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Review on Sewage Treatment Plan

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Abstract: *Sewage treatment is the process of removing contaminants from wastewater both runoff (effluents) and commercial. It includes physical, chemical and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce a treated effluent and a solid waste or sludge suitable for discharge or reuse back into the environment. This material often inadvertently contaminated with many toxic organic and inorganic compounds. Sewage implies the collecting of wastewater from occupied areas and conveying them to some point of disposal. The liquid wastes will require treatment before they are discharged into the water body or otherwise disposed of without endangering the public health or causing offensive conditions.*

Keywords: Sewage treatment

I. INTRODUCTION

Sewagetreatment is the process of removing contaminants from wastewater both runoff(effluents) and commercial. It includes physical, chemical and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce a treated effluent and a solid waste or sludge suitable for discharge or reuse back into the environment. This material often inadvertently contaminated with many toxic organic and inorganic compounds. Sewage implies the collecting of wastewater from occupiedareas and conveying them to some point of disposal. The liquid wastes will require treatment before they are discharged into the water body or otherwise disposed of without endangering the public health or causing offensive conditions. The treatment of wastewater is accomplished by four basic methods or techniques; physical, mechanical, biological and chemical. The sequencing batch reactor (SBR) is afill anddraw activated sludge system for wastewater treatment. In this system, wastewater is added to a single “batch” reactor,treated toremove undesirablecomponents,andthendischarged.,aeration,andsettlingcanallbeachievedusinga singlebatchreactor.SBRhavecomponentssuchasScreeningchamber,Equalizationchamber,SequencingBatchReactor (SBR), Decant tank, sludge holding tank, Final Collection tank.

1.1 Objective

ObjectiveoftheWork

The objective of this work is to design and estimate domestic sewage treatment plantso as to reuse treated water for domestic uses such as watering plants, cleaning the vehicles and toilet flushing etc. Through the treatment of wastewater, the amount of waste that is released into the environment is considerably reduced, thereby improving the environment’s health. This, in turn, reduces the health risk associated with environmental pollution and the nearbywater bodies remain uncontaminated.

Wastewatertreatmentisoneofthesolutionstothe world’s watercrisis,which willonlyincrease astheworld population increases.

1.2 ScopeofProject

Sewege water treatment plants can be installed in numerous setup which maybe industrial, institutional, in human colonies as well as agricultural lands until thereis requirement for safe disposal of waste water generated.

1. Municipal sewage treatment plants: - SBR systems have been successfully used to treat Municipal wastewater and industrial waste water and are uniquely suited to wastewater treatment applications characterized by lowor intermittent flows. Because of rapid urbanization the scope of waste water treatment is a large one.
2. Industrial wastewater treatment plants :- Due to the design flexibility and better process control that can be achieved by the modern technology, the use of these SBR process has not been limited to the field of sewage treatment only; it has also found wide acceptance in biological treatment of industrial Wastewater.
3. Landfill leachate treatment plants: Rainwater passes through the waste in the landfill and if the landfill is not properly lined or it is not properly managed, it is at risk of mixing with the groundwater and polluting it near the site. So it is important to provide landfill treatment plant.

II. LITERATUREREVIEW

EdwarArdernetal.(1914):

Studied the main principles of biological degradation operationsusingactivated sludge in early1900. Theyoperated fill and draw processes on crude sewage and conceptualized sequencing batch reactors (SBR) technology. It was achieved by utilizing single reactor basin and applying iterative approach of aeration, settlement and discharge of treated water. Sequencing batch reactor technology was capable of attaining very high quality effluent water quality, but this technology faced many operational difficulties. Therefore for a long period of time development of SBR process for wastewater treatment has stagnated. In 1913 - 1914 there were carried out lab-scale experiments at the Manchester Davyhulme wastewater treatment plant. The experiments were prepared and performed by William Lockett accordingto the Dr. Fowleras recommendations. Sewage from different districts of Manchester was used for those experiments. Lockett and Ardern found soon that the amount of the sediment increased with increasing number of batches. By this technique of repeated batch aeration with the sediment remaining in the bottle Lockett and Ardern were able to shorten the required aeration time for "full oxidation" from weeks to less than 24 hours which made the process technically feasible.

D.Dohareetal. (2014):

Studied that SBR technology is an alternative method for treating waste water. SBR technologydiffers in various ways fromconventional technologies used in biological treatment of wastewater. The most obvious difference is that in SBR technology, the reactor volume varies with time, whereas it remains constant in the traditional continuous flow system. Theadvantages ofSBR technologyinclude the flexibility of operation(changeof phase), feasibilityofoperation at low retention time, control over microbial population and various reactor configurations. SBR process consists of several time oriented periodic steps, characterized by a series of process phases viz. fill, react, settle, decant and idle, each lasting for a defined period during which wastewater is treated. SBR technology is applicable for any municipal or industrial waste where conventional or extended aerationactivated sludgetreatment is appropriate. Thesuccess of SBR technology depends on the great potential provided by the possibilities of influencing the microbial system in the reactor. SBRprocessesarecomparativelyeasyto operateand costefficientandthisprocesssaves morethan60%ofthe expenses when compared to conventional activated sludge process.

