Proposed Work For Waste Water Treatment By Using Low Cost Materials And by Filtration And Disinfection Process

[1]Shruti Patil, [2]Kajal chavan, [3] Dipmala Jangam, [4]Amruta patil
[1,2,3]U.G. Students, [4]Assistant Professor
Department of Civil Engineering,Dr.D.Y.Patil Pratishthan's College Of Engineering Kolhapur, Maharashtra,I ndia

Abstract: The project proposes a waste water treatment plant that will provide water to meet the demands of water on small scale basis. The waste water treatment system components were designed and they consist of water cans, piping system, filtration disinfection and storing system. The project includes upper head water storage tank which is situated at the top and second water tank for storing pure water after filtration process. The filtering media used were fly ash, fabric, baggas, coarse gravel, foundry sand, pebbles which was removed after 3 weeks and washed carefully with distilled water and dried. The waste after passing through filtration bed goes into the disinfection tank and finally stored there. When there is a need of water, this water can be delivered.

Key Words – filtration, disinfection, activated charcoal, flyash, fabric.

I. INTRODUCTION

Panchganga river is the most important river in relation to water supply and availability. The main problem is only one that water is Panchganga river is polluted at its extreme level. People dump all the waste like, religious waste, biodegradable waste, funeral waste, industrial waste directly into the river. Determining the water supply quality is mandatory. The main properties which show the purity of water are its physical, chemical and its biological characteristics .this characteristics will help us to determine the need of water treatment for consumption of appropriate water determined by national standards. The waste water treatment implies to use of chemical materials which is not very effective for workers. The pollution of Panchganga River is badly affecting the health and environment along the river bank. People living in this area are surviving from this polluted water and bad smell due to dead fish and waste.

All surface water varies in quality throughout the year and in rainy season. Every method of water treatment has different level reducing toxicity and improving the quality. In this present paper the waste water is treated by using low cost materials like fabric, activated charcoal, fly ash and rise husk, foundry sand, coarse gravel.

II .OBJECTIVE

The main objective of this water filtration plant is to reduce the turbidity, colour, and odour and to make the water safe for drinking purpose. Activated Charcoal is used to remove the contaminants and impurities. They are the most effective and useful in water purification. The rice husk possesses greater properties and high energy power. They are composed of organic matter and silica. With the help of this composition it removes colour, odour and dissolved organic substances. Rice husk is biomass material which is cause effective and easily available. Fabric is very much essential part of nearly all industrial process which contributes the purity of product. Fabric can be used as a solid-liquid separation material at the base of water filtration plant. Beside this foundry sand, coarse gravel is used. Main objectives are-

1. To understand the connection between water pollution and its effects of people consuming it.
2. To reduce the toxicity level by using low cost materials like fly ash, rice husk, baggas, activated charcoal, fabric.
3. To plant a water filtration plant which is feasible to everyone and to fulfill the needs of water.

III.MATERIALS

The different material used is fabric, activated charcoal, fly ash and rise husk, foundry sand, coarse gravel. The properties of each materials is described in detail below-

a)**Fabric**-In earlier days, the filter fabrics were produced by weaving yarns spun from natural fibers such as cotton which on wetting, would swell to produce highly efficient media the fabric will provide a long trouble free performance.

b) **Activated charcoal-**activated charcoal carbon filters are most effective at removing chlorine, particles such as sediment, volatile organic compounds, taste and odor from water. They are not effective in removing minerals, salts and dissolved inorganic substances.actiavated carbon is carbon produced from carbonaceous source materials such as bamboo, coconut husk, coal and petroleum pitch. It can be produced by physical activation. The activated charcoal is a good filter material because of its greater surface area which gives countless bonding sites. When certain chemicals pass through carbon surface, they attach to the surface area and are trapped. Active charcoal filter are works very effectively.

c) **Foundry sand-**Sand is used as a natural filter media for various water filtration, water treatment, and waste water treatment applications. Sand captures very small dirt particles. Layer of sand arranged according to density and particles in the water. Water flows through this layer. And after passing through this layer water goes to next layer.

d) **Gravel-**it is an excellent filtering media. It has the ability to hold back the precipitates containing impurities. Filter sand size, angularity and hardness are the important filter sand characteristic which ensures proper filtering. It has a specific gravity of 2.70 and Mohr's hardness is 6.different sizes of pebbles and coarse gravel are used in this filtration bed. The coarse gravel used is of sizes ranging from 40 mm to 5mm.

e) **Fly ash and bagasse balls-**bagasse is the fibrous materials remaining after removal of sugar, water, and other impurities from the sugarcane. And secondly fly ash is one of the most plentiful waste materials.fly ash is generated from combustion.fly ash particles are generally spherical in shape. Their constituent is silicon (SiO_2) .fly ash acts as an adsorbent as it contains high carbon quantity. Mainly fly ash is used to remove COD, organic, colour and heavy metals.fly ash is collected by cement factory.

