

# Assessment of BOD Concentration of Neera River Water, Pune: A Case Study

S. D. Jadhav<sup>1</sup> M. S. Jadhav<sup>2</sup>

<sup>1</sup>Department of Basic Sciences & Humanities <sup>2</sup>Department of Civil Engineering

<sup>1</sup>Bharati Vidyapeeth (Deemed to be) University, College of Engineering, Pune 411043, India

<sup>2</sup>Sinhgad Technical Education Society's Sou. Venutai Chavan Polytechnic, Pune, India

**Abstract**— To assess the trends of biochemical oxygen demand (BOD) of Neera river water, the samples were collected from various sampling stations in the year 2017 & 2018. Standard research technique was used to examine the quality of water samples and its suitability for drinking purpose. Results of this study showed that, at the end of winter and at initial stage of summer the concentration of BOD is higher. These results are above the permissible limit given by WHO and BIS. As per the guidelines given by WHO and BIS, at some of the sampling stations river water is not suitable for aquatic life and human activities. It may be due to agricultural pollution and mixing of domestic waste along with industrial effluents in to the water body.

**Key words:** Neera River Water, Pollutants, Agricultural Pollution, Biological Oxygen Demand (BOD)

## I. INTRODUCTION

A resource like water has many uses like domestic, commercial, industrial and so many. Water is the most useful compound in the world; hence, it is called Jeevan in Sanskrit. The contamination and pollution of water is of great concern in the world for the developing countries like India. Due to rapid industrialization, urbanization and excessive use of fertilizers in agriculture, the quality of water getting affected day by day. In many parts of the world a demand for fresh water has increased. Due to contaminated water the aquatic life is also in trouble. The question of water pollution has acquired a critical stage.

The quality of ground water is getting severely affected because of polluted surface water. Besides, excessive use of fertilizers, pesticides in agricultural area & discharge of untreated waste water through bore wells and solid waste disposals increase the level of ground water pollution. Ground water is the major source of drinking water in both rural and urban area of our country. Once ground water is contaminated, its quality cannot be restored by stopping the pollutants from the sources. Therefore, it is essential to monitor the quality of water at regular interval. Hence, the present study was aimed to analyze the levels of BOD of Neera River near Sarola bridge.

BOD is a measure of the amount of oxygen required for the biological oxidation of the organic matter under aerobic conditions at 20°C and for period of 5 days. Generally, BOD is directly related to the extent of pollution of waste water, sewage and industrial effluents.

Neera river originates from Sahyadri hills in Borhars. It flows through three tahsils viz. Borhars, Baramati and Indapur. It is a tributary of Bhima river. This river covers Pune and Solapur district of Maharashtra.

## II. METHODOLOGY

Study area and collection of water samples

Water samples were collected from seven different sampling stations from Neera river. These samples were collected as per the standard methods given by WHO. These samples were collected in two litre plastic bottles, which were earlier washed and rinsed with triple distilled water before the collection of water samples. After sample collection, they are preserved safely by taking suitable precautions to avoid any type of alterations.

Hammer (1977) had given an idea about the BOD test for polluted water and treated effluents.

Calculation of BOD = (Initial D.O – Final D.O) / ml of water taken in BOD bottles

