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LITERATURE REVIEW PAPER ON WATER TREATMENT PLANT FOR STUDY AREA

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Abstract: Water, food and energy securities are emerging as increasingly important and vital issues for India and the world. Most of the river basins in India and elsewhere are closing or closed and experiencing moderate to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialization and urbanization. Current and future fresh water demand could be met by enhancing water use efficiency and demand management. Thus, wastewater/low quality water is emerging as potential source for demand management after essential treatment. An estimated 38754 million liters per day (MLD) sewage is generated in major cities of India. Now or day water requirement is high and people considered only fresh and pure water that why in this research paper we can work on the water treatment plan and its overview.

Keywords: Water, Treatment plant, Polluted Water, Impurities, Filtration



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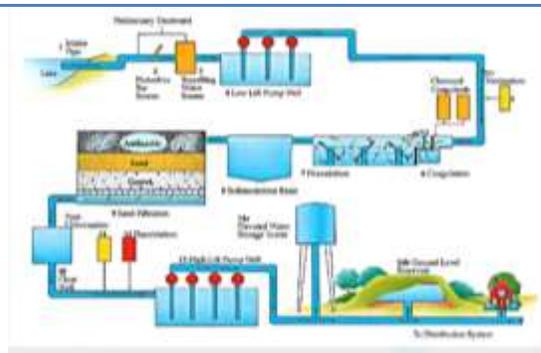
INTRODUCTION

Today there is numbers of water sources are available in the world. Generally two type's water sources one underground and second one is surface water sources. In the generally we can used underground water sources for the for the drinking purpose. Underground water and surface source are polluted in nature. The pollution may be due to several reason namely from sewage waste and industrial, waste. Such water is supplied directly without treatment and may not be used by the consumers due to psychological, or physiological reasons. Regular water also contain high amount of turbidity, organic load from vegetation or animals (web [2]).

It is therefore, necessary to subject any type of water to certain process of purification version it safe for human consumption. It is suitable for regular domestic and industrial uses.

Coagulation is the process of adding chemicals such as Alum to the water to help dirt and other particles stick together. As the particles combine together they become heavier and sink to the bottom of the tank in the sedimentation phase. With the dirt removed, the water is then passed through a filtration process. Most typically, sand, gravel, and charcoal are used to filter the water; removing smaller particles that were not removed during sedimentation. Chlorine is then added in the disinfection phase in order to kill bacteria and other microorganisms in the water.

Treatment for drinking water production involves the removal of contaminants from raw water to produce water that is pure enough for human consumption without any short term or long term risk of any adverse health effect. Substances that are removed during the process of drinking water treatment include suspended solids, bacteria, algae, viruses, fungi, and minerals such as iron and manganese(web [4])



In the figure Water treatment is any process that improves the quality of water to make it more acceptable for a specific end-use. The end use may be drinking, industrial water supply, irrigation, river flow maintenance, water recreation or many other uses, including being safely returned to the environment. Water treatment removes contaminants and undesirable components, or reduces their concentration so that the water becomes fit for its desired end-use.

Fig 1: Water Treatment System (<https://www.slideshare.net/saniyamehmood37/water-treatment-plant-of-environmental-engineering>)

Problem summary

Most urban communities collect water from a natural water body in the catchment, whether a stream, river, or underground aquifer. The water collected may then be stored in a reservoir for some time. Unless it is already of very high quality, it then undergoes various water treatment processes that remove any chemicals, organic substances or organisms that could be harmful to human health.

Main problem of in treatment plant is it's still manual work where in develop countries water treatment plants are fully automotive. We are mainly focus in this report is about automation technology of water treatment plant and future forecasting of population and full fill future needs of water demand. Also in water treatment plant some components are ordinary types like clarifier we recommended in this report about conventional type clarifier cum sedimentation tank.

Objective

To remove the different impurity in the raw water, the water secure and clean and to ensure the treated water quality meets the drinking water standard, Water purification is remove disagreeable organic and waste chemicals animal biological contaminants, suspended solids and gases from polluted water(web[5]).To remove disagreeable and objectionable taste and odour from the water. Remove the pathogenic germs contained in untreated water, water is use for domestic purposes like cooking, washing, and for industrial purpose as dyein, brewing etc To remove polluted that are harmful to health.

NOVELTY

The benefits of water treatment plant is to Reduces operational costs. To Provides immediate knowledge of scada system performance. To improve efficiency and performance. of water costly repairs can reduces. This system is fully automotive Replace ordinary components like clarifier to conventional clarifier. The future water demand design up to next 15years.

