



सत्यमेव जयते

**GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION**

ANNUAL REPORT 2024-25



**CENTRAL WATER AND POWER RESEARCH STATION
KHADAKWASLA, PUNE-411024
INDIA**

Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation

ANNUAL REPORT 2024-25



**CENTRAL WATER AND POWER RESEARCH STATION
PUNE**

VISION

- To be a world class center of excellence in research on hydraulic engineering and allied areas, which is responsive to changing global scenario and need for sustaining and enhancing excellence in providing technological solutions for optimal and safe design of water resources structures.

MISSION

- To meet the country's need for basic & applied research in water resources, power sector and coastal engineering with world-class standards
- To develop competence in deployment of the latest technologies by networking with the top institutions globally, to meet the future needs for development of water resources projects in the country effectively
- To disseminate information, build skills and knowledge for capacity-building and mass awareness for optimization of available water resources

MAJOR FUNCTIONS

- Undertaking specific research studies relating to the development of water resources, power and coastal projects
 - Consultancy and advisory services to Central and State Governments, private sector and other countries
 - Disseminating research findings and promoting/assisting research activities in other organizations concerned with water resources projects
 - Contributions to Bureau of Indian Standards and International Standards Organization
 - Carrying out basic and applied research to support specific studies
 - Contribution towards advancements in technology through participation in various committees at National and State Levels
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FROM THE DIRECTOR'S DESK

It is with profound satisfaction that I introduce the Annual Report of the Central Water & Power Research Station (CWPRS), Pune, for the financial year 2024-25. CWPRS stands as the apex R&D organization dedicated to the advancement of hydraulic and allied research, within the crucial sectors of water and hydropower. This report highlights our significant contributions across diverse areas, including river training, hydraulic structures, coastal protection, and environmental studies, amongst others.



The past financial year witnessed CWPRS undertaking 121 impactful research studies spanning Water Resources, Coastal Engineering, and Earth Sciences. Notably, our work on flood mitigation -Brahmaputra, Kosi, Narmada and Dhauliganga rivers, the intricate designs of spillways - Pakal Dul, Punatsangchhu, Ratle, Polavaram, Kwar and the development of vital port infrastructure - Mangalore, Mumbai and Kakinada, exemplify our commitment to addressing key national challenges. Our active involvement in flagship programs of Government of India- National Hydrology Project (NHP) and Coastal Management Information System (CMIS) further underscores our dedication to national priorities. Recognizing the importance of knowledge sharing, CWPRS actively disseminated research findings through publications in National and International Journals, conferences, along with participation in technical forums, organizing international conference – HYDRO-2024 and the delivery of valuable training programs for its employees and the wider technical community.

For over a century, CWPRS has proudly served the research and development needs of India and its allies, consistently maintaining its leadership in hydraulic research by proactively adopting and contributing to technological advancements. Looking ahead, CWPRS is strategically expanding its expertise into emerging fields such as integrated structural health monitoring, sophisticated data analysis, automation, and the application of cutting-edge machine learning and artificial intelligence for enhanced predictive capabilities with a unified vision of establishing CWPRS as the sole center for all the solutions for water resources management.

I wish to express my sincere appreciation to the Department of Water Resources, River Development and Ganga Rejuvenation, MoJS, for their unwavering support and guidance. I am also deeply grateful to our valued clients in India and abroad for their enduring faith in CWPRS. The exceptional talent and dedication of our scientists and supporting staff are the driving force behind our success, and I extend my heartfelt thanks to each of them. Finally, I acknowledge the remarkable leadership of my predecessors in establishing CWPRS as a center of excellence.

With a forward-looking strategy and a resolute vision to elevate the institute to an even greater heights, we are poised for an exciting future. I am privileged to lead CWPRS on this transformative journey.