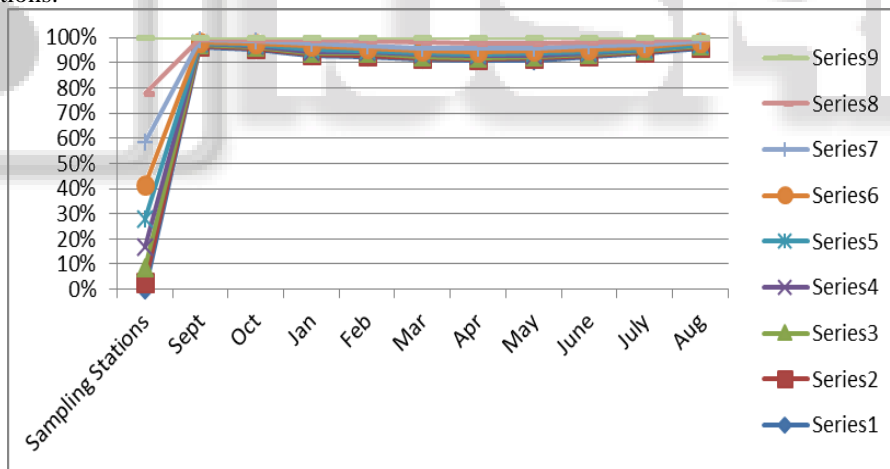




Sampling Stations	Sept 2017	Oct 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	June 2018	July 2018	Aug 2018
1	7.9	7.8	10.7	13.6	15.3	14.6	15.7	12.4	7.9	8.1
2	9.5	10.3	10.6	12.5	14.1	14.8	10.7	10.6	9.4	8.3
3	8.8	9.1	10.3	11.6	13.7	14.9	15.1	7.8	8.1	8.6
4	9.3	9.7	11.2	12.8	14.5	16.9	17.3	7.9	8.3	8.9
5	10.4	16.3	31.8	22.6	21.6	23.9	23.4	26.3	20.8	16.1
6	10.6	16.9	29.9	23.7	25.3	28.7	21.7	27.9	18.3	14.2
7	11.2	14.3	23.1	34.6	45.3	46.7	47.1	37.3	29.4	12.3
8	12.6	14.9	23.8	35.4	46.5	47.2	46.9	37.1	29.1	12.6

Observation Table 1: Biological Oxygen Demand (mg/L) of Neera River

Graphical Presentation of BOD concentration at various sampling stations:



Sampling Stations	Minimum	Maximum	Mean	Std. Error	Std. Deviation	WHO	BIS
1	7.8	15.4	11.4	0.973987	3.080016	6	30
2	8.3	14.8	11.08	0.626386	1.980808		
3	7.8	15.1	10.8	0.852174	2.69481		
4	8.3	17.3	11.68	1.054969	3.336106		
5	10.4	31.8	21.32	1.786885	5.650628		
6	10.6	29.9	22.66	1.963915	6.210443		
7	11.2	47.1	30.13	4.290525	13.56783		
8	12.6	47.2	30.61	4.245383	13.42508		

Table No.2: Descriptive Statics of BOD of Neera River water

### III. RESULTS AND DISCUSSION

The concentration of BOD level in the present study is shown in the observation table. It shows that, the BOD concentration is minimum i.e. 7.8 mg/L at sampling station No.1. The higher concentration of BOD which is 47.2 mg/L was recorded at sampling station No.8. This recorded concentration of BOD is more than the desirable limit i.e. 30 mg/L suggested by BIS. In this analysis it is observed that, at some sampling stations BOD concentration is higher in winter and summer. This variation may be due to variations in man made and natural conditions. This particular trend is observed because at some stations the pollution source is agricultural as well as human activities along with domestic sewage. Basically, when concentration of DO is at lower level then concentration of BOD increases and this situation is suitable for the degradation of organic matter. Similar trend of higher BOD was observed in summer at Bansagar lake water in M.P. by (Bramhanad Shukla 2007). Jinal Patel and Minakshi says positive correlation of BOD with turbidity, EC, TDS, TH and Cl,- While studying water quality of Par river at Valsad (Gujarat) in the year 2015. Chatterjee S.N. and Das D (2013) observed BOD level maximum in summer at Ganga river at West Bengal. Similarly, Rajiv P; Hansa Abdul Salam and et.al (2012) observed higher values of BOD in monsoon while studying river waters in western Tamil Nadu. Also the results are comparable with the observations of Agarwal and Rajwar (2010) in the Teri Dam water analysis.

### IV. CONCLUSION

By studying all the sampling stations, it is observed that from sampling stations 5 to 8 concentration of BOD is beyond the permissible limit given by WHO and BIS. It may be due to agricultural run-off as well as domestic sewage and addition of some sort of industrial effluents in to the river body.

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