

Importance of safe water supply system

Water Supply System It is the infrastructure for the collection, transmission, treatment, storage, and distribution of water for homes, commercial establishments, industries and irrigation as well as for such public needs as fire fighting and street flushing.

People depends on water for cooking, washing, carrying away wastes and other domestic needs. Water supply system must also meet requirements for the public, commercial and industrial activities. In all the cases water must fulfil both quality and quantity requirement.

Water constitutes one of the important physical environments of man and has a direct bearing on the health and hygiene of mankind. There is no denying the fact that the contamination of water leads to numerous health hazards.

Needs of water supply system :->

main objective of any public water supply system are as follows.

- (i) To supply safe and wholesome water to the consumer.
- (ii) To supply water in adequate quantity.
- (iii) To make water available within easy reach of the consumer so as to encourage the general cleanliness.

Importance of safe water supply system :->

Source of Water Supply

Source of water supply are to be classified into two categories: →

(i) Surface water

(ii) Underground sources

(i) Surface water,

(i) Lakes and streams →

A natural lake represents a large body of water within land with impervious bed. Hence, it may be used as source of water supply scheme for nearby localities.

The quantity of runoff that goes to the lake should be accurately determined and it should be seen that it is at least equal to expected demand of locality.

Similar, is the case with streams which are formed by the surface runoff: It is found that the flow of water in stream is quite ample in rainy season.

(ii) Ponds, is a man-made body of standing water smaller than a lake. They ponds are formed due to excessive digging of grooms for the constructions of roads, houses etc and they are filled up with water in rainy season. The quantity of water in pond is very small and it contains many impurities.

(iii) River, is naturally flowing watercourse usually freshwater flowing towards an ocean sea, lake etc. In some cases a river flows into the ground and becomes dry at the end of its course without reaching another body of water.

Transportation of Water

The term transportation refers to taking of water from source to purification plant and from treatment plant to consumer.

Water supply system broadly involves transportation of water from the source of area of consumption through free flow or pressure mains.

If the source is at higher than the treatment plant, the water can flow under gravity automatically. Similarly, after necessary purification of water, it has to be conveyed to the consumer.

Open channels: → In any water supply system, raw water from source to treatment plant may be carried in open channels.

Economical section in OC are generally trapezoidal while rectangular from economical ~~from~~ when crop culturing is involved.

- The initial cost and maintenance cost may be high.
- not recommended for conveyance of raw water.

Adeducts: → These can be used for conveyance of water from source to treatment plant or for distribution.

- In ancient times, rectangular adeducts are used but these days circular or horse shoe are more common.
- It is economical and easy to build.

Tunnels are used to convey water into the cities from outside sources.

- Horse shoe shape tunnel is used when water is not under pressure.
- Circular cross section is best if we have to convey water under pressure.

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CHAPTER-2

Drinking Water Quality →

- It is determined by the impurities present in it.
- It can be physical, chemical in nature.

(i) Physical tests

1 Colour Coloured water give the appearance of being unfit to drink, even though water may be perfectly safe for public use.
- Colour can indicate the presence of organic substance such as algae or other compounds.

(2) Taste and odour →

- It is the human perception of water quality.
- Human perception of taste includes sourness, saltiness, bitterness, etc. Sweetness and produced by organic compounds.

(3) Turbidity

- It is the measure of the light transmitting properties of water and composed of suspended and colloidal particles. It is important for health reasons.

(4) Solids

- It is the residue remaining after evaporation of water.

(ii) Chemical tests

(1) Chlorides

- The excess presence of sodium chloride indicates the pollution of water due to sewage, mineral etc.

- Water has lower content of salt than sewage due to fact that salt consumed by in food is excreted by body.

Domestic Waste Water CHAPTER 3

Quantity \Rightarrow

- (i) Dry weather flow
- (ii) Storm water flow

(i) Dry weather flow \Rightarrow

- a. Domestic or sanitary sewage
- b. Industrial sewage.

Quantity of dry weather flow is determined by considering the following factors.

(i) Infiltration & Exfiltration \Rightarrow

- \hookrightarrow leakage of water from ground to sewer
- \hookrightarrow leakage of sewage to underground

(ii) Nature of Industries & the quantity of Industrial sewage will depend upon the nature of ~~water~~ industries.

(iii) Population & the quantity of Domestic waste water will also depend on the area of population. When the population \uparrow the domestic sewage will \uparrow .

(iv) Rate of Water Supply & the rate of sewage is ~~equal~~ assumed as equal to the rate of water supply.

It depend on two factors &

- (i) Intensity of pressure & Pressure \uparrow , more costly of water
- (ii) Use of Water &

CHAPTER-3

Introduction to Solid Waste

Solid Waste / An solid ~~low~~ material in the material flow pattern that is rejected by society is called solid waste.

All Human Activities viz domestic, Commercial Industrial, healthcare and agriculture generate solid waste. The quantity and nature of the waste vary with the activity and the level of technological development in a country. If solid waste not managed properly, these wastes can have an adverse impact on the environment and public health from the contamination of solid water and pollution of air and through spread of diseases.

Solid waste management →

Management of solid waste may be defined as the discipline associated with the control of generation, storage, collection, transport and disposal of solid waste that they will not laid impact on public health and environment.

Solid waste management in india

India, as an other developing country, is currently facing an acute problem in the management of solid waste. Open dumping of waste is wide spread throughout the country. This is because of the mistaken belief that it is the most easiest and cheapest disposal method. That is why

Solid Waste Characteristics

(i) Characterize by source

- (a) Residential waste
- (b) Commercial waste
- (c) Industrial waste
- (d) Agricultural waste

Physical Characteristics

Solid waste require frequent conversion between mass & volume, that is not constant.

Parameters of solid waste

(i) Density

$$D = \frac{\text{mass}}{\text{Volume}}$$

Dry density

$$P_{\text{dry}} = \frac{\text{mass of solid}}{\text{Total Volume}}$$

Solid waste $D_s = \frac{M_s}{V_s}$

⇒ Specific weight is weight per volume.
→ It's important to design the landfill, storage and transport vehicle.

Photochemical Smog

It is a unique type of air pollution which is caused by reaction between sunlight and pollutants like hydrocarbon and nitrogen dioxide.

Although photochemical smog is often invisible it can be extremely harmful, leading to irritation of the respiratory tract and eyes. If concentration is high, elevated rates of death and respiratory illness may be observed.

Ozone layer depletion

Ozone layer is the earth's atmosphere that contains high concentration of ozone and protect the earth from the harmful UV rays.

Ozone layer depletion is the reduction in the concentration of ozone particle in ozone layer.

Cause

When chlorine and bromine atoms in the atmosphere come in contact with ozone and destroy the ozone molecules.

Ozone depleting substance

CFC, Halon, Methylbromide, Bromo chloro methane, Methyl chloroform.

~~CFC~~



Secondary air Pollutant

Sulphuric acid | It is formed by simple chemical reaction between sulphur dioxide with water vapour.

- it is more toxic than sulphur dioxide.
- it cause acid rain.

Ozone

- ozone has been generally found to occur in the highly moistened areas. during day time it is produced with the photochemical reaction of hydrocarbon and nitrogen oxide.
- it can cause irritation in the respiratory tracts.

Formaldehyde

it is a colorless gas with pungent odor from a family of gases called aldehydes.

- commonly known as preservative in medical laboratories, and mortuaries..

Peroxy-acetyl nitrate

- is an oxidant more stable than ozone. Hence it is better capable of long range transport than ozone.

- it irritates the eyes resulting in blurred vision and eye fatigue.

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