

# Water Quality Analysis of Markandeya River

Deepa Bhavi<sup>1</sup>, Sanketh R<sup>1</sup>, Sarita Tahashildar<sup>1</sup>, Shashikant Modagi<sup>1</sup>, Prof. Rahul R Bannur<sup>2</sup>,

U.G. Student, Department of Civil Engineering, S G Balekundri Institute of Technology, Belagavi, Karnataka, India<sup>1</sup>

Assistant Professor, Department of Civil Engineering, S G Balekundri Institute of Technology, Belagavi, Karnataka, India<sup>2</sup>

**ABSTRACT:** Markandeya River originates in Bailur village of Khanapur taluk, enters Belagavi taluk on southern side and flows towards western side of the Belagavi city and is subsidiary stream of Ghataprabha river. In this project we are going to focus on the River Markandeya, its route of travel, its major and minor location of exposure, its utilization, and the various factors. We have Selected 4 regions to analyse the water quality through which the Markandeya river flows i.e., Shirur Dam, Basapur, Rakaskop dam and Surute. We are going to conduct detail analysis of River Markandeya on the basis of calculating its Temperature, pH, Electrical conductivity, Total dissolved solids, Total Hardness, Calcium Hardness, Magnesium Hardness, Chloride, Dissolved oxygen, Biochemical oxygen demand of 3 days.

By conducting the above mentioned test on River Markandeya River we have come to know the monthly variations in the water quality. The above parameters have been tested and it has been observed that all the parameters are within the permissible limits and can be used for drinking, irrigation and domestic purpose after the basic treatment.

**KEYWORDS:** Markandeya River, pH, EC, TDS, CI, TH, DO, BOD<sub>3</sub>.

## I. INTRODUCTION

Water is the most important natural resource not only of a state or a country, but of the entire humanity. In most of the developing countries surface water have been the most available sources of water used for various purposes such as drinking, irrigation, fishing and domestic purpose. The prosperity of a nation depends primarily upon the judicious exploitation of this resource. Thus, it can be stated that the primary wealth of a nation is water, which flows in rivers and streams. This itself establishes the importance of rivers, and no other explanation is required to stress their importance. River basin, as a domain for planning and management has been accepted the world over, as water does not recognize political boundaries. Among the most distinctive features of India are its rivers which hold high religious importance among its people. Markandeya River one of the tributaries of River Ghataprabha Markandeya River Originates in Bailur village of Khanapur taluk, enters Belagavi taluk on southern side and flows towards western side of the Belagavi city currently the river bed is filled with silt and bushes have grown along the banks.

## OBJECTIVES

- Analysis of several experimental parameters such as Temperature, pH, EC, TDS, Chloride, Total Hardness, Calcium Hardness, Magnesium Hardness, DO, BOD<sub>3</sub>.
- To identify the water quality for the drinking, agricultural and irrigation purpose.
- To monitor water quality of river or small water bodies regularly to protect biodiversity and ecosystems.
- To identify the variation in the water quality.

## STUDY AREA

The study area Markandeya River basin stretches geographically from 15 56' to 16 08' N0 0latitude and 74 37' to 74 58' E longitude, positioned in the midst of Belgaum district in the northern part of 2 Karnataka state. The study area is having a catchment area of 432 Km (43,200 ha).

Markandeya River one of the tributaries of River Ghataprabha, originates at Bailur village and flow at a length of 66 Km before it joins the Ghataprabha River near Gokak. Markandeya River forms the part of a semi-arid belt and agro-climatically it is a part of Belgaum district, a northern dry region of Karnataka state. Physio graphically, the area exhibits relatively flat with gentle slopes covering major portion of the area with moderately undulating central and hilly northern part. In the present study surface water sample from the Markandeya River has been analysed with reference to its suitability for drinking and agricultural purpose.

We have selected the 4 regions through which the Markandeya River flows such as Shirur Dam, Basapur, Rakaskop Dam, and Surute.

