

DISPOSAL METHODS OF WASTE PACKAGES

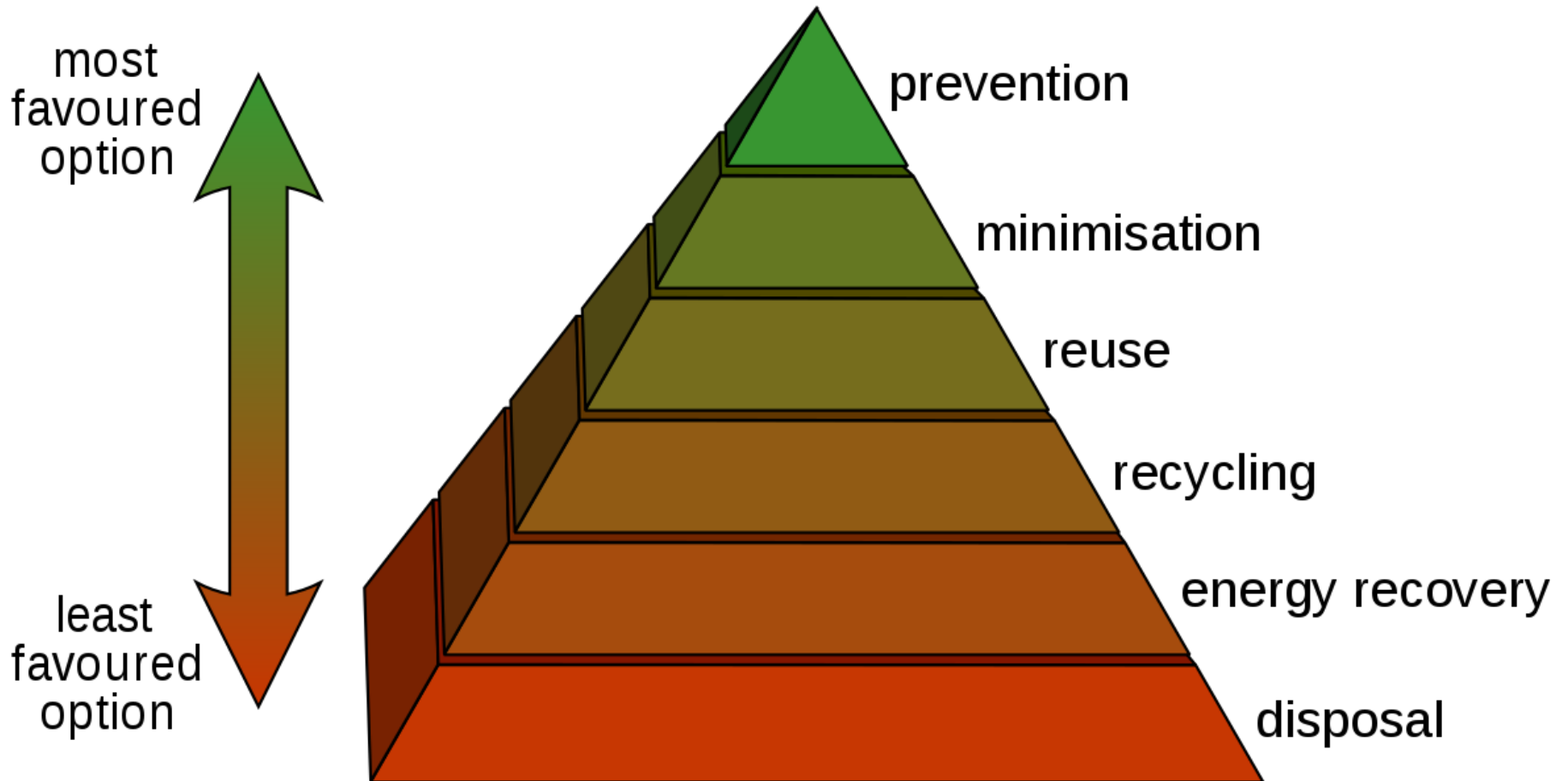
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Introduction

- After product usage, the empty packages have to be discarded, and these constitute a fair proportion of the solid waste produced by the community.
- In developed countries 4 lb of municipal waste is created by each person in one day. Out of this, packaging accounts for nearly 1/3rd of the volume.
- The collection and proper disposal of the waste is done by ministerial or public health authorities.
- Glass, paper, plastics and tin cans are the main packaging materials which get mixed with the city refuse and present problem of their proper disposal.
- The non - disposable nature of many packaging materials make it much more complicated problem.



