

Unit - II Onsite Storage & Processing

Storage of wastes at source:

Factors must be considered in onsite storage of solid wastes include

- * effects of storage on waste components
- * type of container to be used
- * container location and
- * public health and aesthetics.

Effects of storage on waste components:

An important consideration in onsite storage is the effects of storage on characteristics of waste being stored.

These effects include biological decomposition, absorption of fluid and contamination of waste components.

Biological Decomposition:

Food and other wastes placed in containers will almost immediately start to undergo decomposition as a result of bacterial and fungal growth.

If wastes are allowed to remain in containers, flies can start to breed and odorous compounds can develop.

Absorption of fluids:

Because the components that comprise solid wastes have differing initial moisture contents,

re-equilibration takes place as wastes are stored in containers.

The degree of absorption that takes place depends length of time the wastes stored. If wastes are allowed to sit for more than a week, the moisture will become distributed throughout the wastes.

If watertight containers lids are not used, wastes can also absorb water from rainfall that enters partially covered containers.

Contamination of waste components:

The major waste components may be contaminated by small amounts of wastes such as motor oils, household cleaners and paints.

The effect of contamination is to reduce the value of the individual components for recycling.

Types of containers:

The types and capacities of containers used depend on the characteristics and types of solid wastes to be collected, the type of collection system, collection frequency and space available for the placement of containers.

Low-Rise Dwellings with Manual curbside collection service:

Because solid wastes are collected manually at curbside, the containers should be light enough

to be handled easily by one collector when they are full. Injuries to collectors have resulted from handling containers that were loaded too heavily. The upper weight limit should be between 40-65 lb.

The 30-gal galvanized metal or plastic containers has proved to be the least expensive means of storage of low-rise dwellings.

Temporary and disposable containers such as paper bags, card board boxes, plastic containers and bags and wooden boxes are routinely used as temporary and disposable containers of accumulated wastes.

Paper and card board boxes tend to disintegrate because of leakage of liquids. Where disposable plastic bags are used, plastic containers frequently stretch or break at seams when collector lifts the loaded bag.

Low-Rise dwellings with mechanized curbside collection service:

Where mechanized collection systems are used, the containers used for on-site storage of wastes is an integral part of collection system.

The containers are designed specifically to work with container unloading mechanism attached to collection vehicle.

The containers used for mechanized systems vary in size about 75 - 120 gals with 90 gal being the most common. The containers appear bulky and difficult to manage, they are designed so that they can be tilted back and moved quite easily by residents.

Low and Medium - Rise Apartments:

In low rise apartment complexes, a number of different containers have been used: The two most common types are

- * individual plastic or galvanized metal containers
- * large portable or fixed containers.

In most locations the containers are equipped with casters or rollers so that they can be moved easily for emptying into collection vehicles or on-site processing equipment.

High Rise Apartments:

Where solid waste chutes are available, separate storage containers are not used.

The most common means of storage for wastes accumulated from individual apartments include

- * enclosed storage containers or disposable bags used in conjunction with compaction equipment.

- * large open-top containers for uncompact waste, bulky items and white goods
- * large open-top containers for recycled materials.

Commercial facilities:

The type of containers used for commercial facilities will depend on the methods used for collecting wastes produced at various locations within facility and on available space.

Typically large open top containers are used for unseparated wastes.

Limitations of plastic or galvanized metal containers:

- > containers are damaged over time and degraded in appearance and capacity.
- > containers add extra weight that must be lifted during collection operations.
- > containers are not large enough to hold bulky wastes.

Limitations of disposable paper bags:

- > Bag storage is more costly.
- > If bags are set out on streets or curbside, dogs or other animals tear them and spread their contents.
- > Paper bags themselves add to waste load.

Limitations of disposable plastic bags:

- > Bag storage is more costly.
- > Bags tear easily, causing litter and unsightly conditions.
- > Bags become brittle in very cold weather causing breakage.
- > Bags stretch and break in warm climates.

Processing of waste at source:

- Waste processing is used to
- * reduce the volume
 - * recover usable materials
 - * alter the physical form of solid wastes.

The most common on-site processing operations include food waste grinding, component separation, compaction, incineration and composting.

Back yard incineration is a common processing technique to reduce the waste volume.

Grinding of Food wastes:

Food waste grinders are used primarily for waste grinding wastes from preparation, cooking and serving of foods. Grinders render the material that passes through them suitable for transport through the sewer system.

where food waste grinders are used extensively, the weight of waste collected per person will tend to be lower.

In collection operation, the use of home grinders does not have a significant impact on the volume of waste collected.

Separation of wastes:

The separation of solid waste at source is one of the most effective way to achieve the recovery and reuse of materials.

Compaction:

The two principal types of compactors used for processing of wastes at residential dwellings are

- * small home and apartment compaction units and
- * large compactors used to compact waste from large no. of apartments.

Small compaction units can reduce the original volume of waste placed in them by upto 70%, they can be used for only a small proportion of solid wastes generated.

In large apartment buildings a compactor is installed at bottom of solid waste chute. Waste falling through the chute activate the compactor which compressed the waste upto 30-60% or less of original volume.

Composting:

It is an effective way of reducing volume and altering the physical composition of solid wastes while at same time producing a useful by-product.

A variety of methods are used depending on the amount of space available and wastes to be composted.

In waste management problems facing cities, the impact of home composting on the volume of solid waste to be handled is relatively small.

Backyard composting:

The simplest backyard composting method involves placement of material to be composted in a pile and occasionally watering and turning it to provide moisture and oxygen to microbes within pile.

The composted material which is biologically stabilized, can be used as a soil amendment or as a mulching material.

Lawn Mulching:

Another type of composting involves leaving grass clippings from a newly mowed lawn where they were cut.

If the grass clippings are short enough they will fall through the upright grass to humus layer on ground surface.

Allowing the grass clippings to remain on lawns not only reduces the amount of waste generated, but also allows the recycling of nutrients.

Combustion:

Burning of combustible materials and burning of rubbish in backyard incinerators was common in practice. Backyard incineration is now banned.

Elimination of backyard burning significantly increased the quantity of paper, cardboard and yard wastes collected.

Depends on method of charging, two types of combustors are used in high-rise apartments: floor-fed and chute-fed.

In floor-fed type, wastes are charged through doors on each floor directly into refractory floor, the bottom of which opens directly into top of furnace.

In chute-fed type, wastes are charged through hopper doors on each floor into a metal chute, and they collect in a basement hopper. Then wastes are either manually or mechanically transferred into the furnace.