



SHORT COURSE ON SOLID WASTES
COLLECTION AND DISPOSAL

EMRO 134

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Lecture No. 4

Public Health Problems

A. Introduction

With the recent great and rapid expansion of cities and the growing density of the world population, it is found necessary to understand the dangers and the difficulties resulting from the collection and disposal of solid wastes.

It can be said safely that the quantities of solid wastes daily produced by individuals are greatly increasing as a result of social, economic and technological changes. The economic importance of public health problems related to collection and disposal of solid wastes is emphasized by the fact that in many countries a big portion of the municipal budgets (sometimes 20%) are paid out on the collection and disposal of solid wastes.

As this is an important part of the work of the local health authorities, these authorities should direct all their efforts to ensure that this job is being done in the best possible manner.

The aim of the collection and disposal should always ensure that the household and trade refuse is collected :

1. At regular intervals (daily, alternate days, or weekly).
2. Hygienically, so as to create the minimum of public health nuisance through spillage.

It should also aim after hygienic collection, that the refuse is disposed of in such a manner as to render it innocuous.

B. Definition

Refuse is the inclusive term for all solid waste products or those having the character or similarity of solids rather than liquids, in the sense that they will not flow rapidly without additional liquid and are composed wholly or partly of such materials as garbage, sweepings, cleanings, trash, rubbish, litter, industrial solid wastes, organic wastes, fruit or other vegetable or animal matter from kitchens, dining-rooms or any other places dealing in or handling meat, fowl, fruit, grain or vegetables; offal; animal droppings or the carcasses of animals; tree or shrub trimmings, grass clippings; brick plaster or other waste matter resulting from the demolition, alteration or construction of buildings or structures, accumulated waste materials, cans, containers, tyres, junk or other such substance as may become a nuisance.

1. Domestic or Household Refuse Collection

Throughout the world, different systems of refuse collection are employed, depending on local conditions, i.e. on whether refuse is to be collected from apartments, houses, or whether the streets are narrow or wide, etc.

Another factor that has to be taken into consideration, is how often refuse should be collected. The deciding factors are :

- a. Cost of collection; obviously the more frequent the collection, the costlier the operation of collection will be.
- b. The climate; in hot tropical and semi-tropical areas refuse should be collected more frequently than from the cooler areas of the world, as the heat and humidity accelerate the rate at which refuse will decompose, giving rise to the smell nuisance, and providing ideal breeding sites for flies.

2. Trade Refuse

Trade refuse can be subdivided into two headings :

- a. refuse from food-shops, and other business premises;
- b. refuse from industrial concerns, e.g. factories.

In both cases what is important to remember is that refuse from such premises and factories should be collected, and it is the duty of the local health authority to do so.

C. Problems and Hazards Related to Solid Wastes

Basically the three media into which we can discharge our wastes are land, sea, and air.

Normally our wastes are disposed of at or near the surface. With the common disposal procedures our objective should be, generally, to interfere as little as possible with the cycles and processes of nature, and specifically to create no hazards to human beings.

It is evident that failure to deal efficiently with the increasing flow of solid wastes contributes to air, water and soil pollution as well as to the breeding of flies, harbourage of rodents and other vectors of diseases, thus highly endangering public health. It is important therefore to find effective solutions to these problems. It is also essential that problems of refuse disposal must be considered in relation to local conditions, and appropriate methods employed.

1. Insect Breeding

It is obvious that fly breeding takes place around houses when refuse is neglected and left lying about in courtyards particularly during the hot weather. Breeding also takes place at refuse dump sites when moist refuse is left unburnt for sometime. This occurs very rapidly in the tropical and semi-tropical countries as the heat and humidity accelerate the rate at which refuse will decompose giving rise to bad smells and providing an ideal breeding site for flies.

In areas where controlled tipping is practiced, flies are sometimes discovered breeding in solid wastes which have been neglected and left uncovered for more than 48 hours.

The practice of composting refuse scientifically is a recent development and many local authorities are now using this system. One of the most important problems of composting is the control of flies, as refuse, including animal manure, abattoir wastes and several other food processing wastes are excellent media for the breeding of a large fly population.

Fly breeding however can be satisfactorily controlled during composting operations, but more effort than usual is needed when carrying out sanitary composting of refuse.

