

Water Supply & Sanitary Engineering (DI05006021)

Unit 6: Sanitation System

Lecture 22: Sanitation Concepts and Objectives

GTU Diploma Engineering

Agenda

- Introduction to Sanitary Engineering
- Key Terminology in Sanitation
- Basic Concepts of Sanitation
- Objectives of Sanitary Works
- Public Health and Environmental Impact

What is Sanitary Engineering?

- Branch of public health engineering that deals with the proper collection, treatment, and disposal of waste.
- Aims to preserve and promote public health.
- Prevents the outbreak of epidemic diseases.
- Ensures a clean and healthy living environment.

Key Terminology: Refuse and Garbage

- Refuse: General term indicating all kinds of solid wastes generated from a community.
- Garbage: Dry refuse such as decayed fruits, vegetables, grass, leaves, and food waste.
- Garbage is highly putrescible (decomposes easily) and attracts flies and rodents.
- Requires immediate collection and disposal to avoid foul odors.

Key Terminology: Rubbish and Ashes

- Rubbish: Non-putrescible solid waste (excluding ashes), consisting of combustible and non-combustible materials.
- Examples: Paper, rags, plastics, glass, metal, and ceramics.
- Ashes: Residue left after the combustion of fuels like coal, wood, and charcoal.
- Generally handled under Solid Waste Management.

Key Terminology: Sullage

- Sullage: Wastewater generated from bathrooms, kitchens, washing places, and washbasins.
- It does NOT contain human or animal excreta.
- Less offensive and less hazardous than sewage.
- Can sometimes be reused for gardening after basic treatment.

Key Terminology: Sewage

- Sewage: Liquid waste containing human and animal excreta, along with sullage and industrial wastewater.
- Highly offensive and contains pathogenic (disease-causing) bacteria.
- Requires complex treatment before safe disposal into water bodies.
- Also referred to as 'black water' in modern terminology.

Key Terminology: Storm Water and Sub-soil Water

- Storm Water: Runoff from rainfall, street washing, and melting snow.
- Generally clean, but can wash pollutants from streets.
- Sub-soil Water: Groundwater that enters sewers through leaks or poorly constructed joints.
- Increases the total volume of wastewater to be treated (infiltration).

Objectives of Sanitation System

- To collect all waste and wastewater from towns and cities efficiently.
- To transport it to the point of treatment and disposal without causing a nuisance.
- To treat wastewater to acceptable standards before discharging it into the environment.
- To dispose of solid waste safely (e.g., sanitary landfilling, composting).

Public Health Importance

- Prevention of Waterborne Diseases: Cholera, typhoid, dysentery, and hepatitis are transmitted via contaminated water.
- Vector Control: Proper waste disposal eliminates breeding grounds for mosquitoes and flies.
- Improved Hygiene: Provides communities with a clean environment, reducing illness and healthcare costs.
- Historical Context: Epidemics in the 19th century drove the development of modern sanitary systems.

- Prevention of Water Pollution: Protects rivers, lakes, and oceans from eutrophication and toxic contamination.
- Maintenance of Aquatic Ecosystems: Ensures sufficient dissolved oxygen for fish and aquatic life.
- Soil Protection: Prevents contamination of agricultural land by heavy metals and pathogens.
- Odor and Aesthetic Control: Maintains visually appealing and odor-free urban spaces.

Role of a Sanitary Engineer

- Designing collection networks (sewers, drains).
- Selecting appropriate treatment technologies.
- Managing construction and operation of treatment plants.
- Ensuring compliance with environmental discharge standards.

Summary

- Sanitation is essential for public health and environmental protection.
- Wastes are categorized based on their characteristics (garbage, rubbish, sullage, sewage).
- Sewage contains excreta and is highly hazardous.
- The main objective is safe collection, treatment, and disposal of waste.

Next Lecture Preview

- Methods of Collection of Waste.
- The Conservancy System (Dry Carriage System).
- Advantages and disadvantages of the conservancy system.
- Where is it still applicable?