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"ANALYSIS AND CAMPARISON BETWEEN CANAL AND PIPELINE SYSTEM OF GOTHANGAON (GONDIA) IRRIGATION PROJECT "

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ABSTRACT :

The Venture is a minor water system venture arranged on Gothangaon Dam extend in Gadavi premise. Tal..Arjuni/Morgav, Dist Gondia of Maharashtra. We have examination Pipeline framework minor at Gothangaon, Gandhari this extend portray comparative examination another utilize of pipeline framework and canal framework the canal upgraded water system water misfortunes , Simple support, strength, adjustment, capability and adaptability of pipelines allow them term potential to be an temperate elective to supplant the canals. Channels were chosen to build a organize of the pipeline due to the accessibility of plastic water system pipe and fortified concrete pipe and their common utilizing water system. They were chosen to develope organize pipeline.

This think about has been attempted to examine canal framework and to plan a pipeline framework to supplant it. The think about range is Itiyadoh water system extend, found on Gothangaon Dam Gadavi stream bowl in Gondia Area, Maharashtra. The in general effectiveness of pipeline framework was found out to be much way better than open canal framework moreover the conveyance productivity by utilize of lift water system was found discover out.

Key words: Upgraded water misfortunes, Support, Plan of Pipelines, Boundless dissemination through Lift Irrigation

LITRETURE REVIEW

Mr. E. B. Patil, Vital Secretary (WR) :-

Mr. E. B. Patil, Central Secretary (WR), Water Assets Division, Govt. of Maharashtra, India Dr. Sanjay Belsare Official Design and Relate Teacher, Water Assets Division.

INTRODUCTION • Maharashtra is the third biggest State Area (30.8 million hectares) with the third biggest population (97 million) in India. • Almost 58% of the state's populace is in rustic regions, 80% of whom are subordinate on farming • The accessibility of water in the state is exceedingly uneven most of the precipitation happens in fair 40 to 100 days • Extreme water system potential of the state is approximately 12.6 million hectare (M ha), • 8.5 m ha is from surface water • 4.1 m ha from ground water sources • As of June 2011, add up to surface water system potential made in the state was 4.8 m ha

CHALLENGES IN WATER SECTOR IN MAHARASHTRA • Firstly, Competition among distinctive segments has expanded significantly • Of the add up to water utilized in the state • almost 75 % goes to water system, • 16 % for residential water supplies, • 4 % for mechanical utilize, • the left over portion for other employments such as animals, hydro and warm control • Besides, destitute quality irrigation• Thirdly, restricted taken a toll recuperation in the water system segment contributed to wasteful on-farm utilize of water system water and included to the financial burden of the state. Water Estimating. • Maharashtra Water Assets Administrative Specialist (MWRRA) Act 2005.

MAHARASHTRA Administration OF Water System Framework BY FARMERS (MMISF) ACT 2005 • Water for water system might be provided to WUAs as it were • Water will be provided on volumetric premise • Satisfactory representation to tail-enders and ladies individuals in overseeing committee • WUAs will be enrolled by WRD • Time bound program of completion of restoration work

2) Prof. R. K. Bansal :-

Prof. R. K. Bansal is a outstanding figure in the field of designing. Here are a few key subtle elements almost him:

1) Academic Background:

He graduated in Mechanical Engineering in 1966.

He gotten his Master's Degree in 1975 with respects from I.I.T., Delhi.

He earned his Ph.D. from the University of Delhi in 1981

2) Career Path:

- Prof. Bansal joined the Delhi College of Engineering in 1967 as a lecturer.
- Over the a long time, he rose to the position of Professor in 1995

"A Course reading of Liquid Mechanics": Prof. Bansal created this comprehensive book, covering points such as liquid properties, stream past drenched bodies, weight estimation, hydrostatic forces.

