

Analysis of Activated Sludge Process & Sequencing Batch reactor for Sewage Water Treatment

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Abstract- Wastewater (Sewage) is the by-product of municipal, agricultural and industrial activity. Removal of organic matter from wastewater is essential so that treated water can meet the acceptable quality standards to avoid the water pollution. In this review the information available on the removal of organic matter by activated sludge process & Sequencing Batch Reactor has been represented. The sequencing batch reactor (SBR) is a specific fill and draw version of the Conventional activated sludge process (ASP). In contrast to continuous flow systems, the sequencing of batch processes in the SBR is time rather space oriented; metabolic

Keywords- Activated Sludge process (ASP), Sequencing Batch reactor (SBR), Waste water, Municipal sewage, Sewage Water Treatment Plant

I. INTRODUCTION

Historically, activated sludge technology commenced with the investigation of fill and Draw reactors. The first activated sludge plant was really a sequencing batch reactor where in the sewage was introduced batch wise into the reactor for a specified period of time. The Reaction and solid/liquid separation take place at different times in the same reactor. This study aims to investigate the performance and treatment capability of both Activated Sludge Process (ASP) and Sequencing Batch Reactor (SBR) systems under different Cases of operation. The overall efficiency of SBR higher than ASP at low cost in less space for continuous flow and even for constant flow provide preference to SBR selection of technology for biological treatment of wastewater. This paper reviews the Analysis of conventional Activated sludge process & Cyclic SBR process for Sewage water treatment sequencing batch reactor may be composed of one or more tanks biological waste treatment, each tank has five basic operating modes or period. The periods are fill, react, settle, decant and desludge. The sequencing batch reactor has many advantages by comparison with the activated Sludge process. The main advantages of the SBR systems are: optimization of energy Through control of metabolic activity, small land requirement for the SBR, removal of nitrogen and phosphorus nutrient through proper oxygen supply management.

1. Activated Sludge Process

The most common suspended growth process used for municipal wastewater treatment is the activated sludge process. The process flow diagram is as shown in Fig(1). The activated sludge process is used to treat waste streams that are high in organic and biodegradable compounds. It is most widely used biological process for the treatment of municipal wastewater. Historically, activated sludge technology commenced with the investigation of fills and draw reactors. The first activated sludge plant was really a sequencing batch reactor wherein the sewage was introduced batch wise into the reactor for a specified period of time. The contents of the reactor were then aerated for a predetermined period, following which the sludge flocks were allowed to settle and the supernatant liquor was decanted.

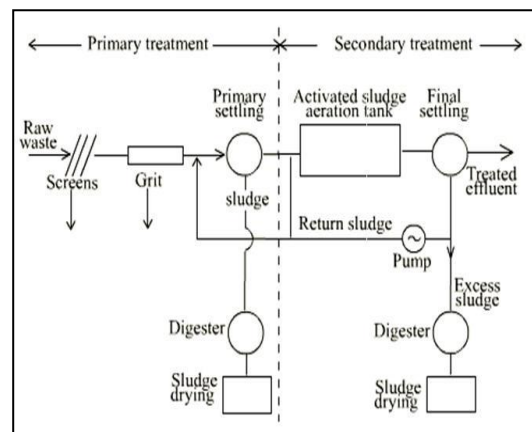


Fig.1: Flow Diagram of Conventional Activated Sludge Process (ASP)

2. Sequencing Batch Reactor

Sequential Batch Reactor treatment process itself indicates that it is intermittent treatment process SBRs are a variation of the activated-sludge process. They differ from activated-sludge plants because they combine all of the treatment steps and processes into a single basin, or tank, whereas conventional facilities rely on multiple basins. The operation of an SBR is based on fill-and-draw principles, which

consists of five steps—fill, react, settle, decant, and idle(C-TECH Basin). Good effluent quality was achieved, but operation of the SBR was difficult at that time for various flow processes. In biological waste treatment, each tank has five basic operating modes or period. The periods are fill, react, settle, decant and desludge. The sequencing batch reactor has many advantages by comparison with the activated sludge.

