IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Comparative Case Study of Sewage Treatment Plant

(Delawas Jaipur and Delhi STP)

[1]Dipanshu Dixit, [2]Manaswee Verma, [3]Paras, [4]Diksha Pathak, [5]Antima Agrawal, [6]Mr. Jatin Gupta

[7]Dr. Omprakash Netula, [8]Dr. V.K. Chandna

[12345]Bachelor of Technology, [6]Assistant Professor, [7]Professor & HOD (Department of Civil Engineering), [8]Professor & Principal, Jaipur Engineering College and Research Centre, Jaipur, India.

Abstract: The ever-increasing population has given a direction to the existing kind to follow up the idea of the sustainable development. Be that as it may, India treats just 20% of its sewage and rest fall straightforwardly into streams causing serious issues. The sewage treatment plant gives exact same opportunity to recycle the waste water and use it for future needs. This is a conventional kind of study. The main objective of the study was to monitor the physicochemical parameters in waste water.

This research paper deals with the comparative study of two STP (Sewage Treatment Plant) located in Delawas, Jaipur and Delhi.

From this comparative study we conclude that Delawas STP comprises of two stage limits each of 62.5 MLD (million litre per day and treat water efficiently but still lacks in efficiency compared to Delhi STP. But the results suggest, as there is development in technology there is a considerable improvement in treated wastewater over the time.

***Keywords*: Sewage Treatment Plant, Wastewater, Water Quality, Pollution, Monitoring, Delawas, Delhi**

I. INTRODUCTION

Across the globe water shortage is a concerned issue. According to survey 2 out of 10 people don't have access to drinking water. Meanwhile the sewage treatment plant is a kind of redemption to meet the gap of available water and consumed one. Discharge of wastewater directly in waterbodies is a general practice in India. Water released by industries and household practices after use for various purposes is termed as sewage. Generally, sewage through such origins have 99% water and 1% sediments and colloidal material.

Sewage treatment is a process of removing harmful contaminants from the water and making it available for the future need. This contaminant mainly consists of the house hold sewage and industrial sewage. The treatment is done in three process namely primary process, secondary process and tertiary process. The efficiency of STP and go up to 85%-90% in best cases and particularly speaking of Delawas efficiency range is between 75%-80%.

This research paper deals with the comparative study of Delhi STP and Delawas STP. According to the survey Jaipur receive basic (pH >7) kind of sewage to be treated than Delhi. The pH range of the inlet at the Jaipur has an average value of 7.36, whereas Delhi has pH of about 6.37. Considering other parameters of the Jaipur STP namely TDS (Total Dissolved Solids), TSS (Total Suspended Solids), BOD (Biological Oxygen Demand) and COD (Chemical Oxygen Demand) have efficiency in range of 50%, 57.7%, 37.25% and 60.48% respectively. It is very clear that the after treating 62.5 MLD of sewage water, results are considerable but not very promising. On the other hand, percentage results of Delhi STP are 85.3%, 98.47%, 97.85%, 95.75%. The results of the Delhi STP are very relying as because the advancement of the technology is very welcome over there. This research paper is statically comparing the two STP following the same methodology yet producing so different results. Obviously, Jaipur STP require much accuracy because in this growing world we should focus on sustainable development and follow every possible path to follow the ideology of reuse and recycle.

The salient features of STP are given below in table

Table 1: Details of Delawas STP

S. No.	Particulars	Details
1	Capacity: Present I Phase	62.50 MLD
2	Work cost	Total Rs. 1157.00 lacs in year 2004-05. O and M cost for 5 years is Rs.180 lacs for 5 years O and M
3	Total land area	Total 28 Hectare, STP constructed in 7.50 Hectare. Remaining area for future expansion
4	Process	Activated Sludge Process with anaerobic Digester and centrifuge unit (no sludge drying beds)
5	Size of main sewer at STP	1800 mm
6	Design flow on main sewer	Total 125 MLD

Table 2: Details of Delhi STP

S. No.	Name of STP	Capacity (MLD)	Actual Treatment in MLD
1	Okhla	140	119
2	Keshopur	72	68.6
3	Coronation Pillar, Timarpur	46	26.0
4	Rithala	80	42.0
5	Vasant Kunj	5	4.10
6	Pappankalan	20	8.2
7	Najafgarh	5	0.2
	Total	368	268.1

The pH values show slightly increase at all locations except Najafgarh and Coronation Pillar after treatment.

