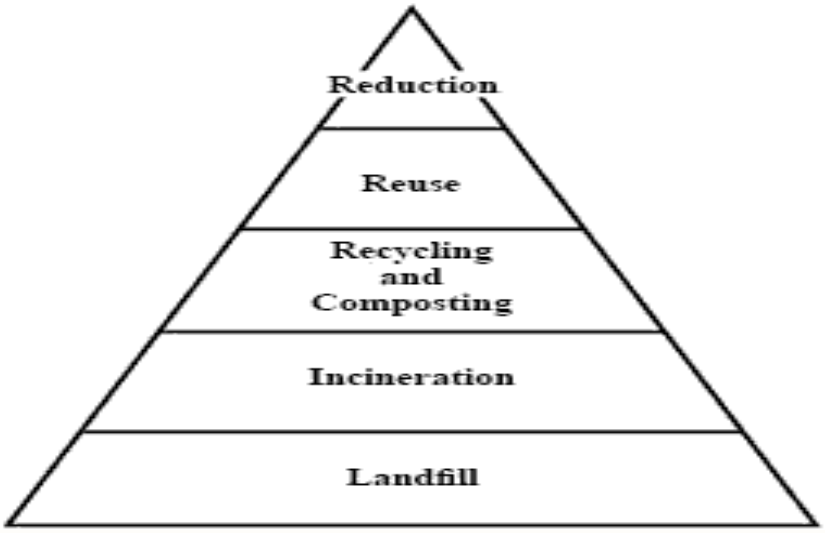
Polluter pays principle –

the Polluter Pays Principle is a principle where the polluting party pays for the impact caused to the environment. With respect to waste management, this generally refers to the requirement for a waste generator to pay for appropriate disposal of the unrecoverable material.

Integrated Solid Waste Management

Integrated Solid Waste Management (ISWM) is a comprehensive waste prevention, recycling and disposal program. An effective ISWM system considers how to prevent, recycle and manage solid waste in ways that most effectively protect human health and the environment. ISWM involves evaluating local needs and conditions, and then selecting and combining the most appropriate waste management activities for those conditions.An integrated waste management strategy includes three main components-

1. Source reduction
2. Recycling
3. Disposal



Hierarchy of integrated solid waste management.

Source Reduction –

Source reduction is one of the fundamental ways to reduce waste. The best way to reduce waste is not to produce it in the first place.

What you can do to reduce solid waste?

- Carry your own cloth or jute bag when you go shopping

- Say no to all plastic bags as far as possible
- Reduce the use of paper bags also.
- Reuse the soft drinks poly bottles for storing water.
- Segregate biodegradable and the non biodegradable are put into separate bins and disposed off separately.
- Dig a compost pit in your garden and put all the biodegradable materials into it.
- See to it that all garbage is thrown into the municipal bin as the collection is generally done from there.
- When you go out do not throw paper and other wrappings or even leftover food here and there, make sure that it is put in the correct place, which is into a dustbin.
- As far as possible try to sell all the recyclable items that are not required to the Kabariwalla (person who trades in waste).

What you should not do?

- Do not litter. If we drop litter it will encourage others to litter.
- Do not put out garbage too early, especially garbage that contains meat and fish scraps.
- Do not dump or litter illegally at the sides of the roads or in gullies, it is not only unsightly but dangerous and hazardous to health.
- Do not allow water to collect in your garbage bin.
- Do not place your old stoves, refrigerators, or other big or bulky items at the side of the road.
- Do not use an oversize bin (e.g. 50 gallons (190L) drum) to contain your garbage. They are generally too heavy to lift.
- Do not overload your garbage bags; they may burst as a result of excessive weight or bulk.
- Do not throw broken objects (e.g. glass, ceramic, etc.) into the garbage without wrapping them first.
- Do not place needles and syringes in the garbage or leave them lying around.
- Do not overload your waste bin or put out loosely tied or untied bags for collection.
- Do not compact waste in the waste bin. This makes it difficult to extract the waste.

Reuse

Do not throw away the soft drink cans or the bottles; cover them with homemade paper or paint on them and use them as pencil stands or small vases. Alternately, you can store them and sell it to the kabariwalla who takes these for recycling. Reuse the plastic bags for shopping again and again. It is better if you use shopping bags made of cloth or jute, which can be used over and over again.

Recycling

Recycling involves the collection of used and discarded materials, processing these materials and making them into new products. It reduces the amount of waste that is thrown into the community dustbins thereby making the environment cleaner and the air more fresh to breathe.

- Paper can be re-pulped and reprocessed into recycled paper, cardboard and other paper products.
- Broken glass can be crushed, re-melted and made into containers.
- Some forms of plastic can be re-melted and fabricated into carpet fiber or cloth.
- Food wastes and yard wastes can be composted to produce fertilisers and soil conditioners.

Disposal –

Disposal of solid waste is done most commonly through a sanitary landfill or through incineration.

Landfilling

A landfill site (also known as tip, dump or rubbish dump and historically as a midden) is a site for the disposal of waste materials by burial and is the oldest form of waste treatment. Sanitary landfills are sites where waste is isolated from the environment until it is safe. A modern sanitary landfill is a depression in an impermeable soil layer that is lined with an impermeable membrane. The three key characteristics of a municipal sanitary landfill that distinguish it from an open dump are:

- Solid waste is placed in a suitably selected and prepared landfill site in a carefully prescribed manner.