Dr. Prabhat Chandra

ABOUT THE INSTITUTE: AN OVERVIEW

GENERAL

The Central Water and Power Research Station (CWPRS), Pune, established in 1916 by the then Bombay Presidency as a Special Irrigation District, is the leading national hydraulic research institute under the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation (MoJS, DoWR, RD&GR), New Delhi. In its early days of formation, this institute played important role by conducting outstanding research work for the Sukkur Barrage in Sind, the largest irrigation project in the world (1927 to 1932). Recognizing its role in the systematic study of various phases of water flow, including floods, the institution was taken over by the Government of India in 1936. With the dawn of independence and launching of planned development of water resources of the nation, CWPRS became the principal central agency to cater to the research and development (R&D) needs of hydraulics and allied disciplines for evolving safe and economical designs of hydraulic structures involved in water resources projects, River engineering, power generation and coastal engineering projects.

MANDATE

Today, as a part of the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation (MoJS, DoWR, RD&GR), the mandate of the institution encompasses undertaking specific research studies supported by necessary basic research relating to development of water resources, power and coastal projects. Advisory and consultancy services are offered to the Central and State Governments and private sector within the sphere of its activities by participation in various expert committees. Disseminating the research findings amongst hydraulic research fraternity and promoting research activities at other institutions by imparting training to their research manpower, are also undertaken.

ORGANIZATIONAL SET-UP

CWPRS is a subordinate office of DoWR, RD&GR. The Director is the Head of the Organization designated as Head of the Department. The Additional Director monitors the overall technical activities of the office. The total sanctioned staff strength of CWPRS is 1,074. The research cadre, comprising of Director, Additional Director, Scientist-E, Scientist-D, Scientist-C, Scientist-B has sanctioned strength of 200 while, Assistant Research Officer (ARO) and Research Assistant (RA) has a sanctioned strength of 125 personnel. The other supporting staff to the tune of 603 includes technical, auxiliary technical, administration, accounts and ancillary services.

CWPRS campus, situated downstream of Khadakwasla dam in South Westerly part of Pune, occupies an area of about 450 acres, where major research infrastructure available includes water re-circulation system for physical models, workshop, library, computers and communication facilities, auditorium and housing facilities. CWPRS has been recognized as the regional laboratory of the Economic and Social Commission for Asia and the Pacific (ESCAP) since 1971. The institution, with a multi-disciplinary approach to its activities, thus represents unique services available to the country and the ESCAP region.

RESEARCH ACTIVITIES

The research activities at CWPRS can be grouped into seven major disciplines as listed below.

- River Engineering
- River and Reservoir Systems Modelling
- Reservoir and Appurtenant Structures
- Coastal and Offshore Engineering
- Foundation and Structures
- Applied Earth Sciences
- Instrumentation, Calibration and Testing Services

Comprehensive R&D support is offered to a variety of projects in fields as diverse as River training and bank protection measures, hydraulic design of bridges and barrages, flood forecasting, dam break analysis, water quality analysis of River and reservoir systems, design of spillways and energy dissipators, analysis of water conductor and tail race system, optimization of the design and layout of ports and harbours suggesting coastal protection measures based on locally available materials, investigations for foundations of hydraulic structures, analysis of structures subjected to various static and dynamic loads, applied earth sciences studies for the sites of hydro-electric and other projects, calibration of current meters and flow meters, testing of pumps and turbines and instrumentation for dams.

The solutions offered by CWPRS are based on the investigations from physical and mathematical models, field investigations coupled with desk studies or from a combination of these. The institution also carries out collection and analysis of field/ prototype data on a variety of engineering, hydraulic and environmental parameters.

Some of the important projects handled during year 2024-2025 are flood protection measures in River Nag in Maharashtra and Tapi in Gujarat, Ganga in the states of Bihar and Uttarakhand, designs of spillways and energy dissipators of Pakal Dul HE Project, Hydraulic Model studies for Polavaram Irrigation project, Andhra Pradesh, Kwar dam, Jammu & Kashmir, Luhri HEP dam, Andhra Pradesh, Development studies of various ports Deendayal Port, Gujarat, Belakari, Mangaluru Karnataka, Elephanta and Mumbai Marina, Maharashtra, Mathematical Model studies for Littoral Drift shoreline changes, Vizhinjam international port, Kerala, Fisheries Harbour, Kerala, the design of bank protection work, Navasari Gujarat, Site specific seismic studies for Bhandardara Dam, all dams of DVG link, Maharashtra, parallel seismic studies at Kaleshwaram, Andhra Pradesh, Geotechnical stability studies for Tapi river, Gujarat, 3D stress analysis of Bindu Barrage, West Bengal, 2D dynamic stress analysis of Bhatsa dam, Maharashtra, 2D static and pseudo dynamic stress and stability analysis at Vani Vilas dam, Karnataka, Vibration studies for Koyna HEP, Maharashtra, Dam instrumentation revival at Sukhi Dam, Gujarat.

