

Processing Techniques

Processing techniques are used in solid waste management systems to (1) improve the efficiency of solid-waste disposal systems, (2) to recover resources (usable materials), and (3) to prepare materials for the recovery of conversion products and energy. Processes used routinely to improve the efficiency of solid-waste systems and to recover materials manually are considered in this section. Me-

Table 11-10 Factors that should be considered in evaluating on-site processing equipment

Factor	Evaluation
✓ Capabilities	What will the device or mechanism do? Will its use be an improvement over conventional practices?
✓ Reliability	Will the equipment perform its designated functions with little attention beyond preventive maintenance? Has the effectiveness of the equipment been demonstrated in use over a reasonable period of time or merely predicted?
✓ Service of machine	Will servicing capabilities beyond those of the local building maintenance staff be required occasionally? Are properly trained service personnel available through the equipment manufacturer or the local distributor?
✓ Safety of operation	Is the proposed equipment reasonably foolproof so that it may be operated by tenants or building personnel with limited mechanical knowledge or abilities? Does it have adequate safeguards to discourage careless use?
✓ Ease of operation	Is the equipment easy to operate by a tenant or by building personnel? Unless functions and actual operations of equipment can be carried out easily, they may be ignored or "short-circuited" by paid personnel or by tenants.
✓ Efficiency	Does the equipment perform efficiently and with a minimum of attention? Under most conditions, equipment that completes an operational cycle each time it is used should be selected.
✓ Environmental effects shd reduce EP	Does the equipment pollute or contaminate the environment? Where possible, equipment should reduce environmental pollution presently associated with conventional functions.
✓ Health hazards	Does the device, mechanism, or equipment create or amplify health hazards?
✓ Aesthetics	Does the equipment and its arrangement offend the senses? Every effort should be made to reduce or eliminate offending sights, odors, and noises.
✓ Economics purchase + Amc	What are the economics involved? Both first and annual costs must be considered. Future operation and maintenance costs must be assessed carefully. All factors being equal, equipment produced by well-established companies, having a proven history of satisfactory operation, should be given appropriate consideration.

Source: From Tchobanoglous et al. [11-8]

chanical systems used for the recovery of materials are considered in Chap. 12. Important processing techniques used routinely in municipal solid-waste systems include: compaction, thermal volume reduction (incineration), and manual separation of waste components. Factors that should be considered in evaluating on-site processing equipment are summarized in Table 11-10.

11-15 MECHANICAL VOLUME REDUCTION

Mechanical volume reduction is perhaps the most important factor in the development and operation of solid-waste management systems. Vehicles equipped with compaction mechanisms are used for the collection of most municipal solid wastes. To increase the useful life of landfills, wastes are compacted. Paper for recycling is baled for shipping to processing centers. When compacting a broad range of municipal solid wastes, it has been found that the final density (typically about 1100 kg/m^3) is essentially the same regardless of the starting density and applied pressure. This fact is important in evaluating the claims made by manufacturers of compacting equipment.

11-16 THERMAL VOLUME REDUCTION

The volume of municipal wastes can be reduced by more than 90 percent by incineration. In the past, incineration was quite common. However, with more restrictive air-pollution control requirements necessitating the use of expensive cleanup equipment only a limited number of municipal incinerators are currently in operation. More recently, increased haul distances to available landfill sites and increased fuel costs have brought about a renewed interest in incineration, and a number of new incinerator projects are now on the drawing boards. Incineration is considered further in Chap. 12.

11-17 MANUAL COMPONENT SEPARATION

The manual separation of solid waste components can be accomplished at the source where solid wastes are generated, at a transfer station, at a centralized processing station, or at the disposal site. Manual sorting at the source of generation is the most positive way to achieve the recovery and reuse of materials. The number and types of components salvaged or sorted (e.g., cardboard and high-quality paper, metals, and wood) depend on the location, the opportunities for recycling, and the resale market.

In Davis, California, residents, on a voluntary basis, manually separate newsprint, aluminum cans, and glass. The separated components are placed at the curb for collection with a special vehicle. The vehicle used for the collection of source-separated waste components is shown in Fig. 11-16. Waste paper is sold to an insulation manufacturer.