Our project is carried out in these 4 regions. For our project we have collect water samples from these 4 regions

## II.METHODOLOGY

For studying the quality of water, we have carried out grab sampling water samples were collected during 7.30 to 10.00am and this was maintained throughout the study period collected samples were brought to the laboratory for analysis following the procedures of standard methods water samples were collected for every 15 days respectively, covering the entire study area have been collected following the procedures suggested by Hem (1959) and IHD-WHO Working Group on Quality of Water (1978). The samples were collected in polythene bottles of 500 ml to determine their characteristics. In the present investigation, the parameters viz., Temperature, pH, EC, Chloride, TH, Calcium hardness, Magnesium hardness, TDS, DO and BOD<sub>3</sub> are estimated. Monthly variation in the parameters has been calculated. Experiments conducted for Analysis of the Water Samples were As per BIS: 10500-2012 limitations. Based on the results conclusion have been drawn. All the samples are analysed in Environmental Engineering laboratory accept pH, TDS and temperature because these were tested on the site itself and all the experimental procedure is as per Standard Method.

## III.EXPERIMENTAL RESULTS

### 1.Experimental Analysis of all Parameters of Shirur Dam

Month/Days	Temp	pH	TDS	EC	Cl	TH	Ca	Mg	DO	BOD <sub>3</sub>
15-Jan	26	8.5	195	190	17.18	106	25.2	80.7	7.2	2.6
30	26	8.52	196	170	17.37	107.5	26	81.5	7.1	2.8
15-Feb	26	8.62	197	116	8.93	48	17	31	8.8	2.1
28	27	8.25	199	225.17	17.12	53.5	34	19.5	8.5	2.1
15-Mar	27	8.9	98.75	223.38	14.64	60	28	32	6	1.4

Table-1

### 2.Experimental Analysis of all Parameters of Basapur

Month/Days	Temp	pH	TDS	EC	Cl	TH	Ca	Mg	DO	BOD <sub>3</sub>
15-Jan	27	7.6	383	150	34.62	159	69.2	90.2	7.6	0.42
30	27	7.7	385	140	36.48	161	69	92	7.8	0.4
15-Feb	28	7.7	374	120	26.8	105.4	64	41.4	9.6	1.1
28	28	7.6	342.7	387.3	25.81	101	77.5	23.5	8	0.6
15-Mar	29	7.8	181	394.5	29.04	119.4	71	48.4	6.7	0.1

Table-2



**3.Experimental Analysis of all Parameters of Rakaskop**

Month/Days	Temp	pH	TDS	EC	Cl	TH	Ca	Mg	DO	BOD <sub>3</sub>
15-Jan	24	8.2	64	72	8.39	51	6	45	6	1
30	24	8.4	65	72	8.43	52	6.6	45.4	6.2	1.3
15-Feb	25	7.7	67	70	8.19	39	7	32	7.1	1.6
28	25	7.5	69	75.2	7.94	42	6	36	5.3	1.4
15-Mar	26	7.9	60	73	7.85	46	6.4	39.6	5.8	1.1

**Table-3**

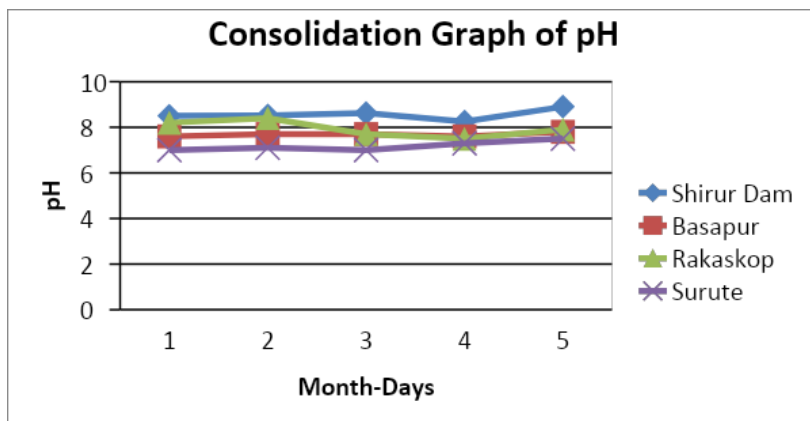
**4.Experimental Analysis of all Parameters of Surute**

Month/Days	Temp	pH	TDS	EC	Cl	TH	Ca	Mg	DO	BOD <sub>3</sub>
15-Jan	25	7	63	120	6.1	38.1	5.9	32.2	6.6	1.7
30	25	7.1	64	120	6.2	38.5	6	32.5	6.4	1.78
15-Feb	26	7	64	100	4.46	41.5	8	33.5	7.2	2.1
28	26	7.3	66	110.2	8.68	39.2	4	35.2	5.2	2.9
15-Mar	27	7.5	59	116.3	8.5	40	4.9	35.1	5.9	2.86

**Table-4**

**5.Experimental Analysis of all Parameters**

**5.1 pH-** pH values are ranged between 7 to 8.9. It has been observed that the pH value of tested sample has been increased for every 15 days in Shirur dam, Basapur and Surute Region in the month of March but pH value has been decreased in Rakaskop dam.



