STUDY ON QUALITY ANALYSIS OF SEWAGE WATER FOR SOUTHERN ZONE OF DAVANAGERE CITY

Nowsheen GS[1], Dr.D.P.Nagarajappa[2], Dr.P.Shiva Keshava Kumar[3]

[1]P.G. Student, Department of Civil Engineering, University of B.D.T. College of Engineering, Davanagere-577004, Karnataka, India

[2]Professor and Chairman, Department of Civil Engineering, University of B.D.T. College of Engineering, Davanagere-577004, Karnataka, India

[3]Professor and Head, Department of Civil Engineering, Proudadevaraya Institute of Technology, Hosapete-583225, Karnataka, India

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Abstract - *The objective of sewage treatment is to produce a disposable effluent without causing harm to the surrounding environment, and also prevent pollution. Industries produce large volumes of wastes that may include a wide variety of chemicals containing most toxic pollutants. Some of the industrial wastes can be treated jointly in municipal wastewater treatment plants, but others must be pretreated at the source. The present paper presents the analysis of the wastewater by finding out the values of various target parameters i.e. DO, conductvity, hardness, chloride, COD and BOD so that wastewater characteristics of the area can be found out with the purpose of modifying the existing treatment scheme for the wastewater treatment being presently used. Waste water, is any water that has been adversely affected in quality by anthropogenic influence. Sewage is a water-carried waste, in solution or suspension that is intended to be removed from a community. In reality about 90% of waste water produced globally remains untreated causing wide spread water pollution, especially in developing countries. The study of some physico-chemical parameters of this untreated sewage disposal of the region reveals that amounts of some of the pollutants are present much above the prescribed limits. The present study shows that the treatment of untreated sewage disposal is necessary otherwise the entry of this polluted water in ground water shall be highly harmful to the flora and fauna of the region.*

Key Words: **Wastewater, BOD, DO, COD, Wastewater Characteristics.**

1.0 INTRODUCTION

Sewage is always contaminated with urine and other waste products, which is from residential, hospitals, office and industries which produces large amount of the sewage waste water, sometimes it also includes the waste water which is released from the domestic and also as well as Municipal including the most from industrial which is delivered from pipe or else it will be Sewer. Considering the domestic sewage it will be considered some of the waste products like impurities pathogens and other organic substance which is dissolved in nature. It is also well known that this sewage water also contain some of the harmful pathogens which will be harmful for the public health, and also the creating of the quality of the water is difficult. It is very important in order to conserve the water for the future. So this project concentrate on the new approach which will attend and profitable and also quality of water resources development methodologies.

We all know that the 70% of the water in the earth is as a natural resources which is having the abundant nature of Oxygen and also as well as hydrogen it is a very important criteria for the earth for all living beings to develope to grow rather than humans. Today humans are polluting all kind of water resources rivers and also as well as lakes including ponds and also considering the Reserve areas along with oceans. Human activities our drinking water has been contaminated and it has been achieved and unmanageable conditions. So we must understand the proper need of the water and have to outcome the solution in order to remove the toxic substance which is delivered by the humans to the water resources. Search methodologies like we have to remove that kind of By- products which is harmful for the all organisms including humans. It not only affects the upper resources water but also affect the groundwater as well.

Let's consider some of the micro in-industries for example like laundries and also as well as Hotel including some of the hospitals, also considered the Macro industries which are like taking the example of household activities and other domestic activities as well which becomes one of the selected zone for the wastewater to be released from These areas, the collected wastewater is considered as sewage which is deliver to the sewage sewer systems, later on this water as to be treated, but especially such conditions of negligence happens in order to treat the water well treated and make them usable for drinking and other resources purpose for that we are going to consider some of the important factor which is covered by the humans contaminating this water resources. Considering the Sewage water network the capacity is very less and becomes ineffective.

