

Submitted by: M. Zubair Khan

Submitted TO: Engr. Nadeen ullah

ID: 7677

Department: Civil Engineering

Subject: waste water
Engineering

Assignment # 02

Iqra National University
Peshawar.

Q1 wastewater treatment:- wastewater treatment consist of applying known technology to improve or upgrade the quality of a wastewater

- wastewater treatment involves collecting the wastewater in a centralized location (wastewater treatment plant) and subjecting the wastewater to various treatment processes.
- wastewater if properly treated, is an important resource and can be used for various purpose including irrigation, lawn watering, car washing, flushing toilets and landscaping etc.
- wastewater treatment can also generate biogas as final product which is a potential source of energy.
- The principal objective of wastewater treatment is generally to allow human and industrial effluents to be disposed off without causing danger to human health damage to the natural environment.

Important: Essential for life, clean water is one of the most important, natural resources on the planet. wastewater, which is basically used water, is also a valuable resource, especially with recurring drought and water shortages in many areas of the world. However, wastewater contains many harmful substances and cannot be released back into the environment until it is treated. Thus the importance of wastewater treatment is twofold: (To restore the water supply and to protect the planet from toxins).

(2)

Why rectangular tank is preferred over circular tank

The shape of the rectangular clarifiers provides a longer path for the wastewater flow and the suspended solids to travel, and subsequently longer detention time which warrants less short circuiting and more sludge settling compared to the center-feed/peripheral overflow of circular clarifiers.



(3)

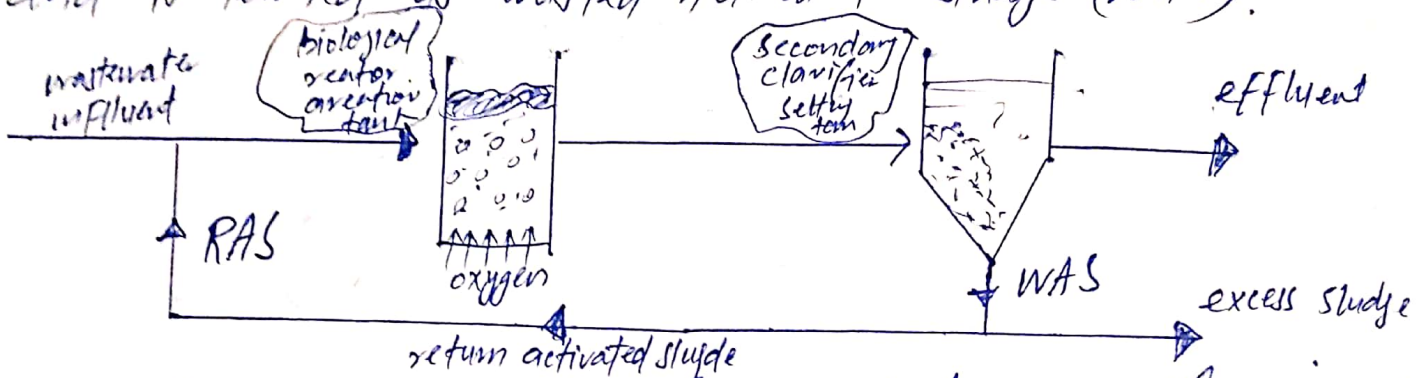
Q2 Difference b/w aerobic & anaerobic wastewater treatment

Aerobic & anaerobic systems are both forms of biological treatment that use microorganisms to break down & remove organic contaminants from wastewater. While both rely on a process of microbial decomposition to treat wastewater, the key difference b/w anaerobic & aerobic treatment is that aerobic systems require oxygen, while anaerobic systems do not require. This is a function of the types of microbes used in each type of system.

- Activated sludge process. Microorganisms responsible for treatment are maintained in liquid suspension by appropriate mixing methods.
- Main constituents of (ASP) are aeration tank in which oxygen is provided for the micro-organism to grow. The aeration also helps to keep micro-organisms in suspension.
 - Aeration tank is followed by clarifier/settler in which the micro-organisms from flocs settle down at the bottom.
 - Formation of floc particles, ranging in size from 50–200 μm , removed by gravity settling leaving relatively clear liquid as treated effluent.

(4)

- A part of settled bio flocs are recycled back to the aeration tank to maintain certain amount of micro-organisms in the system for efficient operation of the system. This is known as ~~Recy~~ Recycled Activated Sludge (RAS).
- Remaining settled bio flocs are removed from the system and is termed as wasted Activated Sludge (WAS).



- APS involves production of activated mass of microorganisms capable of stabilizing waste under aerobic conditions.
- Typically 99% of suspended solid and up to 99% of dissolved organisms are removed by Activated Sludge process.
- The main drawback associated with APS is its high electricity consumption particularly for aeration.

(5)

Q₃

Assimilative Capacity of Receiving Bodies: Refers to the ability of a body of water to cleanse itself; its capacity to receive wastewater without deleterious effect and without causing damage to aquatic life or human 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 help 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 interrelated.
- 3) Sunlight: Sunlight facilitates biological decomposition of pollutant and kill pathogens by ultraviolet radiation (UV).

(6)

Q4

Sludge management

Sludge: Refers to the residual, semi-solid material left from municipal wastewater or industrial wastewater treatment processes.

Sludge management & sludge treatment and management is a growing challenge for countries globally. The cost of sludge treatment constitutes to approximately half of the cost of wastewater treatment. and the quantities continue to increase as new wastewater treatment facilities are built and the existing ones are upgraded to keep up with the growing population and stricter regulation that require more treatment. In developing countries, faecal sludge management plays a key role in protecting public health and environment.

We are finally at a point that sludge is not seen as a ~~wastewater~~ waste but as a renewable source of energy, nutrients, organic matter and water. Resource recovery will continue to be at the center of sludge treatment & management with special emphasis on harnessing the energy value through anaerobic digestion and thermal processes.

Advantages

- ① Energy Generation, Incineration, also called "mass burn" utilize a high temp furnace that burns any waste. In large treatment plants, high quantities of sludge are used as a source of energy used to produce steam when fed through a turbine.
- ② control the spread of disease, Residual wastes from hospitals, research facilities and other industries can be hazardous to our health and the environment. These harmful element may required thermal treatment to control the spread of diseases or toxins.
- ③ Recovery of Precious Metals, significant quantities of precious metals may be recovered from urban waste after it goes through the sewage sludge incineration process. ~~incineration pro~~ These metal can be recycled from sewage ash.



Q5 Environmental Impact Assessment (EIA)

- The concept of environmental impact Assessment (EIA) is linked to Development
- Development basically aims to bring about a positive change in a society. This change may be of social wellbeing and/or economical advancement.
- In the past promotion of economic growth for increased wellbeing of society was the main development goal with little sensitivity to adverse social or environmental impacts

“The processes of identifying, predicting, evaluating and mitigating the biological, social, and other relevant effect of development proposals prior to major decisions being taken and commitments made”

In simple words (EIA) may be defined as

“A formal process to predict the environmental consequence of human development activities and to plan appropriate measure to eliminate or reduce adverse effects and to enhance positive effects”

EIA thus has three main function

- To predict problems.
- To Find way to avoid/mitigate them
- To enhance positive effects.

(9)

How EIA helps us

- EIA provides a unique opportunity to demonstrate ways in which the environment may be improved as part of the development process.
- EIA also predicts the conflicts and constraints b/w the proposed project, program or plan & its environment.
- It provides an opportunity for mitigation measures to be incorporated to minimize problems.
- It enables monitoring programs to be established to assess future impacts and provide data on which managers can take informed decisions to avoid environmental damage.

.X

.X