**Fig.1 Consolidation Graph of pH**



**5.2 TDS-** TDS is an important parameter for drinking and irrigation purpose. It has been ranged between 59 to 374 mg/lit has been observed that the TDS in the Shirur dam and Basapur regions samples have been found decreasing for every 15days and increasing in Rakaskop dam and Surute region. The amount of TDS in water should not be more than 500 mg/l (As per BIS: 10500-2012). Beyond this the taste decreases and may cause gastrointestinal irritation.

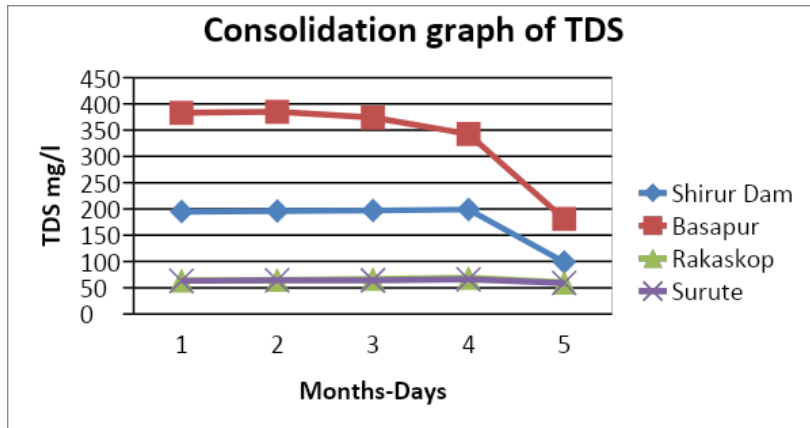


Fig.2 Consolidation Graph of TDS

**5.3 EC-** The higher the concentration of ionic constituents the higher conductivity. Conductivity of the water changes substantially as its temperature changes. The values are ranged between 70  $\mu$ Mhos/cm to 394.4  $\mu$ Mhos/cm.

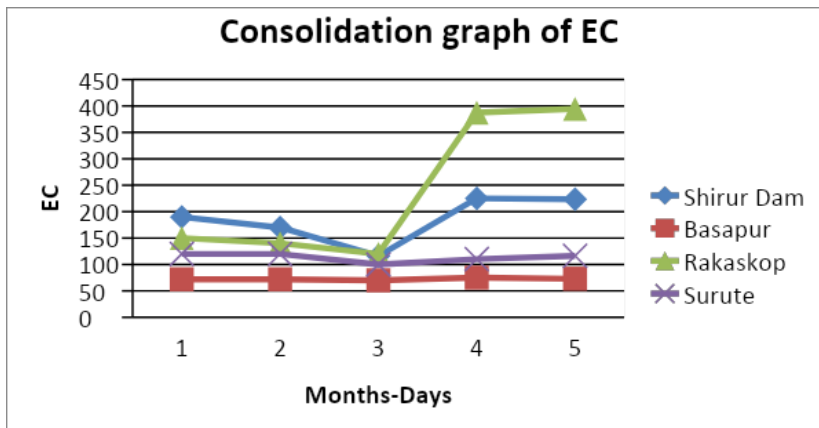


Fig.3 Consolidation Graph of EC

**5.4 Cl-** Contribution of chloride in water may be due to animal waste. Chloride values are ranged between 4.46 mg/lit to 36.48 mg/lit has been observed that the Chloride Content in Rakaskop and Basapur regions sample has been found decreasing and Shirur dam and Surute regions are found increasing for every 15days.