Considering these communities also produces some of the solid waste and also considering the waste which is in the form of the liquid as well. After the use of these liquid waste water it has been have to water treatment for the other

purposes as well. The phenomenone of the waste water which is released from the other households and organisations some of the important water resources like groundwater and also considering the surface water along with the strong water which is also present and must be considered as an untreated wastewater. Which consider to be having a large amount of organic materials, and also considered to be having some of the gases with the large quantities known as malodorous. This and treated wastewater also considered to be having some of the harmful pathogens which is a kind of microorganism which cause diseases in all kind of living beings, so it is important to consider the water treatment to be at the second level to have a quality output and to remove all kind of harmful pathogens or other kind of organisms. (Shivam mani tripathi et al., 2016).

1.1 Wastewater and Sources

Wastewater is of household activities and other domestic activities as well which becomes one of the selected zone for the wastewater to be released from these areas, the collected wastewater is considered as sewage which is deliver to the sewage sewer systems, later on this water as to be treated, but especially such conditions of negligence happens in order to treat the water well treated and make them usable for drinking and other resources purpose for that we are going to consider some of the important factor which is covered by the humans contaminating this water resources. Considering the Sewage water network the capacity is very less and becomes ineffective.

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1.2 Objectives

- To study the quality of wastewater in the southern part of Davanagere city.
- To determine the physico-chemical characteristics of the wastewater in the southern part of davanagere city.

1.3 STUDY AREA DESCRIPTION

The city Davanagere is the district head quarter, It is located in middle part of Karnataka state, covers an area of about 15645 sq.km. For this work samples from

different wards of south zone of davanagere city sewage have been selected. In this project samples were collected from ward-1 to ward-24 for the analysis of physico-chemical characteristics of wastewater. Here water is used for bathing, drinking, and irrigation etc.
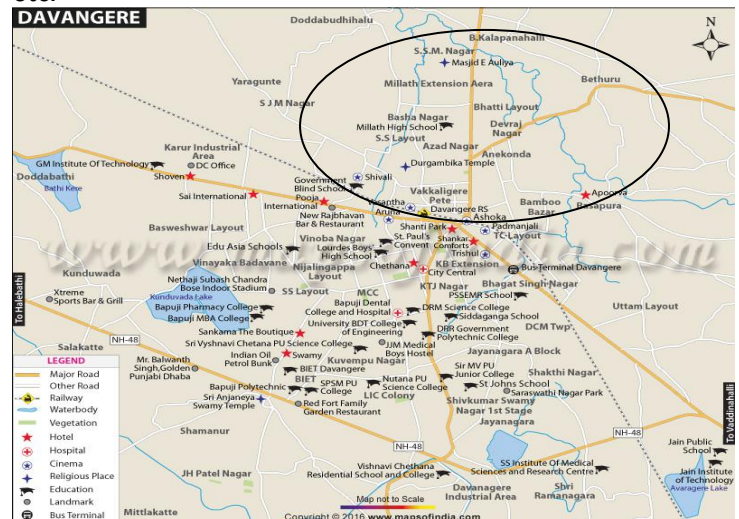

FIGURE:1 Comprehensive plan of sewerage system in Davanagere city.

KEYFEATURES:
- Name of the Place: Davanagere northern region
- Global location : 14.478324,75.908582
- Water Supply Rate : 135lpcd
- Sewage generation rate : 85% of water supply rate
- System of sewerage : Combined type
- Average annual Rain fall data : 610mm

2.0 MATERIALS AND METHODOLOGY

Wastewater: The present study is undertaken to analyse the physico-chemical parameters of wastewater sample from different wards of south zone of davanagere city. The domestic wastewater samples will be collected from manhole from different wards of south zone of davanagere city according to the procedure. Domestic wastewater is collected 40-45cm below the surface to avoid the collection surface impurities. The sampes are planned to collect in 2 litres Polyethene bottles.

The methodology involved in the analysis of the samples includes:

1. Collection of sewage samples from the manhole.

2. Analysis of sewage parameters in Laboratory are as follows

   - Chlorine content.