IV.METHODOLOGY

This study is mainly of river of Panchganga.it is a micro level study.kolhapur is situated at the south bank of river panchganga.the river bhogawati is renamed as panchganga from prayag chikhali.after the combination of five river namely kumbhi kasari, tulshi, dhamani, and bhogawati.the river flows towards south-north side, and meets river Krishna at narsinhwadi.The entire catchment area of panchganga river lies in Kolhapur city.

First step was collecting water sample from Panchganga River. Sample of water of 10ltr collected from Panchganga River and it is stored in college then physical, chemical and biological test are taken with the water sample and then this results are put in a table and the next step will be to pass this waste water from the designed water filtration plant.

Table 1 Proposed Plan Of Study

Sample No	Description Of Sample	Planned Dates	Time
1	Before immersion	12/09/18	9.00 am
2	After 10 days of immersion	03/10/18	9.00 am
3	After 30 days	03/11/18	9.00 am
4	After 3 months	5/02/19	9.00 am
5	Public survey(before immersion)	19/09/18	9.00 am
6	Public survey (after immersion)	06/10/18	9.00 am
7	Sampling after 2 months repeatedly	- up to summer season	9.00 am
8	Model immersion POP sample	17/09/18	9.00 am
9	Model immersion shadu idol (without chemical) sample	17/09/18	9.00 am

IV.A) DATA COLLECTION

Materials are collected from different parts of Kolhapur city. Fabric for filtration media are brought from locally available shop. Activated charcoal is brought from agriculture centre which is situated near Kolhapur. Other materials like fly ash, coarse gravel are brought from construction industry. Then foundry sand is brought from industrial area which is situated at udyamnagar in Kolhapur city. Then other material for constructing the water filtration plant is brought from different parts like water cans needed for plant are brought from murgud city then the pipes, elbows and glass were brought from local shop.

