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Subject

Wastewater Engineering

Assignment No

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Submitted to

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## Hydraulic Retention time: (HRT)

The hydraulic retention time, (HRT) also known as hydraulic residence time. In MEC or MFC studies generally, the theoretical HRT is calculated from the volume of the medium and the flow rate into the reactor.

HRT is an important parameter in wastewater treatment, which directly affects the design, operational/investment cost and energy requirement and in general, higher HRT is will lead greater investment costs. Therefore, varying HRT also has a significant effect on the power generation and wastewater treatment characteristics:

⇒ Hydraulic retention time (HRT) is a measure of the average length of time that a soluble compound remain in a constructed bioreactor.

It is the relation b/w volume and flow rate.

$$HRT = V / \text{flow rate}$$

Time of stay of water in reactor

The term generally used for the determination of the quantity of the influent used in a particular volume of a reactor.

## Solid Retention Time:

The Solids retention time or SRT

Controls the Concentration of bacteria throughout the treatment system. A higher bacterial Concentration in the reactor, which gives rise to:

- \* Smaller reactor size
- \* Larger Separator size
- \* Reduced Sludge production
- \* Higher aeration requirements due to the extra oxygen required for endogenous respiration.

Clearly, an optimum SRT exist, resulting from a trade-off between the gains and losses in the various cost terms. For municipal Sewage treatment plants performing Combined nitrification-denitrification, typical wasting ratio generally fall in the range 0.025-0.10 for a hydraulic retention time of 12-24 hours.

Q.6 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 average volumetric flowrate in many instances a short HRT will reduce Capital Operation Cost. There may be some advantages for a simple design generally reliable and easily managed although modern controls permit it handles off management of more complex design that decouple HRT and SRT.

Q.7 What are the advantages of decoupling SRT from HRT

Ans. HRT treatment technology has 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

⇒ Foaming of surfactant containing wastewater can be avoided

⇒ The HRT treatment technology does not require the import of expensive equipment.

⇒ The HRT nonbiodegradable organics can be degraded.

⇒ Less space is required for an HRT treatment plant compared to an HRT treatment plant

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