   - Total hardness.

- Conductivity.
- Dissolve oxygen.
- Biological oxygen demand.
- Chemical oxygen demand.

3.0 RESULTS AND DISCUSSIONS

The samples of the wastewater from south zone of Davanagere city were collected and tested in the laboratory. It is characterized by a number of tests to ascertain the quality of the sewage. The results of these studies provide an indication of water quality degradation. They compared the various physico-chemical parameters studied with the standards.

Table -1: Physico-chemical parameters of ward 1,2,3,&4.

No	Parameter	Ward 1	Ward 2	Ward 3	Ward 4
1	DO(ppm)	0.013	0.012	0.000	0.014
2	COD(ppm)	784	840	680	754
3	BOD(ppm)	312	370	340	365
4	Chlorine Content(ppm)	381	320	342	371
5	TotalHardness (ppm)	112	132	114	120
6	Conductivity (mho)	$1.30*10^{-3}$	$0.60*10^{-3}$	$0.85*10^{-3}$	$1.40*10^{-3}$

Table -2: Physico-chemical parameters of ward 5,6,7&8.

No	Parameter	Ward 5	Ward 6	Ward 7	Ward 8
1	DO(ppm)	0.000	0.013	0.017	0.011
2	COD(ppm)	792	852	582	476
3	BOD(ppm)	390	363	318	389
4	Chlorine Content(ppm)	363	389	362	340
5	TotalHardness (ppm)	109	134	120	148
6	Conductivity (mho)	$0.95*10^{-3}$	$1.10*10^{-3}$	$0.85*10^{-3}$	$1.20*10^{-3}$

Table -3: Physico-chemical parameters of ward 9,10,11&12.

No	Parameter	Ward 9	Ward 10	Ward 11	Ward 12
1	DO(ppm)	0.014	0.013	0.012	0.000
2	COD(ppm)	827	596	875	704
3	BOD(ppm)	348	470	358	350
4	Chlorine Content(ppm)	412	375	325	381
5	TotalHardness (ppm)	110	13	142	126
6	Conductivity(mho)	$0.90*10^{-3}$	$1.85*10^{-3}$	$1.50*10^{-3}$	$1.70*10^{-3}$

Table -4: Physico-chemical parameters of ward 13,14,15,&16.

No	Parameter	Ward 13	Ward 14	Ward 15	Ward 16
1	DO(ppm)	0.000	0.011	0.012	0.000
2	COD(ppm)	808	758	728	756
3	BOD(ppm)	390	320	367	380
4	Chlorine Content(ppm)	340	310	398	353
5	TotalHardness (ppm)	114	140	112	112
6	Conductivity (mho)	$1.30*10^{-3}$	$1.55*10^{-3}$	$1.20*10^{-3}$	$1.83*10^{-3}$

Table -5: Physico-chemical parameters of ward 17,18,19,&20.

No	Parameter	Ward 17	Ward 18	Ward 19	Ward 20
1	DO(ppm)	0.013	0.012	0.011	0.011
2	COD(ppm)	698	382	860	754
3	BOD(ppm)	365	324	386	338
4	Chlorine Content(ppm)	392	388	360	365
5	TotalHardness (ppm)	130	123	108	134
6	Conductivity (mho)	$0.50*10^{-3}$	$1.70*10^{-3}$	$1.50*10^{-3}$	$0.85*10^{-3}$

Table -6: Physico-chemical parameters of ward 21,22,23,&24.

No	Parameter	Ward 21	Ward 22	Ward 23	Ward 24
1	DO(ppm)	0.013	0.014	0.011	0.011
2	COD(ppm)	662	698	820	754
3	BOD(ppm)	349	364	356	308
4	Chlorine Content(ppm)	378	364	360	355
5	TotalHardness (ppm)	128	107	102	124
6	Conductivity (mho)	$0.90*10^{-3}$	$1.30*10^{-3}$	$1.15*10^{-3}$	$1.45*10^{-3}$

For different samples ranging from $0.50x10^{-3}$ to $1.85x10^{-3}$ mho, the conductivity values are found to be quite high indicating the presence of larger quantities of salts in the sewage water.