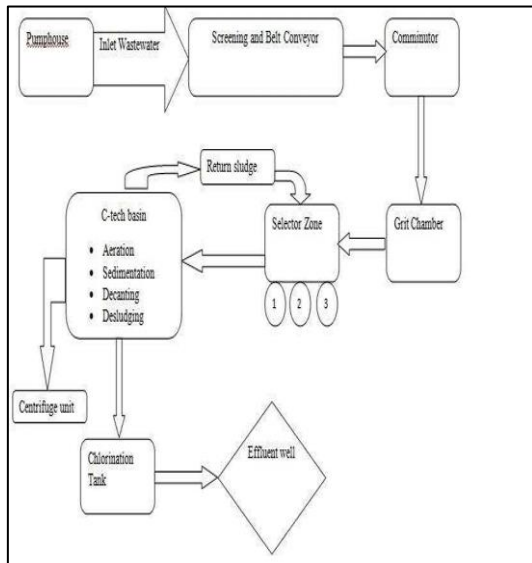


Fig.2: Flow Diagram of Sequencing Batch Reactor (SBR)

II. LITERATURE REVIEW

Research papers being national and international all emphasize on the performance and Analysis of activated sludge process and cyclic sbr process. Sequencing Batch reactor process simultaneous of removal BOD, COD Removal of Nitrogen and Phosphorous Various parameters like TSS, pH, temperature, phosphorus, Nitrogen, solids, BOD, COD. Were studied and analyzed in the papers. Collecting sewage STP plant around the river also briefly studied Dr.Naidu STP & Mundhva STP Pune.

III. METHODOLOGY

The methodology adopted includes collecting the data from Dr. Naidu STP plant Pune & Mundhva STP Plant Pune. This sewage waste water Treatment plants on Mula-Mutha River in Pune. Both plants are placed working position on Mula-Mutha River. Their STP’s are under Pune Corporation & our project group conduct site visits, interviews, questionnaires to Plant Engineer, Site engineers and workers, literature reviews, case studies, internet, book’etc. The Analyzed per STP on daily basis for 21 days collection sample and adopted

chemical test. The Test result was used Investigate the Analyze and treatment capability of both Activated Sludge Process (ASP) and Sequencing Batch Reactor (SBR) systems under different Cases of operation. Conduct Chemical Testes and Data Calculation for find Removal efficiency chemical test perform the project work. The overall efficiency of SBR higher than ASP at low cost in less space for continuous flow and even for constant flow provide preference to SBR selection of technology for biological treatment of sewage wastewater.

IV. ANALYSIS OF ASP & CYCLIC SBR

A .Test are performed on this analysis of ASP & Cyclic SBR Process

1. T.S.S (Total Suspended Solid)
2. B.O.D (Biological Oxygen Demand)
3. C.O.D (Chemical Oxygen Demand)
4. M.L.S.S (Mixed Liquor Suspended Solid)
5. S.V.I (Sludge Volume Index) \
6. PH
7. TEMPARATURE



ASP at Dr,Naidu 115 MLdSTP Pune



SBR at Mundhwa 45 MLD STP Pune



B. Results and Conclusion

In this paper we have compared two different technologies viz. ASP and SBR used for treatment of sewage.

The Process different parameter show in (table 1)

Table1: Treatment Efficiency of ASP (Mundhva STP Pune) and SBR Plants (Dr, Naidu STP Pune)

Parameter	ASP Plant			Cyclic SBR Plant		
	Influent (mg/l)	Effluent (mg/l)	Removal Efficiency (%)	Influent (mg/l)	Effluent (mg/l)	Removal Efficiency (%)
TSS	310	40	87.00	260	10	96.15
BOD	156	21	86.73	150	07	95.93
COD	380	120	68.42	340	28	91.76

V. CONCLUSION

Based on the observation and results obtained from this study, the following points are concluded:

- SBR High efficiency in removing BOD, COD, TSS and Removal of Nitrogen, Phosphorus.
- SBR system has oxygen dissolving capacity higher than ASP.
- As the effluent quality is better in case of SBR system than in ASP system.
- Other conclusion includes SBR requires the low investment and operating costs, 50% Reduction in Power Consumption, Land

Requirement, Man power and maintenance as compared to Conventional ASP.

- SBR technology produces completely digested and odorless sludge which can be used as manure.
- SBR has special ability to handle extremely high organic and hydraulic shock loads.

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