The most effective methods of destroying fly larvae is frequent turning over of the compost, in this way the larvae will be turned into the centre of the compost heap, and the heat in the centre will be sufficient to destroy the larvae. Crickets and cockroaches are sometimes in houses adjacent.

2. Attraction and Harbourage of Rodents

A well organized refuse collection is of major importance for all rodent control work. The open dump is all too common and needs no explanation.

Refuse is generally spread over a large area, providing a source of food and harbourage for rodents and flies, and other vermin. It is unsightly, there is an odour and smoke nuisance, and a fire hazard.

It should always be remembered that rats frequent a spot because it affords either shelter, food or drink, or all of these. Thus refuse dumps constitute a favourable breeding site for rodents which breed freely, multiply and infest the adjoining buildings. The dangers incurred are obvious.

Unsatisfactory means of refuse storage inside house-premises on the other hand, by using defective and uncovered dust-bins attract rodents, particularly when we are aware that house refuse always contains remains of moist fruit, vegetables and other food substances which form ample food for rats.

Besides, dumping of refuse near warehouses and provision stores not rat-proofed will result in rat breeding and their free admission to such places thus damaging and contaminating food materials.

3. Air Pollution

In most industrialized communities, the major sources of air pollution arise from the production and use of coal, coke and oil as fuel. In addition, there is often serious local air pollution from special industrial activities such as petroleum refining, production of cement and other materials. The disposal of household and industrial waste materials by incineration is also responsible for air pollution.

Refuse incineration whether on-site or by incinerators can also cause an unacceptable degree of air pollution through smoke unless they are properly designed and operated.

The increasing quantities of bulky waste such as old furniture and other household equipment also create problems in most existing incinerators.

Uncontrolled burning of wastes cause considerable nuisance by generating gases such as carbon monoxide. Putrefaction also takes place in portions of refuse which has not been fully burnt and this adds to air pollution by foul smells.

Moreover, there may be fire risks to the adjoining farms, factories and houses.

4. Pollution of Groundwater

Pollution of groundwater is likely to happen by the percolation of rain water through landfills thus taking with it some of the refuse down into the subsoil water level which is eventually polluted by organic matter and other parasites carried by such water. This is noticeable when the refuse disposal land is porous and wrongly sited.

Drainage from landfills has been shown to have a high oxygen demand and may cause pollution of water courses or of beaches when the fill is deposited near the shore of bodies of surface of water. It is possible that improper location of fills may result in pollution of groundwater.

Furthermore during heavy rains, large amounts of refuse is washed out and flushed to adjoining ground and hence percolates into rivers and other water courses and thus causes water pollution. Sometimes the increasing discharge of waste water used for municipal and industrial purposes into streams that are already diminishing in flow, because of increased withdrawals, makes it no longer possible to rely as in the past on the self-purifying capacity of receiving bodies of water.

D. Other General Problems

The quick growing density of the world population as a result of urbanization and industrialization is making efficient and satisfactory collection, treatment and disposal of solid wastes a complicated problem of great magnitude with serious implications for health. The importance of the problem of solid wastes in highly industrialized and advanced countries is characterized by the high percentage of funds allocated and spent on this item by local health authorities.

Systems for the collection and disposal of wastes are complicated and expensive to establish and operate. Processes and treatment are set to function within limits, and if the latter are exceeded the result may be excessive costs, overloading and breakdown of the system, and damage to the environment.

Generally there is lack of information on which to estimate the costs of the different means of refuse collection and disposal.

Landfill is perhaps the cheapest, but in some instances it is difficult to find sufficient land to be used as disposal area. There is also lack of information about the comparative costs of incineration and composting.

Shipping of refuse out to sea has the disadvantages of the difficulty in getting rid of the light and bulky articles, and the nuisance that may be caused to adjacent towns.

The marked shortage of trained professional staff in the management of solid wastes is a noticeable feature. The difficulty of recruiting manual labourers is becoming another problem.

This is particularly observed in the case of solid wastes, where collection systems have been usually based on manual labour.

It should always be remembered that management of solid wastes and control of pollution require much expenditure for the construction and operation of plants and the evaluation of all relevant aspects of the problem, technically, economically and socially.