BOD values range from 308 ppm to 470 ppm above the BOD value of treated waste (< 20 ppm) and much higher than that of normal river water (2- 8 ppm). The sample COD values are in keeping with the BOD values.

The quantity of dissolved oxygen varies little and ranges from 0.000 ppm to 0.017 ppm, but it is much lower than the standard values varying from 14.5 ppm at 0^oC to about 7.5 ppm at 30^oC (under one atmosphere pressure) in distilled or fresh waters with low solids.

The Total hardness parameter does not indicate much about the degree of contamination of sewage water samples. This parameter's values (102.00 ppm to 148.00ppm) are equivalent to those of relatively hard waters (75ppm to150ppm).

Sewage water samples have chloride content varying from 310.00 ppm to 412.00 ppm. The chlorides are commonly present in all natural waters as $NaCl$, $MgCl_2$, and $CaCl_2$. They enter water by solvent action of water on salts found in soil or from polluting materials such as sewage containing the salt used in households and agricultural waste containing chloride used in manufacturing. When present at concentrations above 250 ppm, chlorides give water an unacceptable taste although no adverse effects have been observed on humans who regularly consume water with much higher chloride concentrations. Exceptionally high concentration of chloride in water samples, however, as in the present case, can be considered as an indication of domestic wastewater contamination.

Waste water treatment plants (WWTP) are intended to make the consider treatment of the plant for the wastewater with the proper Municipal sewage must be compatible with all kind of environmental considered to be having certain kind of disposal surface and also as well as considering the sometimes it will be land in order to minimise the search unwanted impact on health from the sewage. Nevertheless, there are no wastewater treatment plants in most Indian towns and cities used to handle sewage disposal and kitchen waste.

The untreated waste is applied directly to the water bodies such as rivers, lakes, wetlands, reservoirs etc. Which pollutes the region's fresh water and makes it unfit for usage. The above studies show the degree to which freshwater production deteriorates. Of most physico-chemical parameters, the calculated values are much higher than the standard values. Thus treatment of untreated waste is possible by the use of wastewater treatment plant. The waste water treatment plants complement the water bodies' natural purification power / capacity and help maintain their utilities. Researchers have shown earlier in several articles related to sewage water contamination and its treatment that its intensity is decreased by treating waste / sewage water and it is safe to be disposed of satisfactorily.

It is concluded that the load on sewage systems has increased a lot due to the rapid and uncontrolled urbanization of Indian towns. The direct addition of untreated waste to water bodies in these towns is creating an alarming situation for the surface and underground water quality. Therefore the establishment of one or more treatment plants is necessary depending on the total population of a city.

4.0 CONCLUSIONS

- The standard of waste water has been increased with pollution concentration due to the consequent transition and urbanization.
- It has been found that physico-chemical concentration was not so good in wastewater.
- Water quality and quantity are directly or indirectly affected by water bodies degradation.
- Increasing pollutant accumulation poses many problems for people and the environment around the water bodies due to unmanaged and unregulated waste disposal into the water bodies.
- The highest value of BOD was recorded as 470mg/l at Jalinagar Ward No.10.
- The lowest value of BOD was recorded as 308mg/l at Aruna Theater Ward No.24.
- The highest value of COD was recorded as 875mg/l at Azad nagar Ward No.11.
- The lowest value of COD was recorded as 382mg/l at Vasanth takis Ward No.18.
- Strong odour, flora and fauna variability, atmospheric variability etc. Can be caused by pollution.
- The direct disposal waste water in to the water bodies leads to death of aquatic organisms like fishes etc due to sudden decrease of DO in water bodies due to the decomposition of the organic matter present in wastewater.
- From the above it is concluded that the waste water is not fit for industrial, domestic and irrigation purpose, without proper treatment.

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