The Hierarchy of Waste Proposal



- **Prevention**– Waste prevention is a primary goal. Packaging should be used only where needed. Proper packaging can also help prevent waste.
- **Minimization**– The mass and volume of packaging can be measured and used as one of the criteria to minimize during the package design process. Usually “reduced” packaging also helps minimize costs. Packaging engineers should continue to work toward reduced packaging.
- **Reuse**– The reuse of a package or component for other purposes shall be encouraged. Returnable packaging has long been useful and economically viable.
- **Recycling**– Recycling is the reprocessing of materials (pre- and post-consumer) into new products. Emphasis is focused on recycling the largest primary components of a package. i.e. Steel, aluminium, papers, plastics, etc. Small components can be chosen which are not difficult to separate and do not contaminate recycling operations.
- **Energy recovery**– Waste-to-energy and Refuse-derived fuel in approved facilities are able to make use of the heat available from the packaging components.
- **Disposal**– Incineration and placement in a sanitary landfill are needed for some materials. Material content should be checked for potential hazards to emissions and ash from incineration and leach out from landfill. Packages should not be littered.

Methods of Waste Disposal

1. Open dumping

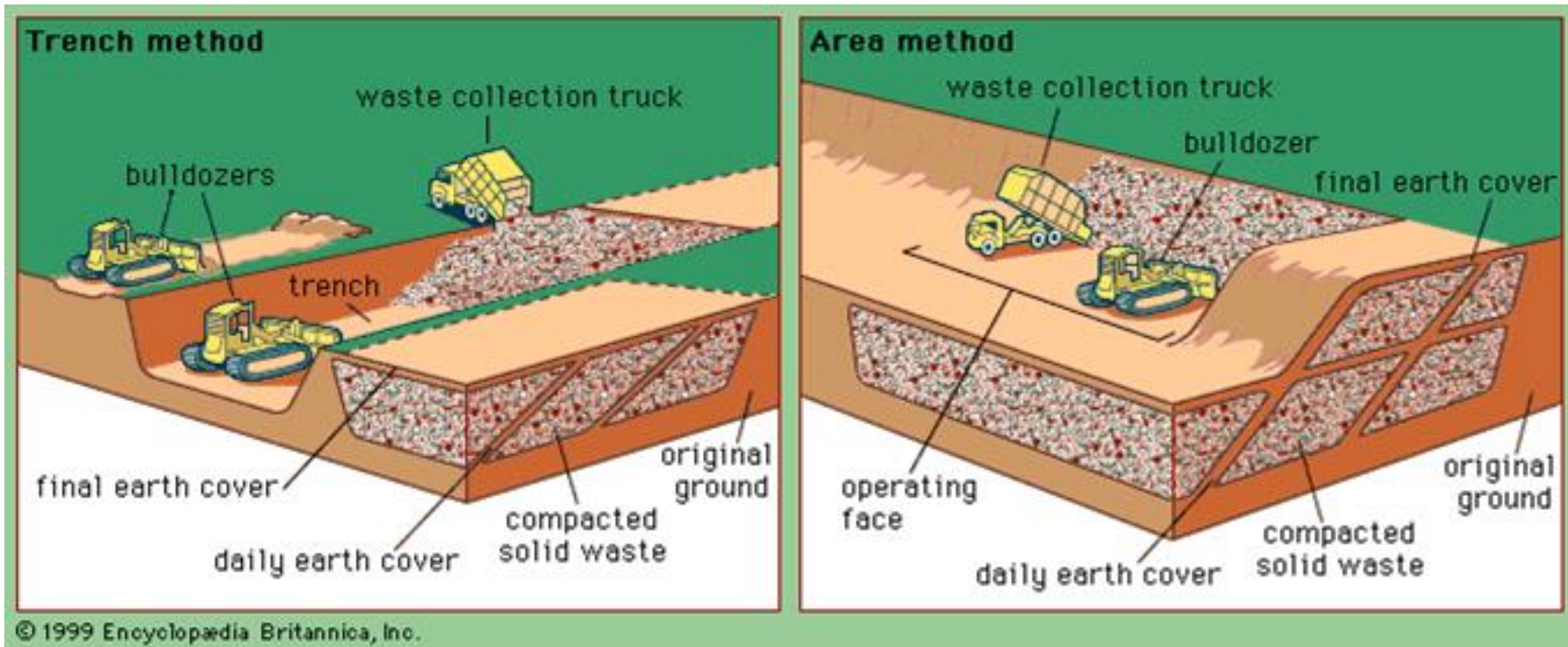
By this method only those packaging materials which would not be expected to contribute to public health hazards can be disposed.