- The waste material is spread out and compacted with appropriate heavy machinery.
- The waste is covered each day with a layer of compacted soil. landfilling is an economic alternative for solid waste disposal.

Incineration

Incineration is the process of burning municipal solid waste in a properly designed furnace under suitable temperature and operating conditions. In this method solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products . Incineration is a chemical process in which the combustible portion of the waste is combined with oxygen forming carbon dioxide and water, which are released into the atmosphere. This process reduces the volume of solid waste to 20 to 30 percent of the original volume This method is commonly used in developed countries.

Composting

Composting is a technology known in India since times immemorial. Composting is the process by which the organic, biodegradable portion of solid waste is microbiologically degraded under aerobic conditions. Main advantages of composting include improvement in soil texture and augmenting of micronutrient deficiencies. It also increases moisture-holding capacity of the soil and helps in maintaining soil health. Moreover, it is an age-old established concept for recycling nutrients to the soil. It is simple and straightforward to adopt, for source separated MSW. It does not require large capital investment, compared to other waste treatment options.

Vermi-composting

Vermi-composting is the natural organic manure produced from the excreta of earthworms fed on scientifically semi-decomposed organic waste. A few vermi composting plants generally of small size have been set up in some cities and towns in India, the largest plant being in Bangalore of about 100 MT/day capacity. Normally, vermi-composting is preferred to microbial composting in small towns as it requires less mechanization and it is easy to operate. It is, however, to be ensured that toxic material does not enter the chain which if present could kill the earthworms.

Conclusion

Solid wastes cause pollution in water, air and soil. Integrated solid waste management (ISWM) is a comprehensive waste preservation, recycling and disposal program. An effective ISWM system considers how to prevent, recycle and manage solid waste in ways that most effectively protect human health and the environment. ISWM involves evaluating local needs and conditions and then selecting and combining the most appropriate waste management activities for those conditions. Technologies should be used for minimizing, recycling and treating wastes. Everyone should be informed about the advantages of solid waste management. General public and government should come forward to keep our earth clean and green.

References

Composting and its Applicability in Developing Countries. Hoornweg, D., Thomas, L. and Otten, L. 2000. Urban and Local Government Working Paper Series No. 7, The World Bank, Washington, DC.

Conceptual Framework for Municipal Solid Waste Management in Low-income Countries. Schubeler, P. et al. 1996. Urban Management Programme Working Paper No. 9, St. Gallen, Switzerland.

Decision Makers' Guide to Municipal Solid Waste Incineration. Haukohl, J.; Rand, T.; and Mr. U. Marxen. 1999. The World Bank, Washington, D.C. Pp. 20.

Guidance Note on Landfill Siting. Johannessen, L.M. (in press). Urban and Local Government Working Paper Series, The World Bank, Washington, DC.

Guidance Note on Leachate Management for Municipal Solid Waste Landfills. Johannessen, Lars Mikkel. 1999. Working Paper Series No. 5. Urban Development Division, Urban Waste Management Thematic Group. The World Bank, Washington, D.C. Pp. 22.

Health Care Waste Management Guidance Note. Johannessen, Lars Mikkel; Dijkman, Marleen; Bartone, Carl; Hanrahan, David; Boyer, M. Gabriela; and Chandra, Candace. May 2000. Urban Development Division, Infrastructure Group, Environment Department and Health, Nutrition and Population Team. The World Bank, Washington, D.C. Pp. 64.

Planning Guide for Strategic Municipal Solid Waste Management in Major Cities in Low-income Countries. Environmental Resources Management 1998. Draft report prepared for Transport, Water & Urban Development Department, World Bank, Washington, DC.

Private Sector Participation in Municipal Solid Waste Management: Guidance Pack (5 Volumes). Cointreau, S., Gopalan, P. and Coad, A. 2000. SKAT, St. Gallen, Switzerland.

Safe Management of Wastes from Health-care Activities. Prüss, A., Giroult, E. and Rushbrook, P. 1999. World Health Organization, Geneva.

Solid Waste Landfills in Middle- and Lower-income Countries: A Technical Guide to Planning, Design and Preparation. Rushbrook, P. and Pugh, M. 1999. World Bank Technical Paper No. 426, Washington, DC.

Solid Waste Landfills in Middle- and Lower- Income Countries: A Technical Guide to Planning, Design, and Operation. Rushbrook, Philip and Pugh, Michael. 1999. World Bank Technical Paper Technical Paper No. 426. The World Bank, Washington, D.C. Pp. 248.

Workshop report. International Workshop on Municipal Solid Waste Management, Ittingen, Switzerland, 9-12 April 1995. Swiss Centre for Development Cooperation in Technology and Management (SKAT), St. Gallen, Switzerland.

Workshop report. International Workshop on Promotion of Public/Private Participation in Municipal Solid Waste Management in Low-income Countries, Washington, DC, 22-23 February 1996. Swiss Centre for Development Cooperation in Technology and Management (SKAT), St. Gallen, Switzerland.

"Drowning in a Sea of Garbage". The New York Times. April 22, 2010.

"Alternative Daily Cover (ADC)". Retrieved September 14, 2012.