

Salman Abdullah Khan

IO: 7772

Sec: C

Subject: Wastewater Engineering

Assignment 1st

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Submitted to Sir Nadeem Ullah

Question no 1

Briefly describe each one of these parameters.

⇒ Hydraulic Retention Time:

The Ratio b/w the reactor and feeds flow rate represent the average time the cells and substrate stay inside the reactor. HRT is very important parameter for Hydrogen and methane production in Continuous mode very low HRT causes the washout of the reactor which means all the active microorganism escape out from the reactor. Contrary an adequate HRT result in abundant hydrogen and methane yields. low HRT favored the washout of methanogenic guardantying the survival of hydrogen producers.

> Solid Retention Time:

The Solid Retention Time (SRT) is the time of solid fraction of the waste water spend in a treatment unit. It is a quantity of a solid maintained in the reactor divided by the quantity of solid coming out of the reactor each days.

$$SRT = \frac{V \times C_d}{Q_{out} \times C_{out}}$$
 is the solid concrete ratio of the effluent in a conventional completely mixed or plug flow reactor the HRT equal SRT

The Solid retention time or SRT Control the concentration of bacteria through the treatment system

- Smaller reactor Size
- Larger Separator Size
- Reduced Sludge production.

Q2: What are the methods used for decoupling SRT from HRT.

Ans: By decoupling the SRT and HRT the liquid wastewater can be processed faster HRT is the time water is retained within the digester and equal to reactor volume divided by the average volumetric flowrate in many instances. Short HRT will reduce Capital operation cost. There may be some advantages for a simple design generally reliable easily managed.

Although modern controls permit hands off management of more complex design that decouple HRT and SRT.

Some of more common digester type are given below

- Continuous Stirred tank reactor.
- HRT Control Reactor.
- ~~HRT~~ HRT Sequencing Batch reactor
- Plug flow reactor
- Induced bed reactor.

Q.3.

What are the advantages of deception
SRT from HRT.

Ans: HRT treatment technology was relatively low equipment
cost.

- ⇒ Available HRT treatment system can be applied at small as well as larger scale.
- ⇒ HRT process stability can be easily achieved.
- ⇒ Management Requirement is low.
- ⇒ off-gas air pollution can be eliminated.
- ⇒ Foaming Surfactant Contaminant wastewater can be avoided.
- ⇒ The HRT treatment technology does not require the input of expensive equipment.
- ⇒ HRT nonbiodegradable organics can be degraded.
- ⇒ Less Space is required for an HRT treatment plant compared to an HRT treatment plant.