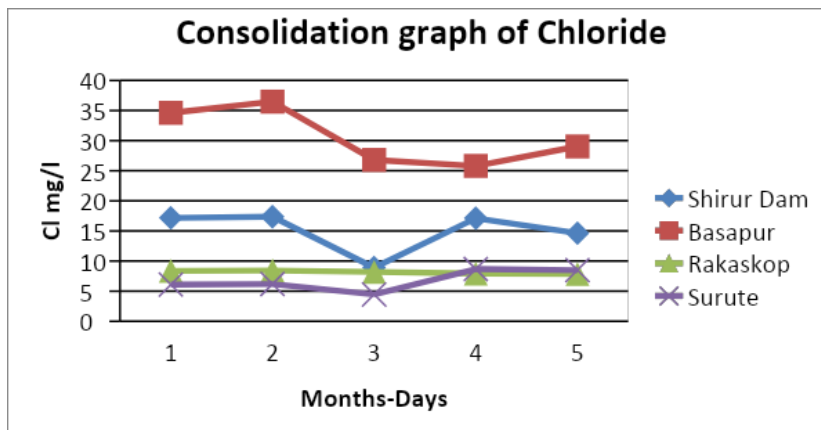


Fig.4 Consolidation Graph of Cl

**5.5 TH-** Total hardness values are ranged between 39 mg/l to 159 mg/lit is observed that the Total Hardness in Shirur dam, Basapur and Rakaskop region has been found decreasing and increasing in Surute for every 15 days test. As per BIS : 10500-2012 for drinking water the limits are  $DL \leq 300$  mg/l,  $PL \leq 600$  mg/l and even our tested samples of all 4 region are within the limit

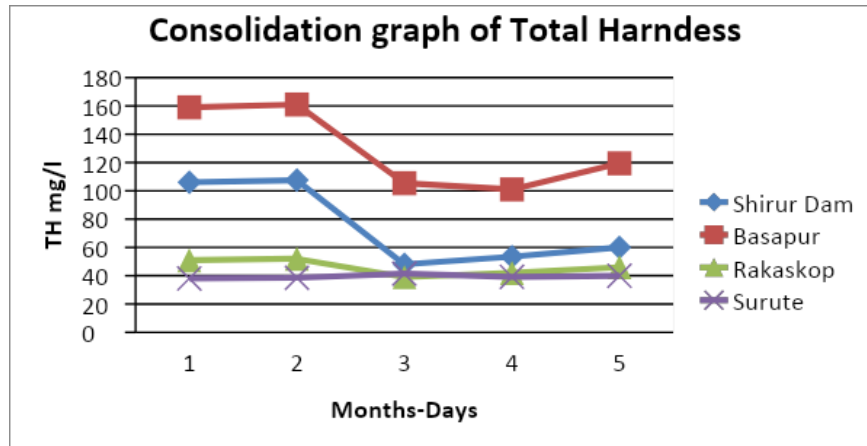


Fig.5 Consolidation Graph of TH

**5.6 Ca Hardness-** Calcium hardness in the 4 regions ranges between 4 mg/lit to 77.5 mg/lit is observed that the Calcium content in Shirur dam and Basapur region has been found increasing and decreasing in Rakaskop and Surute in the month of February and March. As per BIS: 10500-2012 for drinking water the limits are  $DL \leq 75$  mg/l,  $PL \leq 200$  mg/l and even our tested samples of all 4 region are within the limit

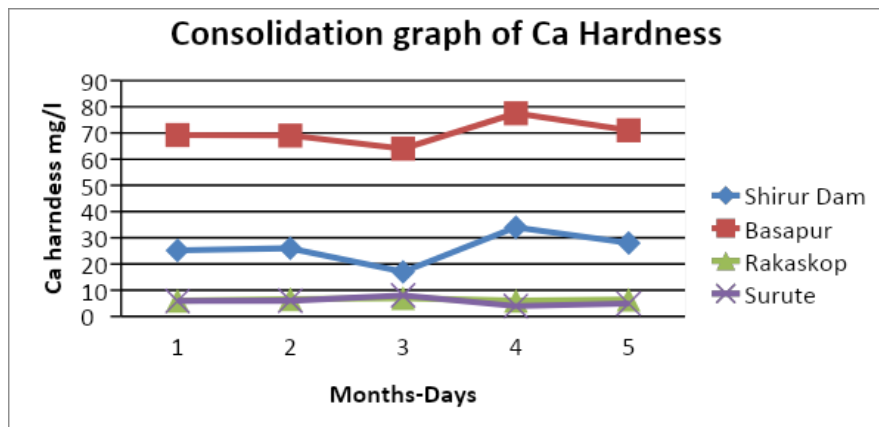


Fig.6 Consolidation Graph of Ca Hardness

**5.7 Mg Hardness-** Magnesium hardness ranges between 19.5 mg/l to 92 mg/lit is observed that the Magnesium content in Shirur dam, Basapur and Rakaskop region has been found decreasing and increased in Surute for every 15 days. As per BIS: 10500-2012 for drinking water the limits are  $DL \leq 30$  mg/l,  $PL \leq 100$  mg/l and even our tested samples of all 4 region are within the limit