AparnaDuttaetal.(2015):

Studied theSequencing batch reactor (SBR) Due to itsoperationalflexibilityand excellent processcontrol possibilities, SBR are being extensively used for the treatment of wastewater which is contaminated with newer and more complex pollutants. It is also possible to include different expanding array of configurations and various operational modifications to meet theeffluent limits whichare also continuouslygetting upgraded. Theyprovided basic description of SBR process along with its functional and physical variants that lead to improve the removal of nutrients and emerging contaminants. The significance of selectors and various recent advancements in the application of SBR was discussed along with the possibilities held by SBR process in the treatment of wastewater of different origins and composition to produce effluent of reusable quality.

III. METHODOLOGY

3.1 Methodology/PlanningWork

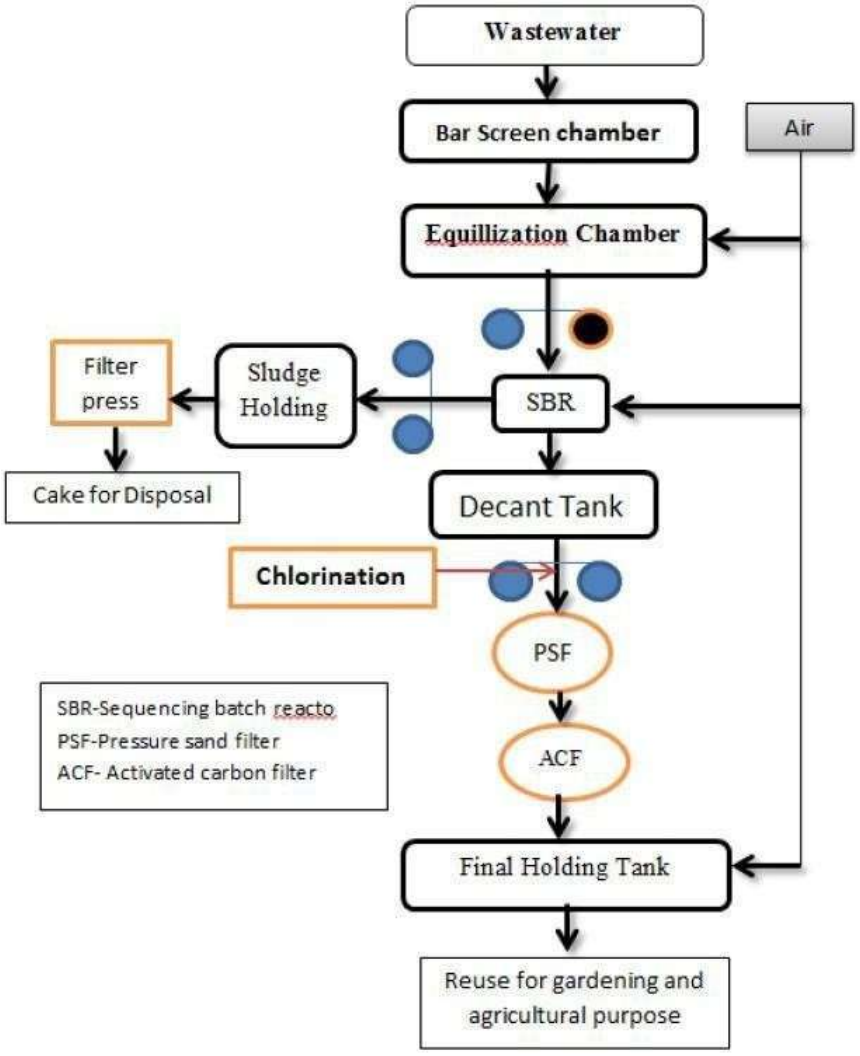

Figure:SBRFlowDiagram

For this work Sequential Batch Reactor (SBR) was selected to treat the sewage. 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 intoasingletank.Whereasconventionalfacilitiesrelyonmultipletanks.SBRisrecommendedinareas where thereisa limited amount of space. In this system, wastewater is added to a single —batch reactor, treated to remove undesirable components, and then discharged, aeration, and settling can all be achieved using a single batch reactor. The various components of SBR sewage treatment plant are bar screen chamber, equalization tank, SBR tank, Decant tank, sludge holding tank, pressure sand filter, activated sand filter, filter press, treated wastewater collecting tank.

- **BarScreenChamber:**BarScreenChamberisusedforremovingrags,sticks,andotherdebrisbeforethey canenterthetreatmentprocess.
- **Equalization Tank:** The main function of the equalization tank is to act as a buffer: to collect the raw incoming sewage that comes at widely fluctuating ratesand pass it onto the rest of the sewagetreatment plant at a steady flow rate.
- **SBR Tank:** A sequencing batch reactor works in five steps Fill, React, Settle, Decent, and Idel. It is the Main component of SBR process.

- **Decant Tank:** Effluent coming fromSequencing Batch Reactor throughdecant mechanism is stored in decant tank.
- **SludgeHoldingTank:** Sludgecollectedinsbrtankisstoredinsludgeholding tank
- Filter: These Filters are designed to remove turbidity and suspendedparticles present in the feedwaterwithminimum pressure drop.
- **Activated Carbon Filter:** Activated carbon filter process basically absorbs micro pollutants such as chlorine, methane, organic compounds, and even the taste and odor from water.
- **Filter Press:** Filter Press is fixed volume machine that separates liquids and solids using pressure filtration. A slurry is pumped into the filter press and with the help of recessed plate dewatered under pressure.

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