We learn around him and apply his ponder essential Common terms and phrases

1) Acceleration Applying Bernoulli's equation , Area Bernoulli's equation body,

2) Centre of buoyancy centre of gravity centre of pressure cm² co-efficient continuity equation cylinder

3) Delhi University density depth differential manometer dimensions discharge distance due to friction equilibrium

4) Find floating fluid flow free surface given by equation

5) head due head loss Hence horizontal inlet kg/m³ Kinematic viscosity

6) liquid lit/s litres/s loss of head m³/s manometer mercury meta-centric height N/cm² N/m² oil of sp

7) pipe of diameter plate poise pressure head Problem prototype

8) rate of flow rectangular Reynold number scale ratio shear stress shown in Fig Solution specific gravity stream function Substituting the values tank throat total pressure tube

9) velocity of flow velocity potential venturimeter vertical Volume water surface .

3) B.N. Datta :-

Bhupendranath Datta (4 September 1880 – 25 December 1961) was an Indian communist revolutionary. Later in his career, he became a noted sociologist and anthropologist. Estimation and Costing Book By B.N. Dutta: It is based on departmental practices and I.S.I specifications.

The book provides technical data, conversion tables, and other practical information necessary for civil engineering professionals. It also includes numerous drawings and plates relevant to civil engineering design. Apart from estimating and costing, the book contains additional chapters, practical data, charts, and tables that are valuable for engineers, architects, and other professionals in the field.

The Ritso Society :-

The study mentioned was published by The Ritso Society (Inc) in August 2007 comparison between piped and open channel distribution of irrigation water supplies. Open Channel Distribution Network:

- **Advantages:**
  - Traditional Approach: Open channels have been widely used for centuries to distribute water for irrigation.
  - Low Initial Cost: Constructing open channels is relatively inexpensive.
  - Natural Flow: Water flows naturally through open channels.
- **Drawbacks:**
  - Water Losses: Open channels suffer from water losses due to seepage and leakage.
  - Maintenance Costs: Maintaining open channels can be expensive in the long term.
  - Uneconomical: The cost of maintaining open channels may not be sustainable.
  - Risk of Water Logging: Open channels can lead to waterlogging in certain areas.

Piped Distribution Network (PDN):

- **Advantages:**
  - Efficiency: PDN systems exhibit an Overall Project Efficiency (OPE) in the range of 70% to 90%.
  - Reduced Water Losses: PDN significantly reduces water losses due to seepage and leakage.
  - Faster Water Flow: Water travels more swiftly through pipes, reducing travel time.
  - Equitable Distribution: PDN ensures more equitable water distribution.
  - No Land Acquisition: PDN eliminates the need for land acquisition and canal regulation works.
  - Lower Overall Project Cost: PDN can be more cost-effective overall.
  - Hydraulic Modeling: The study area focused on designing and modeling a PDN using Water GEMS Software in the Gothangaon Medium Irrigation Project located in Gondia, District Maharashtra.

In summary, the Pipe Distribution Network offers several advantages over the conventional open channel system, including reduced water losses, improved efficiency, and equitable distribution.

5) M. Hanif Chaudhry's :-

M. Hanif Chaudhry's book, titled "Open-Channel Flow", provides comprehensive coverage of open-channel flow, with a focus on water supply, hydropower, flood control, drainage, and navigation. Here are some key details about the book:

1.Title: Open-Channel Flow
2.Author: M. Hanif Chaudhry
3.Publisher: Prentice Hall, Inc.
4.Publication Year: 1993
5.Content Highlights: Explores open-channel flow with a focus on water supply, hydropower, flood control, drainage and navigation.

6) Mohammed Hashim Siddig (Feasibility of Replacing Irrigation Canals with Pipes in Sudan Abdallah.):-

1) Improving Conveyance And Distribution Efficiency Through Conversion Of An Open Channel Lateral Canal To A Low Pressure Pipeline At Al-Hassa Irrigation A feasibility study was conducted to compare water canals with pipes in irrigation projects in Sudan. The study evaluated and compared the technical and economic aspects of using development irrigation systems with gated pipes versus common conventional irrigation systems for sugar cane crops.

Objective: The study aimed to assess the viability of replacing traditional open irrigation canals with low-pressure pipelines (gated pipes) in Sudan.

2) Research Design: Four treatments were arranged in a split-plot design:

- Irrigation Systems: Surface irrigation vs. development irrigation system by gated pipes.
- Planting Methods: Furrows vs. beds.