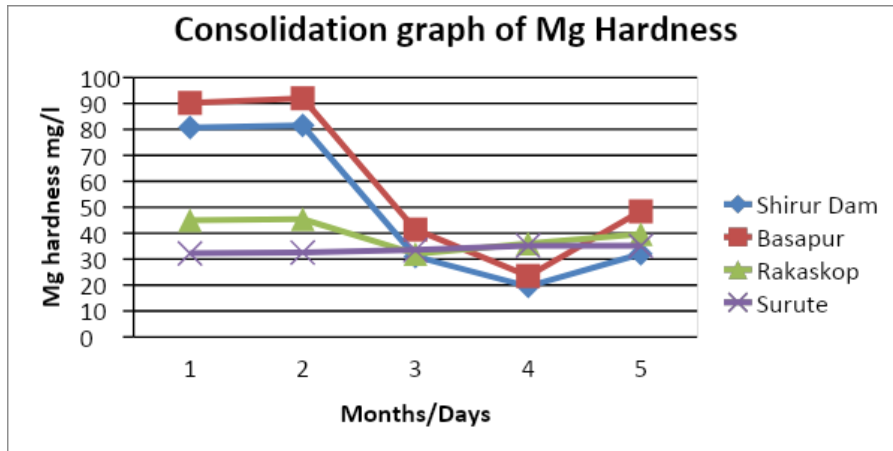


Fig.7 Consolidation Graph of Mg Hardness

**5.8 DO-** DO content ranges between 5.3 mg/l to 9.6 mg/lit is observed that the DO content in the month of January is less as compared to February. It has been increased maximum in the month of February and again decreased in March. Aquatic life in natural surface water bodies needs a minimum DO of 4 mg/l for survival. Oxygen level that remains below 2 mg/l for a few hours can results in large fish kills. DO value about 4 to 8 mg/l are sufficient.

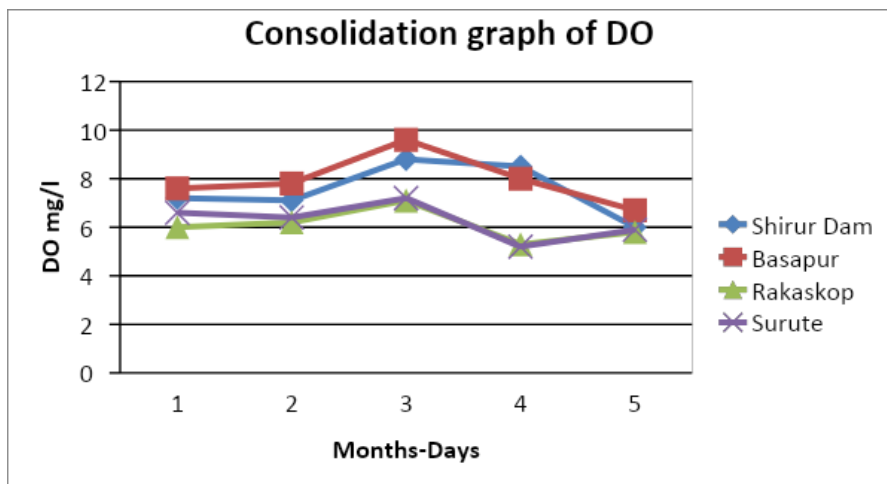


Fig.8 Consolidation Graph of DO

**5.9 BOD<sub>3</sub>-** BOD<sub>3</sub> ranges between 0.1 mg/lit to 2.9 mg/lit is observed that the BOD<sub>3</sub> content in January month is higher as compared to February in Shirur dam. The BOD<sub>3</sub> content has been found decreasing in Shirur dam, Basapur and Rakaskop and increasing in Surute. Drinking water must have a BOD of less than 01 mg/l and water is considered fairly up to 03 mg/l of BOD, but when the BOD value  $\geq$  05 mg/l the water is doubtful in purity. All 4 regions have the BOD value within the limit