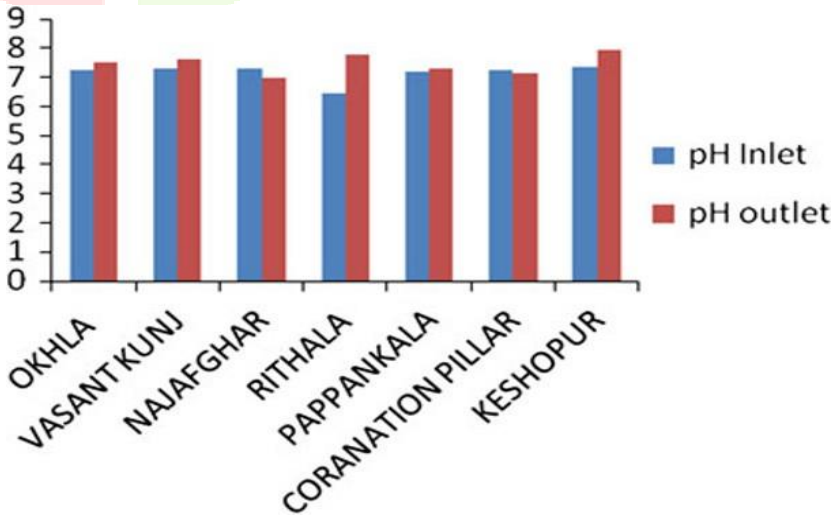
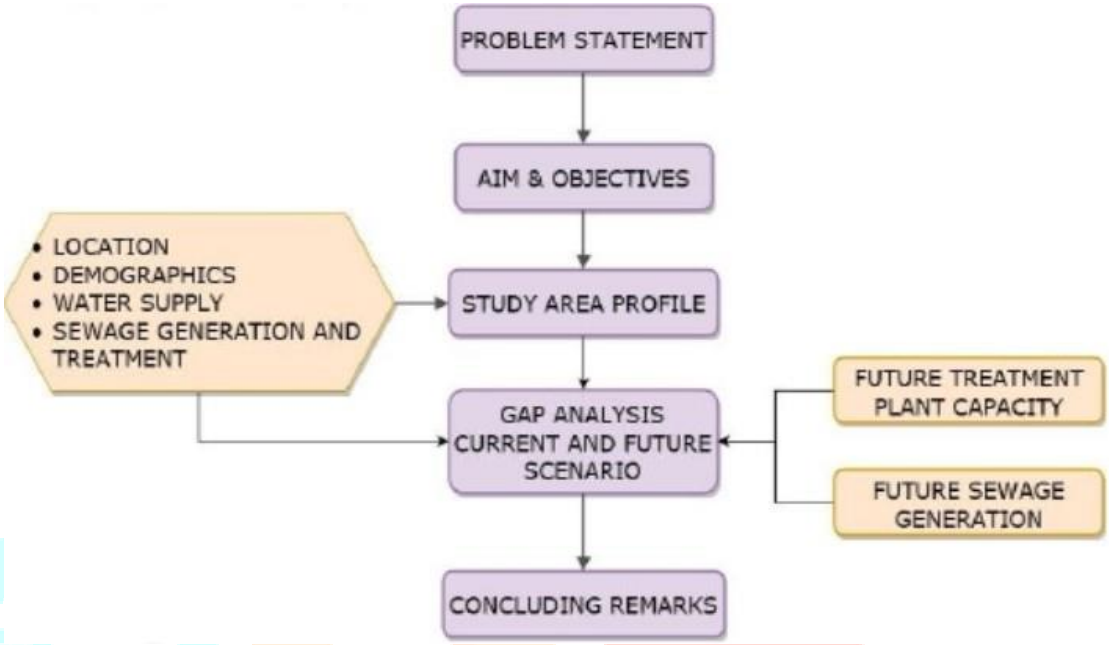