3) Results:

- Water Use Efficiency: The treatment using gated pipes in beds (A2B2) showed the highest field water use efficiencies (7.56 kg/m³, 6.21 kg/m³, and 4.81 kg/m³) in the El Minia, Luxor, and Aswan regions, respectively.
- Economic Benefits: The same treatment (A2B2) resulted in the highest total income, production, financial benefits (LE/area), net return, and economic efficiency across all regions.

4) Context: Sudan faces population growth and limited water availability for agriculture. Implementing development irrigation systems using gated pipes is crucial for improving water management and increasing crop yields, especially for water-intensive crops like sugarcane.

OBJECTIVES :

- To Minimize water losses from the irrigation reservoir to through canal and pipeline.
- To reduce daily annual maintenance of canal .
- To reduce daily annual maintenance cost of canal .
- Calculate Use of water for irrigation projects, and commercial with industrial purpose .
- Trying to find good benefitable way from to compare canal and pipeline.

AIM

- Reduce time of water to flow through the fields (travel time).
- Increased equity of distribution.
- Reduce water logging.
- Reduce overall cost of project.

METHODOLOGY

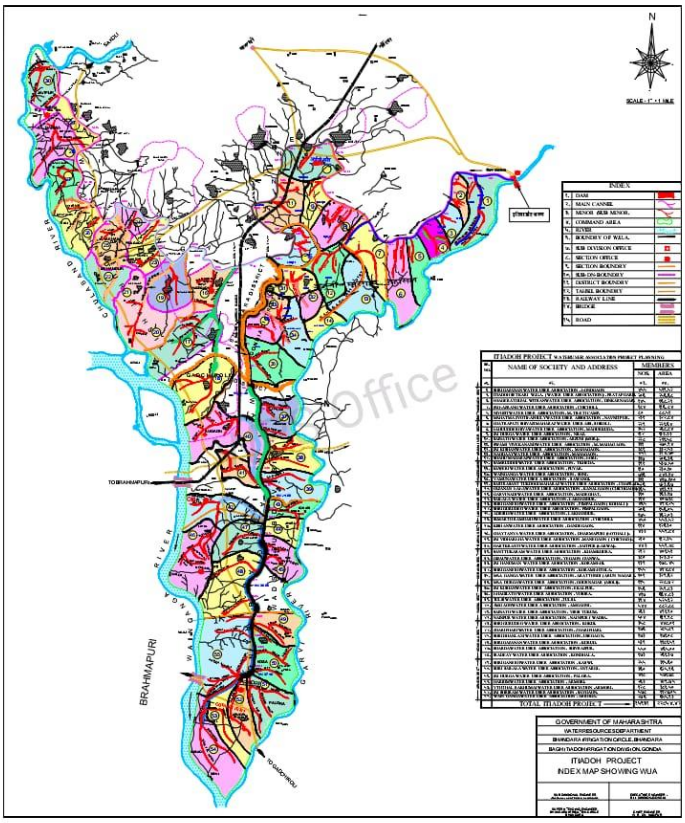
A] Design of Canal

Various factors like crop water requirement, irrigation methods, water distribution plans, flow control mechanism and social economic settings are considered in determining the design discharge. Various methods are available for the design of canals. Some use basic principles of hydraulics and soil stability to determine the geometry of the canal. Tractive force methods (Fortier and Scobey, 1926, Lane, 1955), rational methods are some of the methods in this category. These methods are known as regime methods and the works of Lacey (1930) and Simons and Albertson (1963) are few examples in this field.

