



## INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY

### TITLE: AUGMENTATION IN WATER STORAGE OF EKRUKH DAM

Manoj Jadhav<sup>1</sup>, Prof.Hangargekar P.A.<sup>2</sup>

<sup>1</sup>Student, Civil Department, Shri Tulajabhavani college of engineering, Tuljapur, Maharashtra, India, [jadhavmanoj100@gmail.com](mailto:jadhavmanoj100@gmail.com)

<sup>2</sup>Professor & Head Civil Department, Shri Tulajabhavani college of engineering, Tuljapur, Maharashtra, India, [pradeppah@gmail.com](mailto:pradeppah@gmail.com)

#### Abstract

Solapur is a city located in the south-western region of the Indian state of Maharashtra, Ekrukhdam is the major water storage capacity dam in the solapur region which is located on adela river near north solapur, The height of the dam is near about 21.45m (70.4 ft) and length is near about 2360 m (7,740 ft), The dam volume is approximately 130 Mm<sup>3</sup> and the total capacity is near about 61,10 Mm<sup>3</sup> The industrial development and as per the water demand of city the water storing capacity is low due to the various aspect like sludge accumulation in the dam. The concept of this research is to increase the water storing capacity of the ekrukhdam by removing the sludge. The study analysis data and collected from the different government departments and from previous research paper.

The comparative analysis is done on the basis of various reaserch papers and data collected , Augmentation plan, Sludge calculations, Ekrukhdam details and calculations, Project Finance, Cost estimations and Benefits of proposed augmentation plan is carried out in present work

**Index Terms:** Sludge Removal, Water storage, Solapur water demand, Augmentation of water storage in soalpur. etc.

\*\*\*

## 1. INTRODUCTION

Maharashtra's total geographical area is 307.70 lakh hectares of which 225.4 lakh hectares area is "cultivable land". Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 kilometers along the Arabian Sea. The Sahyadri mountain ranges provide a physical backbone to the State on the west, while the Satpuda hills along the north and Bhamragad-Chiroli-Gaikhuri ranges on the east serve as its natural borders. The State is surrounded by Gujarat to the North West, Madhya Pradesh to the north and Chhattisgarh to the east, Andhra Pradesh to the south east and Karnataka to the south and Goa to the south west.

The total water demand of the solapur district is continuously increasing and the water storage capacity is constant for the augmentation of the water storage in the ekrukhdam need to remove sludge from the ekrukhdam. To maintain and fulfil the water demand of domestic, Industrial, commercial

### 1.1 Problem Statement

Maharashtra has always faced droughts. The drought has persisted for four consecutive years and has affected drinking water security and crop production and productivity severely all over the Maharashtra state. Marathwada is the region in Maharashtra which also faces drought after every four to five years. Annual average rainfall in the solapur region is approximately 545 mm. If we see technically this rainfall is sufficient in all respect, but due to the improper practices and unavailability of water storing structures deficiency of water has been observed.

After removing the sludge the amount of water storage capacity will be increased and will be beneficial to the solapur region for the domestic, industrial, agricultural cultivation. The total cost of the project is to be calculated.

### 1.2 Aim

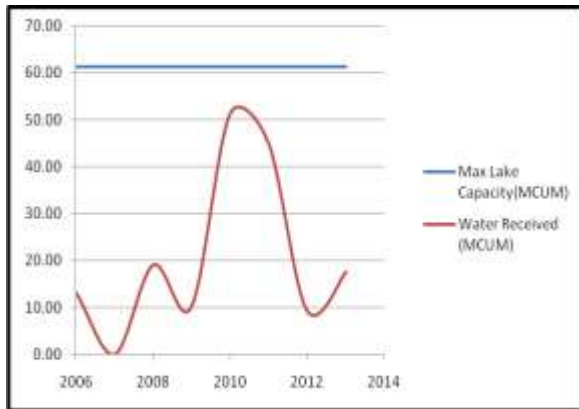
To find out the actual costing and efficiency of the sludge removing from the ekrukhdam.

### 1.3 Objectives

1. Estimation of total water demand of the Solapur district.
2. To augmentation of water storage capacity of ekrukh dam by removing sludge

**1.4 Location**

The Ekrukh dam was built 150 (1860's) years ago. It is at only 8 Km from town and water from this dam can be by gravity to WTP and is therefore the first choice. After deduction of accumulated silt over such a long period of operation, it has 61.61 Mm<sup>3</sup> as storage capacity. However in 150 years many small and medium size water harvesting structures have developed in the catchment and the yield into the reservoir has reduced drastically. That is why the dam which once supplied 27 MLD of water now cannot supply more than 10 MLD. The graph of the water received in the dam against the overall possible storage in last 6 years is presented below.



