

Dhirubhai Ambani Institute Of Information And Communication Technology (DA-IICT)



SEWAGE TREATMENT PLANT OF DA-IICT (STP)

Submitted By:

Shah Sneha

Agarwal Ashish

Choubisa Himanshu

Gupta Apurv

Acknowledgement

We would like to express profound gratitude to our guide Prof. Shweta Rao Garg for his invaluable support, encouragement, supervision and useful suggestions throughout this project work. Her moral support and continuous guidance enabled us to complete the work successfully.

We are grateful for the cooperation and constant encouragement from the honorable Sir Rajesh Patel. His suggestions and the ideas made our work easy and proficient.

We wish to express our appreciation to Prof. Ranendu Ghosh who helped us to overcome from our doubt in doing this report.

Last but not the least, We are thankful and indebted to all those who helped us directly or indirectly in completion of this project report.

Shah Sneha
Agarwal Ashish
Choubisa Himanshu
Gupta Apurv

Index

Sr. No.	Topics	Page No
1.	Introduction.....	4
2.	Requirement of STP in DA-IICT.....	5
3.	Literature Survey of India	7
4.	Analysis Techniques..... 3.1 Diagram 3.2 Levels of STP 3.3 Design Consideration	9
4.	Advantages of STP in DA-IICT.....	15
5.	Conclusion.....	18
6.	Bibliography.....	19

Introduction

The DA-IICT was established in Gandhinagar in 2001. The architecture of DA-IICT is functional, but what surrounds it is a fascinating garden. The entire design was oriented to "Preserving the Environment".

To reuse the waste water, the STP Plant at DA-IICT was established in 2005. After recycling the waste water, the filter water is used in garden and fountain.

Pollution in the Gandhinagar in the broadest sense includes all changes that curtail natural utility and exert deleterious effect on life of people at DA-IICT. The crisis triggered by the rapidly growing population with the resultant degradation of the environment causes a grave threat to the quality of life.

Degradation of water quality is the unfavorable alteration of the physical, chemical and biological properties of water that prevents domestic, commercial, industrial, agricultural, recreational and other beneficial uses of water. Sewage and sewage effluents are the major sources of water pollution. Sewage is mainly composed of human fecal material, domestic wastes including wash-water and industrial wastes.

The growing environmental pollution in Gandhinagar needs for decontaminating waste water result in the study of characterization of waste water, especially domestic sewage. In the past, domestic waste water treatment was mainly confined to organic carbon removal. Recently, increasing pollution in the waste water leads to developing and implementing new treatment techniques to control waste water and other priority pollutants at DA-IICT that is Sewage Treatment Plant.

Requirement of Sewage Treatment Plant at DAIICT

Sewage Treatment Plant

Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage. It includes physical, chemical, and biological processes to remove these contaminants and produce environmentally safe treated wastewater (or treated effluent).

The term "Sewage Treatment Plant" (or "sewage treatment works" in some countries) is nowadays often replaced with the term "wastewater treatment plant"

Sewage Treatment Plants (STPs) are proposed to DA-IICT :-

- 1) To make for recycling and reuse for gardens and fountain uses and for planting purpose and also to minimize the environmental and health impacts of the sewage.
- 2) Treating wastewater has the aim to produce an effluent that will do as little harm as possible when discharged to the surrounding environment, thereby preventing pollution compared to releasing untreated wastewater into the environment