Section design calculation:

Itiyadoh irrigation minor- off take of main canal, main canal having two (2) branch canal and its having nine (9) section canal
Main TWO Branch of Canal

1)**Arjuni/morgaon Branch**
2)**Wadsa branch**



Cost Components for Canal

For computation of canal cost, most of the methods from quantity, survey, evolution & valuation was used for estimation of earthwork and foundation. Abstract for calculation of Canal Cost is:

- Site Clearance for Canal Lining
- Land purchasing for construction of the canal
- Excavation for canal way
- Providing and fixing RCC boundary stone
- Miscellaneous; sign boards, outlets, service road, etc

CHECK WISE AREA STATEMENT

Sr. No.	Name of Check	R D	G C A Ha	Detected Area	C C A Ha	I C A Ha
1	2	3	4	5	6	7
1	OR-1	60	18.81	0.00	18.81	16.93
2	OL-1	155	16.44	0.00	16.44	14.80

3	OL-2	790	10.40	0.00	10.40	9.36
4	TAIL	1020	17.76	0.00	17.76	15.98
		TOTAL	63.41	0.00	63.41	57.07

B] Design of Pipeline

For planning of the pipeline, release required is collected from water system office. Concurring to release, we give 400mm, 315mm, 250mm, 90mm distance across of High-Density Polyethylene Pipe. Pipe distance across is decided by utilizing Darcy Weisbach equation: D= (flV2 /2hLg) Fetched

Components for Pipeline

The primary share of Pipeline system's taken a toll is the fabric of pipeline itself. Rest for the share is taken by the establishment, joints, etc.

- Initial taken a toll: channels, establishment, unearthing for establishment, other fitments, etc.
- Running taken a toll: intermittent check-ups, repair work if required

CONCLUSION

We have investigation as it were one minor i.e.. of primary canal, Wainganga branch canal 40 To 72 Kms. from fundamental canal for pipeline framework which is attainable in case of sparing water and cash for long term so if we can supplant generally canals, Wholesaler And Minors By Pipeline Framework It Will Be More Attainable to decrease Water Logging In Command Zone And To Spare The Soil From losing Its ripeness, In Expansion To Increment In Command Region And Ideal Utilize Of Water. There Are Of Course, Impediments Of The Pipe Line Framework When Considering The Assurance From Seismic tremors Or Conceivable Disturbance To The Agriculturists Amid Establishment And Misfortune Of Living space In Places Of Open Canal Framework From Where The Channels Are Drawn. The Pipe Line Frameworks Are Moreover Adaptable To The Clients, Have A Higher Dissemination Proficiency, And Less demanding Precise Water Estimation. Thus, The Future Nitty gritty Consider By Water Asset Office May Approve The Conclusion.

REFERANCE :

1. Performance Assessment Ponder of ITIADOH Water system Project
2. FAO Water system Water Administration, Water system Planning, Attach I. Water system efficiencies.
3. Rules for progressing water utilize effectiveness in water system residential & Mechanical segments, CWC; Govt of India. Nov 2019
4. Research Article: Productivity Enhancement of expansive LI Plans: Mhaisal Venture Maharashtra, Patil E.B. Central Secretary.
5. WRD, Maharashtra, India Water Week 2013.
6. IS: 10430 – 1982 "Criteria for plan of lined canals and rules for choice of the sort of lining".
7. IS: 5968-1987 "Guidelines for arranging and format of canal framework for irrigation" (Reaffirmed 1992).
8. B.C. Pnumia (water assets), sixteenth version, Jodhpur, India.
9. R.K. Bansal (liquid mechanic).
10. B.N. Datta (assessing and coasting).
11. Current plan rate of Maharashtra Jeevan Pradhikaran.
12. Replacement of Water system Locale Canals and Sidelong Canal with Pipelines by Water Area Conveyance Framework, 2004.
13. Improving water-efficient water system: Prospects and troubles of inventive hones Les Levidowa, Daniele Zaccaria, Rodrigo Maiac, Eduardo Vivas, Mladen Todorovic, Alessandra Scardigno.
14. Comparison of Channeled and Open Channel Conveyance of Water system Water Supplies Distributed by The Ritso Society (Inc) PO Box 75, Darfield, Canterbury Eminent 2007.
15. Chaudhry, M.H. 1993. Open-Channel Stream. Prentice Lobby, Inc.
16. Updated Rules For Pipe Measuring By Alejandro Anaya Durand, Jorge Arroyo.
17. Feasibility of Supplanting Water system Canals with Channels in Sudan Abdallah.
18. Authors: Mohammed Hashim Siddig Channeling Components and Fittings Finbar Smith © SOLAS 2014.