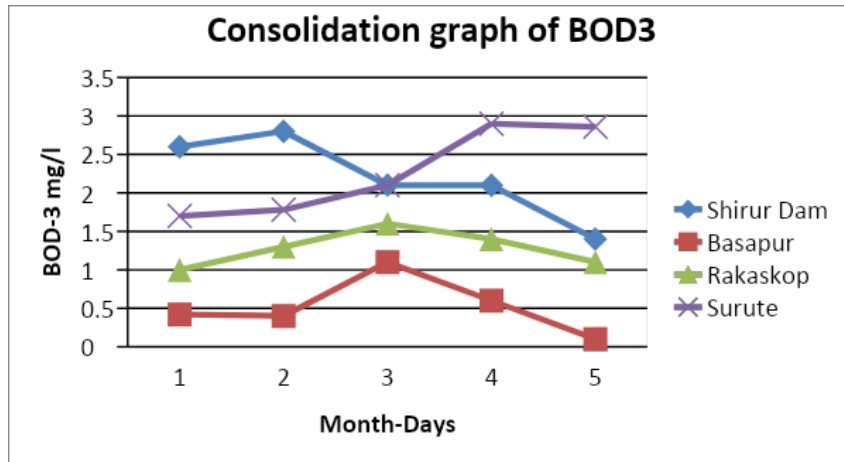


Fig.9 Consolidation Graph of BOD<sub>3</sub>

#### IV.CONCLUSION

- For studying the quality of water, water samples were collected for every 15 days from January to March.
- Analysis of water quality is to check the monthly variation in water and suitability of water sources for designated use.
- Several parameters such as Temperature, pH, TDS, EC, Cl, TH, Ca, Mg, DO and BOD<sub>3</sub> are analysed and compared with their standard values of BIS: 10500-2012.
- From the tested results of water sample it is concluded that the water in the Shirur Dam, Basapur, Rakaskop and Surute are within the permissible limits.
- Variations have been found for every 15 days test but all the parameters are within the permissible limits.
- Before supplying the water to the residences basic disinfection treatment is required.
- After the basic disinfection treatment water can be used for drinking, irrigation and domestic purposes.

#### V.FUTURE SCOPE

- Water samples can be collected from the centre of the main flow of the river by varying the depth of the water surface at minimum 10cm.
- Other physical and chemical parameters can be studied and analysed for the future study.
- Weekly collection of samples can be preferred for more accurate results and variations.

#### REFERENCES

1. Bureau of Indian Standard (BIS) Specification for Drinking Water (As per BIS: 10500-2012)
2. Water quality of malaprabha river with reference to physico-chemical factors Dr.B.N.Sunkad,
3. Water quality assessment in markandeya river sub basin (MRSB) Belgaum Talwar, S.K.Chandan Kumar B. And Nadagouda, B.V.
4. Analysis of water Quality using physic-chemical parameters in charcha colliery korea District, Chhattisgarh, India SD Jadhav and MS Jadhav
5. Water quality evaluation of river Ghataprabha, India Shivayogimath C.B, Kalburgi P.B
6. Analysis of water Quality using physic-chemical parameters in charcha colliery korea District, Chhattisgarh, India Pratima rani dwivedi, M.R, Augur and Anita Agrawal.
7. Surface water Quality Evaluation of malaprabha River, Belagavi District Karnataka. Archana Umesh Hiremath, B.K.purandara, r, shreedhar.
8. Water Quality Analysis of River Mahanadi in Sambalpur city Smita Rout, Asit Kumar Behera, Aliva Patnaik.
9. Surface and Ground water Quality Evaluation of Ghataprabha Basin Archana Umesh Hiremath, B.K.purandara, r, shreedhar.

10. Assesment of water quality and suitability analysis of river Ganga in Rishikesh,India
11. Assessment of seasonal variation in water Quality Dynamics in River Varuna –A Major Tributary of River Ganga Pankaj Kumar, AbaidyaNath Singh, ReshuShrivastava, and Devendra Mohan

### BIOGRAPHY



Deepa Bhavi is B.E Student, Dept. of Civil Engineering in S.G.Balekundri Institute of Technology, Belagavi-590010, Karnataka India



Sanketh R is B.E Student, Dept. of Civil Engineering in S.G.Balekundri Institute of Technology, Belagavi-590010, Karnataka India



Sarita Tahashildar is B.E Student, Dept. of Civil Engineering in S.G.Balekundri Institute of Technology, Belagavi-590010, Karnataka India



Shashikant Modagi is B.E Student, Dept. of Civil Engineering in S.G.Balekundri Institute of Technology, Belagavi-590010, Karnataka India



Prof. Rahul R Bannur is working as Assistant Professor, Dept. of Civil Engineering in S.G.Balekundri Institute of Technology, Belagavi-590010, Karnataka India