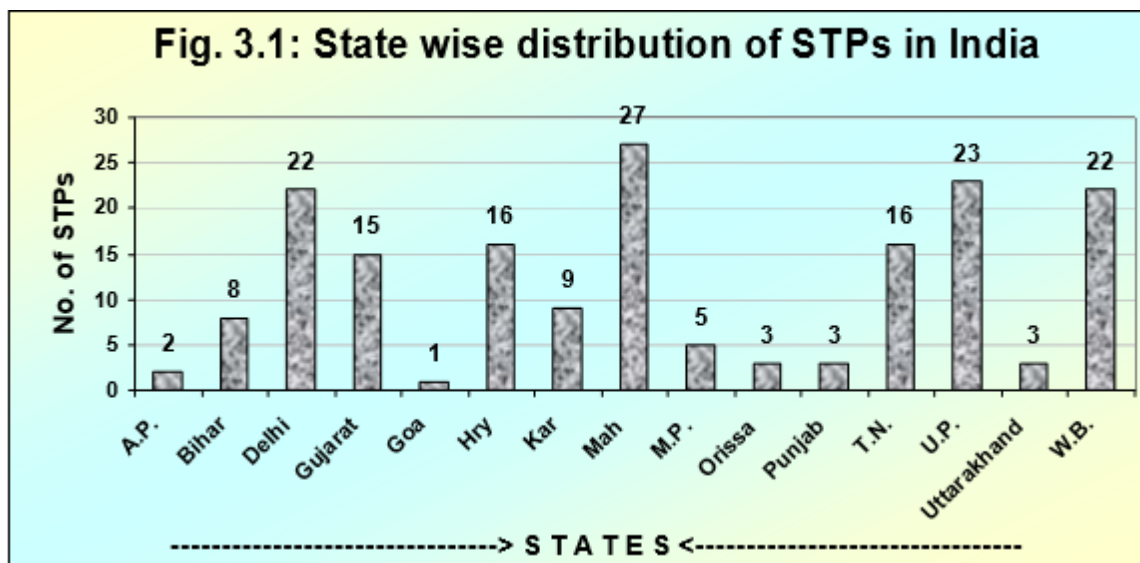


(Image From-Google Earth)

At DA-IICT, the Sewage Treatment Plant was installed in 2003

Literature Survey of India

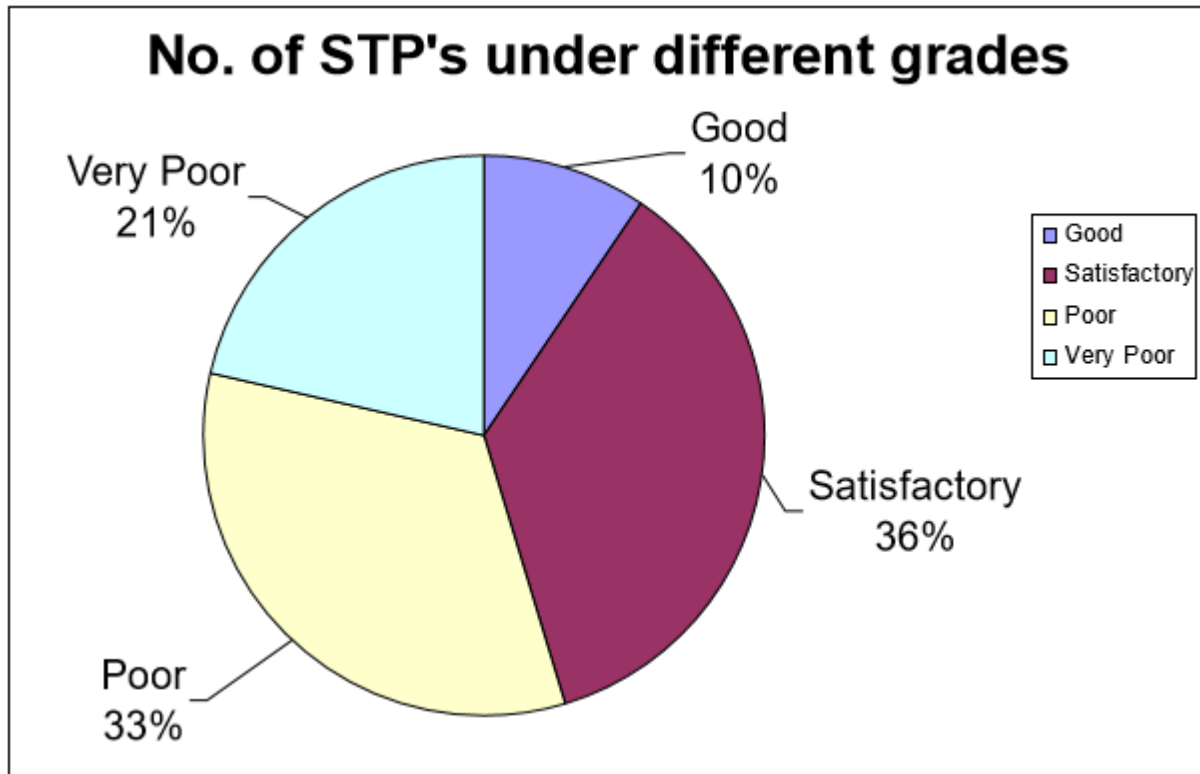
The study brought out large number of technological & managerial problems in operation of these STPs. Out of 175 total identified STPs spread over 15 States , the present report has included only 84 STPs of 13 different technologies spread over 9 States of India . Information in the prescribed format has been received for 79 STPs from different agencies . The overall performance of 45 STPs has been found poor or very poor. Out of 84, performance of only 8 STPs has been rated good, while that of 30 of these have been rated satisfactory . Capacity utilization in general was inadequate. Sludge handling appears to be most neglected area in STPs operation. Alternate power supply facility is not available in most of the cases. Utilization of biogas generated from UASB reactors or sludge digesters is also not adequate in most of the cases. In this Chapter, an attempt has been made to bring out the facts on technological and managerial problems in operation of the STPs in India



