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FEASIBILITY STUDY OF MODIFIED STABILIZATION TANK FOR SEWAGE TREATMENT

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Abstract— **Water pollution and scarcity are two serious problems living organisms are facing currently. Out of which Water scarcity is in some areas but Water pollution is everywhere. If we consider India only, as almost 70% of surface water resources and growing percentage of its groundwater reserves are polluted by biological, toxic, organic and inorganic pollutants. If we observe closely we can easily find out that these two problems are directly interdependent. And day by day these problems are seriously affecting entire ecosystem. In most cases, these sources have been rendered unsafe from households as well as industrial waste. This shows that degraded water quality can contribute to water scarcity because it limits it's availability for both human use and ecosystem. Waste water and solid waste disposal are the problems among the other environmental problems which urban and semi-urban areas are facing. These wastes ranges from household waste to animal & human excreta to industrial waste material etc. The time has come to take serious action so that we can make this planet exists and that too in better condition for the generations to come.This needs awareness at individual side as well as collective side. The local public authorities can play a crucial role in this. They must develop proper system to collect, treat and dispose all waste products. There are several techniques used to treat domestic wastewater. These can be broadly classified into two groups, Conventional and Non-Conventional Treatment Plants.**

I. INTRODUCTION

With other source, household effluents are large contributor of water pollution in India. Normally all household effluent conveyor system directly connected to sewerage line and finally it leads to natural stream or surface water source. Mostly this is implemented in rural region but in city life; a sewage treatment plant (STP) is designed to play it's role. But this is not sufficient to fulfil the ever increasing population and again finally most of untreated water has to be discharged in stream. This untreated discharge water is not only polluting surface water sources but also ground water source. As the Global warming showing its results in the form of drought, water scarcity is a big problem world over. All these problems can be resolved partly but effectively by using stabilization tank. The biogas plant effluent & grey water from the house is collected in the stabilization tank. The primary function of the tank is to digest or to stabilize the solid content in refused water. This tank is designed for 5 days of Hydraulic Retention Time (HRT). The tank comprises of 5 chambers connected in parallel to avoid mixing of liquid, to increase travel time and to avoid stagnation of material by providing semi-mechanize system which yields better results

II. OBJECTIVE OF STUDY

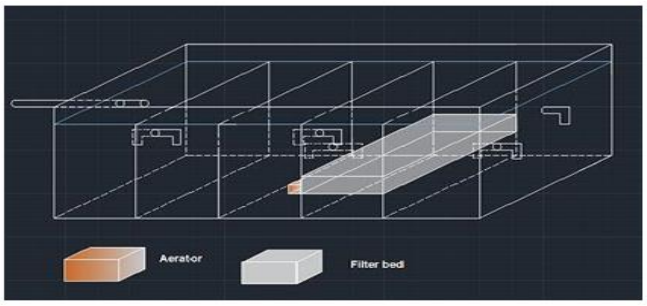
The basic aim of this to design and comparative study between feasibility of modified stabilization tank and conventional stabilization tank. So we can conclude modified stabilization tank have more advantages over stabilization tank.

The objectives are:-

i. To carry out detailed study of non-mechanized system
ii. To find out the advantages & disadvantages of conventional stabilization tank
iii. Design of modified components according to existing stabilization tank model
iv. To make model of modified stabilization tank for further process
v. To find comparative study between stabilization tank(old) and modified stabilization tank

III. METHODOLOGY

Project is carried out for reducing the detention time of stabilization tank from 5 days to 3 days with modifying the tank by adding screeners, filter bed and fish aerator. This project also concentrates on characteristics of treated water. The BOD, COD, TS, TSS, TDS tests were conducted for both tanks for knowing that this treated water is usable or not. For that purpose tests are carried out at particular time interval with addition of modified components in the different compartments.



AutoCAD drawing showing modified stabilization tank model

IV. MATERIALS USED

1. Water tank - For treatment of sewage water

2. Foam sheet - Used as partition wall.

3. Pipes, valve and elbows - They are used for increasing contact length of water

4. Block tab - Block tabs are used to restrict movement of water from one compartment to another compartment and also to prevent leakages.

5. Screener - Screeners are used to remove suspended material and solids

6. Aerator - Aerator is used for bringing water and air into close contact to dissolve more amount of oxygen in order to remove dissolved gases, such as carbon dioxide, and to oxidize dissolved metals such as iron. It can also be used to remove volatile organic chemicals (VOC) in the water.

7. Aggregates - 20mm, 16mm, 12.5mm and 3.35mm aggregates are used for formation of sand filter bed with the help of fibre net and also small sloping gradient is given to filter bed with the help of supporting stand for equal distribution of water over the bed.

8. Glue gun and fevibond - Glue gun and fevibond are used for the fixation of partition wall with tank.

V. TESTS

BOD- Biochemical oxygen demand (BOD) (also called biological oxygen demand), it is microbes required demand of the oxygen for biological decomposition of dissolve solids or organic matter present in the sewage under aerobic condition at a given temperature.

COD - Chemical oxygen demand (COD), it is a required amount of oxygen for the chemical oxidation of organic matter by the strong oxidising agent under the specific acidic condition.

TS- Total Solids is the normally addition of two types of solids i.e. Total Suspended solids (TSS) and Total Dissolve Solids (TDS). Any sewage is having both organic as well as the inorganic solid in the form of either suspended form or in colloidal form.

