Sequential Batch Reactor

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Abstract

The improved sequential batch reactor is a process of treating waste water economically. In short the sewage is generated by residential, commercial, industrial establishments. Improved Sequential Batch reactor process improves the quality of waste water. The waste water coming from toilets, baths, kitchens, and sinks draining into the sewers. The waste water or sewage from everywhere contaminates to water bodies when it is directly mixed with river, nullah and other water body it also affects on environment. So to overcome from that the best way to treat the sewage properly. Improved sequential batch reactors a type of activated sludge process in which the waste water is treated by mechanically in batches in reactors. Sometimes it includes Combi treat unit, and this combi treat unit is a power saving as well as power generating sequential batch reactor technology. This technology has been studied and recommended by reputed Indian Research Institutions such as Indian institute Technology and numerous consultants in the field. Attention has to be paid to the fact that suspended solids are always present in the effluent.

Keywords- Sequential Batch Reactor, Combi Treat, Activated Sludge, Clarifier

I. INTRODUCTION

During the second half of the nineteenth century sewage treatment methods developed rapidly. Sewage treatment contains semi-solid waste called as Sludge. The sludge can be removed from waste water various process like Activated sludge process, which came into existing in 1920 at UK. As this process required large space and more time and it does not gives better quality of effluent. Thus later, new process came into existence which was known as Sequential Batch Reactor (SBR) which came in 1970. SBR is a type of Activated sludge process, for the treatment of waste water. SBR Reactors that waste water of output from anaerobic digesters facilities in batches. Oxygen is bubbled through the mixture of waste water and activated sludge to reduce the organic matter i.e measured by Bio-chemical oxygen demand (BOD) and Chemical oxygen demand (COD). The treated effluent may be suitable for discharge to surface waters or possibility for the use of land. By the early 19th century this had changed. It identifies that the stages - primary, secondary, tertiary has one or two conventional treatment technologies.

II. OBJECTIVES OF THE PAPER

The paper focuses mainly the advanced sewage treatment method of sewage treatment that is combi-treat technology used in details.

III. COMBI TREAT TECHNOLOGY

Combi treat unit is our indigenously designed solution to improved Sequential Batch Reactor Technology to make them energy efficient. Combitreat Unit harnesses primary sedimentation and anaerobic digestion to treat a major portion of the organic matter without using any electricity. The Combi treat Unit is a combination of Primary Clarifier, Sludge Digester and Biogas Holder Tank. Combi treat unit generate methane gas and this gas is collected in flexible balloon.
IV. COMBI TREAT UNIT – IMPROVED SBR

A. Procedure
After screening and de-gritting unit, raw sewage enters to combi treat unit where much of the organic matter settles, like it does in a primary clarifier. Proper feeding arrangement of raw sewage into combi treat unit enables to settle the sludge. Sludge is allowed to settle at the bottom of combi treat unit which act as sludge digester.

Draft tube type mixers are provided to mix entire sludge settled at the bottom in such a way that settled raw sewage on upper portion of combi treat unit does not affect. Thoroughly mixing helps in stable performance of the digestion process and creates a homogeneous environment throughout the digester. It also quickly brings the raw sludge into contact with microorganisms.

Furthermore, when stratification is prevented because of mixing, the entire digester is available of active decomposition there by increasing the effective solids retention time (SRT).

This combi treat unit ensures BOD removal efficiency around 35% - 45% and SS removal efficiency around 45% - 60%. Removal of this parameter in combi treat unit results in less power requirement for balance organic load in the i-SBR Basin.

The supernatant from upper portion of combi treat unit is allowed to flow over a weir and flows radially outwards into i-SBR basins/CLSBR Basins.

V. FLOW DIAGRAM

A. Advantages of Improved SBR Technology
1) Improved SBR requires much less space that other technology.
2) Combi-treat unit acts as a primary clarifier and anaerobic digester.
3) CLSBR basins replace aeration tanks and secondary clarifiers.
4) It generated near about 40% electricity by its own and save 60% power required as compared conventional SBR.
5) It is easy in operation & also in maintenance.
6) It gives excellent quality of effluent parameter.
7) It gives BOD upto 95% to 98% as compared to other process.
8) The methane gas is generated from combi treat unit and which can be collected using flexible membrane balloon or flexible dome. That's why, if the excess of methane gas has come to increase, the balloon may have less chances of bursting.
9) Energy can be produced from both sources viz. Biogas and hydropower

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