Fig. 1: The pH inlet and outlet values.

II. RESEARCH METHODOLOGY

Study was started with identification of general infrastructure problems in Jaipur and Delhi. Turns out that the treatment of waste water generation is major problem in both the cities. After identification of the problem, the aim, objectives and the methodology were framed. Firstly, the study is carried out for geographical conditions and existing sewage conditions of cities. Primary and secondary data is collected from several sources.



1. Inlet is the place where all the sewage of the city is collected for the further treatment of turning this waste water in a usable form.
2. Initially the water is sent for coarse screening to separate out the waste of big size example plastic bags, cans, bottles etc.
3. Collecting Channel is the place where water is stored after the screening so that the stable water can be pumped up.
4. In Pumping the water is pumped up with the help of pipes of various diameter varying from 32mm to 75mm.
5. Fine Screening is the step which involves the removal of fine impurities from the sludge. This step is important because removing the fine impurities like jute bags, scrap of plastic, hairs, threads etc. will reduce the cost of treatment.
6. The sewage water from screen chamber flows to grit chamber, where coarse particles of sand, ash and clinkers, egg shells, bone clips and inert materials are removed by method of Grit Separation.
7. The sewage water from grit chamber flows to primary clarifier where sedimentation of settleable solids takes place. Primary clarifier also reduces the organics load on secondary treatment units.
8. The sewage water from primary clarifier flows to aeration tank, where the sewage containing waste organic matter is aerated and micro-organisms metabolize the soluble and suspended organic matter.
9. The waste water from aeration tank flows to secondary settling tank, where separation of biological sludge takes place. The efficient separation of the biological sludge is necessary for ensuring final effluent quality and also for return of adequate sludge to maintain the MLSS level in the aeration tank.
10. The Primary sludge Digestion is the step in which anaerobic sludge digestion takes place.

III. CONCLUSION

The idea of STP is very promising step that each city should plant. It gives us the liberty to reuse the sewage water. By using the STP, water is available for variety of uses like it can be discharged easily to any water bodies, can be used for irrigation and cultivation purpose and what not. STP also develop biogas which is used to make different form of energy available for government, specifically mentioning, Jaipur STP produces electricity of 12-19 kWh. Moreover, production of methane also contributes to the unavoidable advantage of STP. The idea of waste to vitality is the prime concern that draws the attention. In Jaipur STP the water is discharged to the canal which is running all over the city and finally ends up in a water body. Further this water is used for irrigation purpose. The sludge generated from the secondary treatment process is used as manure besides this, the production of biogas is enough for running the plant and also available for the government uses. Jaipur STP lacks the tertiary treatment process which makes it suppressing in terms of efficiency than Delhi STP. But still Jaipur STP is a very effectively treating sewage of Jaipur.

Table 3: Comparative Study

S No.	Parameter	Unit	DELHI "STP"		Jaipur "STP"		Calculated Parameters	
			Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
1	pH	-	6.37	7.5	7.36	7.59	7.30	7.62
2	TS	Mg/l					1000	600
3	TDS	Mg/l	1340		1000	<500	800	400
4	TSS	Mg/l	656	10	390	165	400	200
5	TVS	Mg/l					200	200
6	DO	Mg/l					6	4
7	BOD_5	Mg/l	280	6	204	128	240	120
8	COD	Mg/l	660	28	496	196		

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