Brief history water treatment plant

The growth of water treatment and filtration technologies went through many stages. The maximum level of change came in the 19th century as growth of cities increase new methods of distributing and treating water in cites and the problems of water pollution became more pronounced. All through most of human history the primary means of acquire untainted water

to avoid the problem and bring the water from an outside source that did not require treatment.

The Romans did this with their aqueducts. London's New River was constructed, beginning in the early 17th century as a means of bringing in clean water from outside the city. The River was slow flowing, which helped to increase sedimentation. It also had screens to install every few miles to catch any debris and weeds. These screens required periodic maintenance and workmen to clean them and cut back the weeds. The new river could meet London's needs well enough that there were few complaints before the 19th century, even if the water supplied was rarely used for drinking directly, rather it was more likely used for washing .

Study Area



Fig: 2 Kotarpur plant photos

This place is situated in Ahmedabad near kotarpur. This plant is operational since 5th April 2000. 650 MLD water treatment plant was constructed from 1983 to 1987, This plant is 275 acres. In Ahmedabad 1000 to 1050 MLD water is supplied everyday. In this plant 65 crore liter water is stored.

This place is situated in ahmedabad near kotarpur naroda. District:-ahmedabad, state:-Gujarat This plant is operational since 5th April 2000.Narmada river and Sabarmati river are the two resources of Raw Water for kotarpur Water treatment plant. There are 48nos. Of clear water tank at kotarpur Water treatment plant.900kg cylinder of chlorine is used for chlorination and 2 cylinders per day (24hrs) are used every day. There are 10 pumps at the plant. Each pumps is

having capacity of 4.1 million per hour. After post chlorination process water is distributed to ahmedabad from the pump station

Type of impurities in water

There is the two main types of the impurities present in the water floating type: removed screening process and second types is suspended solid: Removed chemical process. Both the impurities are dangerous for the human body and many other disadvantages.

Methods of water treatment plant

First is screen method Screens are provided in front of the pump to collect the large size of particles such as debris, trees, animals after that water goes to sedimentation to remove suspended particles third process is water goes to sedimentation with co-agulation to remove very fine suspended clay particles and colloidal matters fourth method is aeration to remove taste and odours caused by gas to organic decomposition in fifth method the process of passing the water through beds of sand or other granular materials, is known as filtration after that the method is disinfection to killing the pathogenic bacteria from the water and making it safe

Working process of water treatment plant

In the beginning of process, raw water from different suppliers is collected in intake tank. There were total of three units for treatment of water, so this stored water is divided into three units using pipes, each contain 225 MLD. The first stage of is screening, here the water is allowed to pass through a big fine mesh (cross wire gauge) having tiny pores. Because of this, the impurities which are bigger in size than pores get removed.

Once the screening is done, chemical processes are implied on water. Raw water has an NTU (Nephelometric turbidity unit) value. According to WHO, water should have up to 5.0 NTU.

In summer, raw water has 5 NTU, but in winter or monsoon, it has about 10 NTU. So in order to maintain this value, chemical dosing is used. In this process, aluminum sulphate alum is dozed on water. Because of this color of water changes somewhat. Alum is sprayed on water so that it gets mixed. The ratio of alum is 1:10. After 2 to 2.5 hour, the water gets discolored. More than 90% impurities are removed till now. Water passes through flocculation process. Here alum and water is mixed well using flocculates. Because of this, many impurities collide and forms bundle which can easily be removed. All these impurities were being dumped into a 4 by 4 foot pit.

Then comes the sedimentation process, here the water is settled for sometimes, as a result, some impurities get settled down at the edge of tank. After this, the impurities settled at bottom are taken to the center for dumping with a use of Traction Bridge. It has scrapers at

the bottom at some angle and revolves at speed of 1rev/45 min. It rotates 2" above the surface. Then filtration takes place, where any other invisible impurities left in water is removed. Types of filter used: 1) decline rate type & 2) gravity sand filter. Filter media contains fine coarse silica sand. It has 350 mm of gravels and 750 mm of fine silica sand. Impurities get settled in media used for filtration

To identify result and conclusion

Now or day population growth is more that why fresh water requirement is more. Ahmedabad city is the metro city and population growth is more. For the using paper consists solution of present scenario of water treatment in Ahmadabad. We design plant capacity of 1150mld for Future growth of population and requirement of fresh water up to 2031.

In conclusion of this project we can say that with automation of plant and design up to 2031 more easily and efficiently. With use of such solutions Ahmadabad can accommodate present growth as well as for future expansion

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