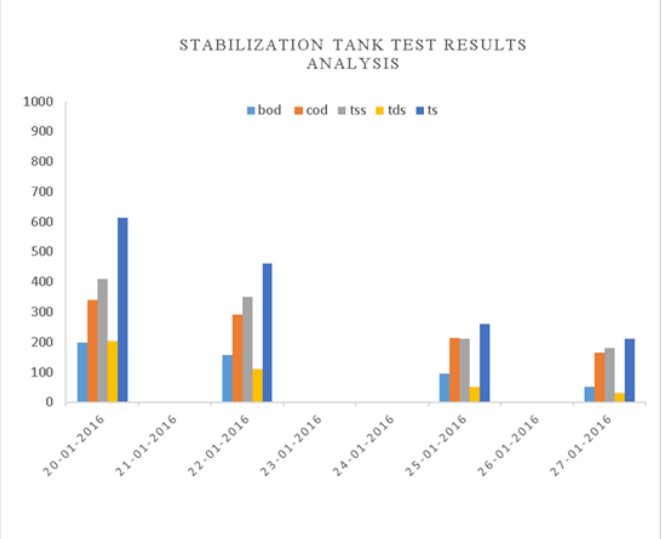
TSS-Total suspended solids are the solids present in water and which can trapped by providing suitable type of filter. It includes variety of materials such as sewage, silt, animal matter, decaying plants. Due to its overload it causes many problems on sewage system & aquatic life.

TDS-Total dissolve solids refer to that solids matter which are present in water in dissolve form & which not easily retainable on filter media. These dissolve components may be inorganic matter like sodium, chloride, calcium, magnesium, potassium, bicarbonates and sulphate salts and some organic matter also.

VI. RESULTS

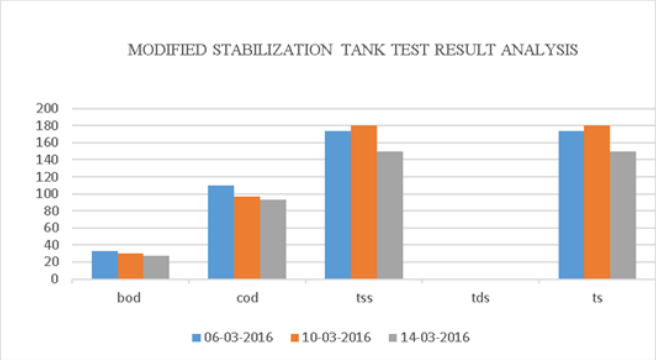
Stabilization Tank Test Results-

Parameters (Test.)	1st day inlet sample(1st day)	3rd compartment Effluent (3rd day)	5th compartment Effluent(6th day)	5th compartment Effluent(8th day)
	20/01/2016	22/01/2016	25/01/2016	27/01/2016
TDS	410	350	210	180
TSS	204	110	50	30
TS	614	460	260	210
BOD	198	157	94	52
COD	340	290	214	164



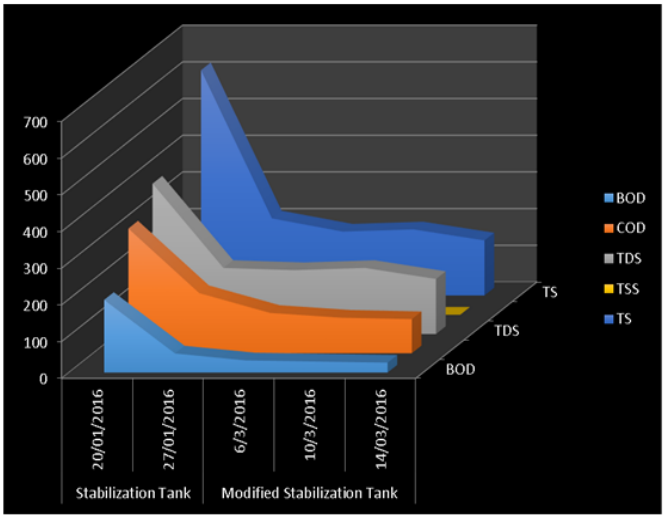
Modified Stabilization Tank Test Results

Parameters(Test)	Aeration-1hr	Aeration-2hr	Aeration-3hr
	06/03/2016	10/03/2016	14/03/2016
TDS	180	170	150
TSS	0	0	0
TS	180	170	150
BOD	33	30	27
COD	110	97	93



Comparative study-

Results					
	Stabilization Tank		Modified Stabilization Tank		
Test(mg/l)	20/01/2016	27/01/2016	06/03/2016	10/03/2016	14/03/2016
BOD	198	52	33	30	27
COD	340	164	110	97	93
TDS	410	180	174	180	150
TSS	204	30	0	0	0
TS	614	210	174	180	150



Graph showing comparative result between stabilization tank and new one

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VIII. CONCLUSION

From the comparative study of stabilization tank and modified stabilization tank we can conclude that detention time period, large quantity of total solids, odour, and colour reduced up to great extent and treated water obtained with great value which can be used for gardening, curing and washing purposes.

REFERENCES

[1] Research paper - Sanitation an Essential Lifestyle. Documentary. Concept - Dr. S. V. Mapuskar

[2] Research paper - 'Status of Wastewater Generation and Treatment in India' - Bhardwaj, Rajendra M. (2005)

[3] IS: 3025 (part 15) -1984, method of sampling and test (physical and chemical) for waste and waste water, part 15 - total residue (total solids –dissolved and suspended)

[4] IS : 3025 (part 16) - 1984, method of sampling and test (physical and chemical) for waste and waste water, part 16 - filterable residue (total dissolved solids) Environmental engineering - 2010 edition by S.K Garg - Khanna publisher