

Water Supply & Sanitary Engineering (DI05006021)

Unit 6: Sanitation System

Lecture 23: Methods of Collection: Conservancy System

GTU Diploma Engineering

Agenda

- Overview of Waste Collection Methods
- Introduction to the Conservancy System
- Handling Different Types of Waste
- Advantages of the Conservancy System
- Disadvantages and Health Risks
- Suitability and Current Context

Methods of Collection

- Once waste is generated, it must be collected and removed.
- There are two principal methods of collection:
 - 1. Conservancy System (Dry Carriage System)
 - 2. Water Carriage System
- The choice depends on water availability, topography, financial resources, and technological development of the town.

What is the Conservancy System?

- Also known as the 'Dry Carriage System'.
- Different types of refuse and storm water are collected, conveyed, and disposed of separately.
- Solid wastes (garbage, rubbish) and human excreta (night soil) are collected in containers or dry latrines.
- They are periodically removed manually by sanitary workers.

Handling of Solid Waste (Garbage & Rubbish)

- Collected in dustbins placed along streets or at houses.
- Transported via trucks or tractor trailers.
- Disposal methods include sorting for combustibles and non-combustibles.
- Combustible refuse is burnt; non-combustible is used for filling low-lying areas.

Handling of Storm Water and Sullage

- Storm water (rainwater) and sullage (kitchen/bath wastewater) are usually allowed to mix.
- Carried away in open or semi-closed surface drains.
- Discharged into nearby natural watercourses like rivers or streams.
- Relatively less harmful, but open drains can become blocked or emit odors.

Handling of Human Excreta (Night Soil)

- Collected in pans or buckets in dry privies/latrines.
- Manually emptied into covered carts or trucks by sweepers.
- Transported to disposal sites outside the town.
- Commonly disposed of by 'Trenching' - buried in trenches to decompose and form manure.

Advantages of the Conservancy System

- Initial Cost: Low capital cost as underground sewer networks are not required.
- Water Conservation: Requires very little water, making it suitable for areas with severe water scarcity.
- Manure Value: Night soil can be directly converted into valuable agricultural fertilizer through composting.
- Storm Water: No risk of sewage overflowing into streets during heavy rains (as systems are separate).

Disadvantages: Health and Hygiene

- Highly unhygienic and poses severe health hazards to sanitation workers.
- Dry latrines and open transport carts cause extreme foul odors and visual nuisance.
- Spillage during transport spreads pathogens in streets.
- Flies and insects breed in dry latrines, leading to outbreaks of diseases like dysentery and typhoid.

Disadvantages: Operational Challenges

- Labor Intensive: Requires a large, continuous workforce of sweepers.
- Unreliable: Strikes or absence of workers lead to immediate and severe sanitary crises.
- Space Requirement: Requires large land areas outside the city for trenching.
- Building Design: Latrines must be placed on outside walls for access, restricting architectural freedom.

Disadvantages: Sub-soil Pollution

- Seepage of liquid waste from dry latrines can pollute shallow groundwater.
- Open drains carrying sullage may percolate into the soil.
- Polluted groundwater can contaminate nearby wells, causing waterborne epidemics.

- Small towns or villages with very limited financial resources.
- Areas facing extreme water scarcity where a water carriage system is impossible.
- Temporary camps, fairs, or military bases.
- Largely obsolete in modern urban planning due to public health and social (manual scavenging) concerns.

Summary

- Conservancy system collects solid, liquid, and human waste separately.
- Relies heavily on manual labor for collection and transport.
- Low initial cost and low water requirement are the main benefits.
- High health risks, odors, and unreliability are major drawbacks.

Next Lecture Preview

- The Water Carriage System.
- How water is used to transport waste.
- Advantages and disadvantages of the water carriage system.
- Direct comparison between Conservancy and Water Carriage systems.