[Images taken from the central pollution control board]

Sewage Treatment Plant

Performance rating of STPs visited in India



[Images taken from the central pollution control board]

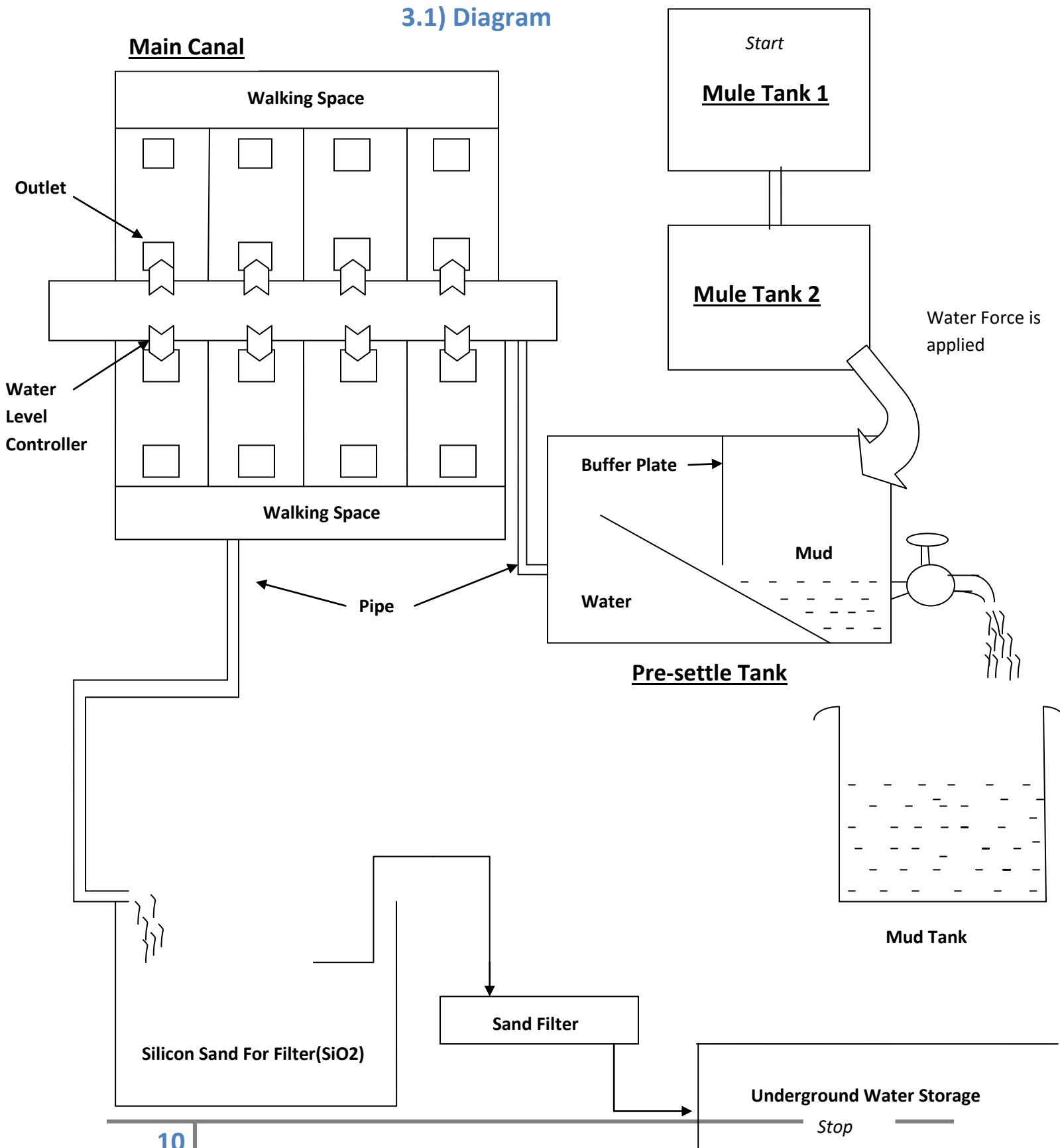
Total scenario of STPs performance is dismal, as overall performance of 46 STPs has been found Poor or Very Poor. Performance of only 8 STPs has been rated Good while that of 30 other has been rated Satisfactory.

Analysis Techniques

(Methodology)

Sewage Treatment Plant

3.1) Diagram



3.2 Sewage treatment at DA-IICT generally involves three stages :-

- 1) Primary Treatment
- 2) Secondary Treatment
- 3) Tertiary Treatment.