Water received in Ekrukh dam against maximum lake capacity in McM

**1.5 Proposed Plan of Augmentation and Improvements**

**removal of sludge In Ekrukh dam**

The Ekrukh dam, located around 6km from Solapur Municipal Corporation. Silt has been accumulating in the dam for around 150 years, and was not removed . This led to a decrease in the water storage capacity of the dam, which normally would store around 1 TMC. Desilting was carried out in the dam . A total of 27.6 Mm of silt was removed from the dam due to which the storage capacity increased by Approximate 1 TMC litre.

**2. CAPITL COST OF THE PROJECT**

The cost of proposed components under this project is worked out by as per Government of .Maharashtra G.R 25 may 2017

Sr. No.	Proposed Components	Estimated Cost in CR
1	Proposed Regarding removal of sludge In Ekrukh dam	32.89

**Capital Cost of Project**

**A) Project Financing**

**Financial Structure of Project**

The project cost will be shared by;

1. Grants from GoI
2. Grants from GoM
3. Solapur Municipal Corporation

The share of each of these institutions is as per following table and proposed tariff based on full recovery of O&M costs

S.N.	Particulars	Percentage	Cost / Share In Crores
1	Estimated cost of project	100	32.89
Financed by			
2	Govt. of Maharashtra grants	70	23.02
3	Solapur M.C.	30	9.86

Financial structure of the project

S.N.	Year	Proposed tariff for full O&M cost recovery (Rs./KL)		
		Domestic	Non domestic	Commercial
1	2014-15	11.25	33	35

2	2016	11.25	33	35
3	2021	15	45	51

## B Financial Viability

• A detailed year wise cash flow statement for the 3 years is prepared for the project. It clearly indicates that the tariff required for recovering the O&M cost is not much higher than what is already implemented. Present rate for 15 mm domestic connection are Rs. 2756 per connection per year and Rs. 11.25 / KL for volumetric charging  
The repayment period of project is 3 year this shows that the project is financially viable and feasible.

Year	Revenue billed	Recovery efficiency (%)	Revenue recovered
2021	12.20	37	12.20
2022	12.20	74	24.40
2023	12.20	114	36.61

Key statistics from Cash flow statement (Amounts in Cr.)

## 4. CONCLUSION

It is concluded that,

- 1) Today Solapur city gets only 5 mld water reservoirs from this dam. However, after removing the sludge in This dam, 27.60 mld water is available for Solapur city.
- 2) The sludge to be desilted to the amount of 27.60 Mm this covers 68 acers of land become fertile this increase the crop production of farmers
- 3) From the cost & benfit analysis it is concluded that project is financially viable.

## REFERENCES

- [1]. Research Report (1997).No. CE 154 Department of Civil Engineering, The University of Queensland, April,
- [2]. M.A1 saud morphometric analysis of WadiAurnah Drainage System, Western Araiben Peninsula the open Hydrology Journal, 2009,3,1-10.
- [3]. Nageswararao. K, SwarnaLatha, p, HariKrishna, M, morphometric Analysis of Gostani River basin in Andhra Pradesh State, India Using Spatial information Technology, INTERNATIONAL JOURNAL OF GEOMATIC AND GEOSCIENCE OLUME1, NO 2,2010.
- [4]. Geena. G.B, Ballukraya.P.N. Morphometric Analysis of korattalaiyar River Basin, TamilNadu, India: AGIS approach. INTERNATIONAL JOURNAL OF EOMATIC AND GEOSCIENCE Volume 2, No2, 2011
- [5]. P.T. Arvinda 1, H B Balkrishna. MARPHOMATRIC ANALYSIS OF VRISHABHAVATHI WATERSHADE USING REMOTE SENSING AND GIS IJRET : International Joournal of Research in Engineering and Technology.
- [6]. GOVERNMENT OF INDIA MINISTRY OF WATER RESOURCES CENTRAL GROUND WATER BOARD "Prepared by : Dr. AGS REDDY" 2013
- [7]. Fulton George P.: Alum recovery and Waste Disposal in Water Disposal in Water Treatment, US Patent 3959133(1976).
- [8]. NEERI: Manual on Waste Water and Waste Water Analysis, National Environmental Engineering Research Institute, Nashik.
- [9]. Singh S.P., Pathak Deepa and Singh Rashmi: Hydrobiological Studies of two ponds of Satna(M.P.), Eco.Environmental and Conservation, Vol.8(3), Pg. no. 289-292,(2002).
- [10]. www.indiawaterportal.org