Disadvantage: Discarded food packages may contain residual food products and moisture which can harbour insects and bacteria that may cause public health concern.



2. Sanitary landfill method

The most popular method of disposing the package waste is the landfill method. Here the trouble free waste packaging material is stored after compressing and piling. The waste is spread layer by layer and each layer is covered by earth. Degradability due to bio-physical agents or chemical oxidation is the common feature in sanitary landfill.



Disadvantage:

- Leaking of contaminants and then polluting ground water and production of methane gas are the commonly encountered problems in this method.
- In general, packaging materials are not easily degradable. Bio degradable material produces methane gas.
- Plasticizers used in PVC will evolve from waste as emissions.
- Lead and calcium compounds used in pigments pose a problem of ground water pollution.

3. Composting

This process is best suited for bio degradable packaging waste material.

Disadvantage: Paper degrades in composting. Glass, metals and plastics do not degrade in composting operation.



Incineration

Incineration means burning of the packaging waste with or without energy recovery. This is the most hygienic method of reducing the volume and weight of solid waste.

Advantages

- a. Incineration of packaging materials like wood, paper and plastics have significant fuel value/ energy source.
- b. Packaging is not hazardous contributor to the emissions except PVC.
- c. Very little lead and cadmium are found in ash on incineration
- d. Most hygienic way of waste disposal.

Disadvantages

- a. Large investment is required to construct plants.
- b. High operational cost is involved.
- c. Air pollution - Ex: release of hydrogen chloride during burning of PVC.
- d. Glass, steel and other metals are not combustible and they should be removed before incineration.

Glass and plastics if not removed, create problems in incinerator due to melting and solidifying inside the equipment.

Recycling

Recycling means use of waste material as raw material for preparation of new products.

Two methods of recycling

- a) **Primary Re-cycling:** It means the use of recycled material to produce the same material. E.g. Aluminum cans, Glass bottles.

- b) **Secondary Re-Cycling:** Use of recycled material to form new materials with lower specifications. E.g. Use of food grade plastics in production of plastics for industrial use.

Advantages

- 1) This method conserves resources.
- 2) Reduces the waste disposal load by other methods.
- 3) There is a good demand for recycled material and they are cost effective.

Disadvantages

- 1) Cannot dispose laminates etc which are now the commonest packaging for food due to combination of different varieties of packaging materials.
- 2) Efficient collection system should exist and the recyclable material should be separated from the rest of the waste material.
- 3) Residual food products in containers / pouches require cleaning before recycling.
- 4) Recycling of coloured glasses / films is a complex phenomenon.
- 5) Difficulty in collection and segregation.



The Materials that can be Recycled

- (A) Steel cans
- (B) Aluminum cans
- (C) Glass bottles/containers
- (D) Plastics
- (E) Paper



Recent Developments

- Recent developments in packaging waste disposal include grinding of glass before land filling, more sophisticated combustion techniques to eliminate fouling problems of plastics.
- Bio-degradable, solar-degradable plastics are under development.
- PE, PET, PP etc. can be added to coal tar while melting and use of this coal tar gives water resistance for the road laid.
- The laminates of Aseptic packs can be compressed into ply boards which are used for industry lamination.