1) Primary treatment

It consists of temporarily holding the sewage in a mule tank where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment. Some sewage treatment plants that are connected to a combined sewer system have a bypass arrangement after the primary treatment unit. This means that during very heavy rainfall events, the secondary and tertiary treatment systems can be bypassed to protect them from hydraulic overloading , and the mixture of sewage and storm water only receives primary treatment.



This is the Mule tank of DA-IICT where the water which have to be recycle is store over here. It is primary stage of the sewage treatment plant.

Mule Tank of DA-IICT

2) Secondary treatment

It removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.



Pre-settle Tank in DA-IICT



Filtering at DA-IICT

Pre-settle Tank – In DA-IICT, the task for this tank is to clean the water and take out the sludge from the water and move to further process of cleaning it.

Filtering – This is also at the secondary treatment where the water is again filtered which is come from the Pre-settle tank.

3) Tertiary treatment

It is sometimes defined as anything more than primary and secondary treatment in order to allow rejection into a highly sensitive or fragile ecosystem. Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a river, or it can be used for the irrigation of a garden. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes.



Silicon sand filter at DA-IICT

Silicon Sand Filter (SiO_2)- It is the tertiary treatment in DA-IICT where the last process of recycling process is made. In this stage, the chemical named silicon sand is used to clean the water for the final time and to make that to use again.

3.3) Design considerations of DA-IICT

Following points are considered during the design of sewage treatment plant:

1. The design should not be done on the hourly sewage flow basis, but the average domestic flow basis.
2. Instead of providing one big unit for each treatment more than two numbers small units should provided, which will provide in operation as well as no stoppage during maintenance and repair of the plant.
3. Overflow weirs and the bypasses should be provided to cut the particular operation if desired.
4. Self cleaning velocity should develop at every place and stage.
5. The design of the treatment units should be economical; easy in maintenance should offer flexibility in operation.

Advantages of STP in DA-IICT

Saving of extra water

As the water is reuse again and again so due to that water saving is done. No requirement of extra water is made in the campus.

Recycling of water

Sewage treatment plant help in reuse the waste water which is the best method to save the water from being over use.

Ground water, surface water source is safe from pollution due to treatment of waste water

As the STP uses the groundwater again and again so due to that it is away from the other polluting sources like air pollution etc so it is easily filtered and can be reused.

Treated water is used for vegetation

As when the waste water is again reused so at that time the only purpose of that is to serve that water only for the vegetation purpose but not for the drinking purpose or daily use.

Cost of transportation of polluted water is saved

The STP helps in reusing the waste water so it saves the cost of the extra water with that it also decrease the transportation charges of that too.

Air pollution is limited to treatment plant

The process of the STP plant is done below the surface area so there is no direct contact made between the water and the air so it avoid the polluting the level of water as compared to vice versa.

Disadvantages of STP found in DA-IICT & Future improvements

Space

If there is exceeding of the area in the campus in future than there is another requirement of land which is a big thing and it increase the cost with that for the STP.

If the filtered water is stored for a long time than after a certain days the problems of bacteria, ammonia will start increasing.

As long as the recycled water is stored for a time , it start creating the bacteria ,ammonia as the recycled water cannot be hold for the long time.

Money is used for construction of waste water treatment

After establishing the STP plant is not that the work is complete, to maintain the STP plant with the regular maintainance is required which also need to invest money and it also increase the cost of the college.

Handling of dry sludge, cake

In the process of the STP, there a stage comes when it removes the sludge from the water so it is difficult to handle the sludge and to dispose it.

Food chain is missed for various organisms, life cycle river animals

As the water is been recycled again so at that time the food for the water organisms misses because the same water is recycled so the water organisms does not get food and because of that it cause death of the water organisms which is sometime necessary.

Conclusion

In the present study a scheme for the primary treatment and management of sewage generated in DA-IICT college has been developed. The total sewage generated in one day is 3.5ML. The treated water will be supplied for irrigating the gardens and trees which is at DA-IICT and the remaining sludge after treatment will be used as mud for other purposes. The use of treated water will reduce the ground water use and additionally the treated sludge will be very useful for increasing the fertility of soil. Important analysis of the STP have been designed for a specific case are:-

- 1) The design of primary sewage treatment is for the predicted population of 5,000 and estimated sewage of 3.5 MLD.
- 2) The capacity of the sewage treatment plant storage is it can serve over 4-5months continuously.
- 3) The Structure of the STP plant is made in such a way that it can cope up with additional 20% of the area then the current.
- 4) The construction of the primary sewage treatment plant will prevent the direct disposal of sewage in nearby river and the use of treated water will reduce the surface water and ground water contamination.

Bibliography

- 1) [1] https://en.wikipedia.org/wiki/Sewage_treatment
- 2) [2] <http://www.cpcb.nic.in> - CENTRAL POLLUTION CONTROL BOARD
- 3) Google Earth