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Section

"A"

Assignment

No # 1

Subject

waste water

Instructor

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Q#01

⇒ Hydraulic Retention time:

The Hydraulic retention time is a measure of the average length of time that a soluble compound remains in a construction bioreactor.

The volume of the aeration tank divided by the influent flow rate is τ (tau) the hydraulic retention time.

The hydraulic retention time is closely related to the amount of substrate that can be handled per unit time, and thereby has a direct impact on economic feasibility of bioprocess.

A short "hydraulic retention time" yields a higher hydrogen production rate and lower capital outlay by reducing the size of the bioreactor.

According to Bolzonella David 2019 "The hydraulic retention time is the ratio between the reactor volume and the feed flow rate,

(2)

represent the average time
the cell and substance stay
inside the reactor

HRT is a range important
parameter for the hydrogen
and methane production in continuous
mode



⇒ Solid Retention Time:

The Solid Retention Time (SRT) is time of the solid fraction of the wastewater speed in a treatment unit.

It is quantity of solid maintained in the reactor divide by the quantity of solids coming out the reactor each day

$$SRT = \frac{V \times c_d}{Q_{out} \times c_{out}}$$

c_{out} is the solids concentration of the effluent, in a conventional, complete mixed or plug flow reactor the HRT equal the SRT

The solid retention time (SRT) controls the population of bacteria through the treatment system

- ⇒ Small reactor size
- ⇒ large separate size
- ⇒ Reduce sludge production

Q2:

Ans: Method used for Decoupling
SRT from HRT

By decoupling the SRT and HRT
the liquid wastewater can be
processed faster

HRT is the time water is
retained within the digester and
is equal to reactor volume divided
by the average volumetric flow rate
in many instances a short HRT
will reduce capital operation cost
There may come advantages for a
simple design generally reliable
and easily managed

Through modern controls permits it
levels of management of more
complex design that decouple
HRT and SRT

Some of the more common digester type are given below

- Continuous stirred tank reactor
- HRT contact Reactor
- HRT sequencing Batch reactor
- Plug flow reactor
- Induced load Reactor.

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Q#3:

ANS Advantages of decoupling
SRT from HRT

⇒ HRT treatment technology has relatively low equipment cost

⇒ HRT Process stability can be easily achieved

⇒ management requirement is low

⇒ off-gas air pollution can be eliminated

⇒ foaming of surfactant containing waste water can be avoided

⇒ The HRT treatment technique does not require the input of an expensive equipment

⇒ HRT material degradable organics can be degraded

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