B) WATER FILTRATION PLANT DESIGN CONCEPT

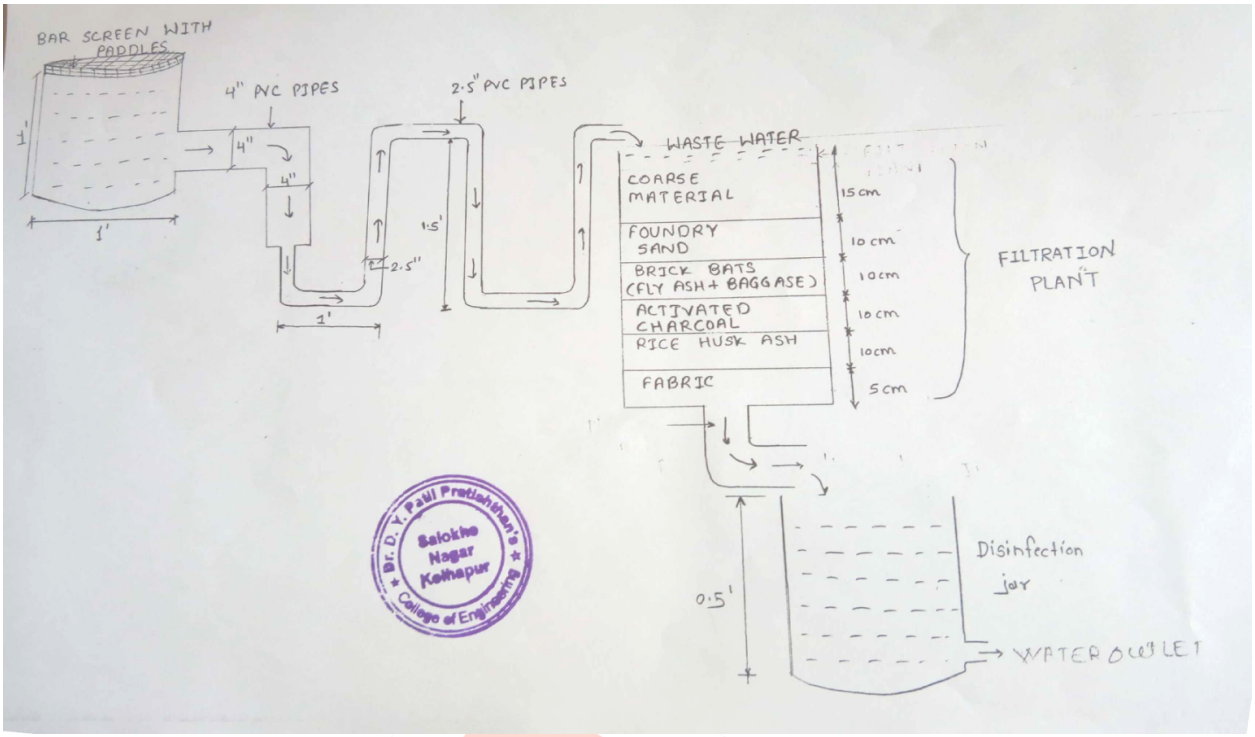

FIG.1

FIGURE 1 shows the proposed water filtration plant. There are two tanks one is situated at the upper head and other is situated at the lower head. Upper head tank is the main inlet for waste water and the lower head tank is the outlet of pure water and in between this plant pipes and for filtration of water filtration system is provided. For this plant secondary data has been collected.

V. THEORY OF DISINFECTION

Water disinfection means removing or killing the pathogenic microorganisms. Disinfection can be done by chlorine, .mostly chlorine is used in disinfection of water. When applying disinfection to the water there are three level which are high, intermediate and low. In high level disinfection process, this process kills all microorganisms. Chemicals which are used in disinfection process are called as disinfectants generally disinfection performs the last step of water purification.

In the present study, naturally available plant species like neem, bamboo, moringa olifera, ipomoea carnia is to be used for the disinfection process so that it will perform the role of low cost material as well as easily available material.

VI. RESULTS

Parameters	Khaneshwar khan	Irani khan	Main rankala	Rajaram lake	kalamba	panchganga	WHO standard
pH	6.5	6.7	7.0	7.2	7.74	6.8	6.5-8.5
TURBIDITY (NTU)	4.2	4.0	4.4	5.0	4.8	6.0	5-25
HARDNESS mg/lit	48	50	51.5	70.2	65	80	100-500
TDS mg/lit	100	110	112	170	158	160	500-1000
DO mg/lit	4.0	3.8	4.2	10.4	9.6	-	5.0
COD mg/lit	200	225	220	230	210	230	250
BOD mg/lit(3days)	75	70	80	85	84	86	100

Table 2

VII. CONCLUSION

From the above results , it is necessary to adopt some treatment processes. The proposed study for purification of waste water is to be done. After passing the waste water through the filtration unit it ensures that the toxicity of water level is reduced. The

present bacteria, microorganisms, and pathogen is reduced after passing through the filtration media. After filtration the water can be disinfected by various plant species neem, bamboo, moringa olifera, ipomoea carnia.

VIII. ACKNOWLEDGEMENT

The author would like to express thankful to the civil engineering department,head of department also guide.The author would like to thankful to the financial support shivaji university Kolhapur to funding of the project.

REFERENCES

[1] Environmental Studies By Mahua Basu.
[2] Manual Of Water Supply And Treatment By Government Of India Publications.
[3] Water And Waste Water Technology By M.L.Davis And Davis A. Cornwell,Mc.Graw Hill.
[4] Environmental Engineering By H.S Peavy ,D.R Rowe.Mcgraw Hill.S
[5] Water Supply Engineering By S.K.Garg.
[6] Mannual On Msw Management By Ministry Of Urban Development Government Of India.
[7] Anil K. Dwivedi (Pollution And Environmental Research Laboratory, Pearl) "International Research Journal Of Natural And Applied Science" Volume-4,Issue 1, January 2017. Associated Asia Research Foundation (Aarf).
[8] Miss.Shilpa Patil G., Chonde Sonal Guroba,"Study Of Physicochemical And Biologial Characteristics Of Lakes From Shivaji University Campus Kolhapur, Maharashtra", Issn-0976-8610
[9] Mr.Riyaj K. Mulla, Mr. Shrikant M. Bhosale, "Water Quality Analysis And Simulation Of Panchganga River Using Matlab", Issn-2277-9655.