

Wastewater Engineering

Lecture - 8



Engr. Nadeem Ullah
Department of Civil Engineering,
Iqra National University Peshawar

Sewage Disposal

Sewage Disposal

- Wastewater also called sewage once collected through proper collection system . After collection it is properly treated and then disposed off.
- Sewage is normally disposed off to natural streams / rivers or any other surface water sources.
- More important point here is that sewage disposal should follow the relevant “National Environmental Quality Standards (NEQs)” before it is discharged into natural water bodies.

Assimilative Capacity of Receiving Bodies

- **Assimilative capacity of receiving water bodies** refers to the ability of a body of water to cleanse itself; its capacity to receive wastewaters without deleterious effects and without causing damage to aquatic life or humans who consume the water. It is level to which water body or nature control the toxicity without affecting the aquatic life.
- Although wastewater is properly treated before it is disposed of to the natural water streams still it has impurities / pollutants that need to be removed or make them less effective so that the receiving water bodies may not become unsuitable for use or cause damage to the aquatic life.

Physical Forces Helping Assimilative Capacity of Receiving Bodies

- 1) Dilution :** Dilution is the process of reducing the concentration of pollutants in receiving water, usually simply by mixing with more quantity of water.
- 2) Dispersion:** Dispersion is the distribution of pollutants in relatively large area of water. Dilution and dispersion are inter-related.
- 3) Sunlight:** Sunlight facilitates biological decomposition of pollutants and kills pathogens by ultraviolet radiation (UV)

Factors Effecting Assimilative Capacity

1) Temperature: Temperature plays an important role in assimilative capacity of receiving water. Increase in temperature will increase the biological decomposition of organics and thus assimilative capacity will improve. Increase in temperature also causes to increase the dilution process and thus increases the assimilative capacity.

2) Flow Velocity: Flow velocity is also critical to assimilative capacity of receiving water bodies. Higher the flow velocity will encourage quick dilution and dispersion of pollutants.

Factors Effecting Assimilative Capacity

3) Dissolved Oxygen (DO) : Rate of biological decomposition is directly related to the amount of dissolved oxygen. DO is replenished by re-aeration. Re-aeration may be provided by maintaining sufficient flowing velocity.

4) Depth of flowing water: Assimilative capacity is indirectly related to the depth of receiving water bodies. Increase in depth causes to decrease dissolved oxygen in the water and thus it reduces the purification process. Also the effects of UV radiation from sunlight which helps to kill the pathogens, decreases with increase in depth.

Factors Effecting Assimilative Capacity

5) Types and concentration of pollutants : Types and concentration of pollutants disposed off to the water greatly affect the assimilative capacity. Higher concentration of pollutants require much time for dilution and purification as compared to less pollutants present in the sewage.

Thus assimilative capacity is not a fixed quantity but rather it's a range depending not only on characteristics of pollutants but also depends on prevailing physical conditions of the receiving water bodies.

Streams Pollution

- Streams pollution refers to the contamination of streams due to the disposal of sewage into the streams.
- The extent to which a stream is polluted depends on the concentration and duration the sewage being added to the streams.
- To reduce streams pollution, relevant NEQs need to be followed.

Self Recovery of Streams

- Self Recovery of streams refers to getting back the water quality conditions before sewage being added to it.
- It is the assimilative capacity of streams that helps in self recovery.
- Self recovery is time taken process and is attained along the length of the streams.
- The more the distance between the point of contact of sewage and location of taking samples, the more recovery will be attained.

Thank You