CENTRALLY SPONSORED SCHEMES***NATIONAL HYDROLOGY PROJECT (NHP)***

CWPRS, one of the central implementing agencies under National Hydrology Project has been identified as centre of excellence for providing technical expertise for Hydro-Met-WQ Instrumentation including Data Loggers, Telemetry systems etc. to support water resources management program of State Implementing Agencies. CWPRS proposal under NHP included establishment of state-of-the-art Hydro-Met-WQ Instruments testing, calibration and certifying facility, Training and support to IAs on Hydromet instrumentation, Bathymetry survey etc, strengthening existing research facilities, Infrastructure development, Capacity building, Purpose driven studies involving special technical support within the overall framework of National Hydrology Project.

COASTAL MANAGEMENT INFORMATION SYSTEM (CMIS)

Field observed data on coastal processes is one of the essential requirements for evolving long term plans and coastal protection measures. In view of this, for collection of such data a scheme of Coastal Management Information System (CMIS) was approved by the Government of India under the on-going Scheme 'Development of Water Resource Information System (DWRIS)' of Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR). Central Water and Power Research Station (CWPRS) was awarded the work as Project Executor for implementation of CMIS at two sites viz. Satpati in Maharashtra (Northern region) and Nani Danti- Moti Danti in Gujarat (Southern region). The total cost of the project is Rs. 6.95 Crores with total duration of the work as 6.5 years (up to December 2025) wherein various coastal data such as wave, tide, tidal currents, shoreline and cross-shore profile, suspended and bed sediments, river /creek discharges, winds, rainfall etc. is being collected. Further, this data would be processed to be used at the front-end and linked to Centralized Data Centre (CDC). The equipment viz., detailed bathymetric survey instruments, tide gauge, Marine Current Profiler, Automatic weather station, Sieve shakers, Beach survey instruments, river discharge profiler, LISST for in situ sediment data and CTD meter, have already been procured and installed for data collection at both sites

DAM REHABILITATION AND IMPROVEMENT PROGRAM

India is home to some of the world's most sizeable river diversion infrastructure with about 6281 dams. These dams are vital for ensuring the water security of the country and constitute a major responsibility in terms of asset management and safety. The Department of Water Resources, River Development and Ganga Rejuvenation through Central Water Commission (CWC) is coordinating and supervising implementation of Dam Rehabilitation and Improvement Project (DRIP), with financial assistance from the World Bank and Asian Infrastructure Investment Bank. The Project Development Objective is to increase the safety of selected dams in participating States and to strengthen dam safety management in India through institutional strengthening. The DRIP phase -1 was implemented during April 2012 to March 2021. Capacity building of CWPRS (DRIP phase I) has been carried out successfully by procuring various equipment and software utilizing an amount of Rs.9.88 crores. Now, Proposal has been submitted under DRIP –II & III.

CWPRS is well equipped with necessary infrastructures and laboratories with state-of-the-art equipment and software and has adequate expertise in dam design and analysis, planning, operation and maintenance aspects. As such, CWPRS with its experience is contributing towards DRIP activities and Dam Safety in a multi-disciplinary approach. CWPRS has dedicated divisions which are catering to the needs in controlling seepage, improving structural safety for smooth operation, rehabilitation of distressed hydraulic structures and associated issues of dams. Major Categories of Work/Study are as follows:

- i. Diagnostics and Investigative Field studies
- ii. Laboratory Studies
- iii. Site specific desk studies/ Seismic Hazard Studies
- iv. Numerical studies by Finite Element Method
- v. Dam Break Analysis & Emergency Action Plan
- vi. Hydraulic Model, Dam Instrumentation and Miscellaneous Studies

MAJOR CLIENTELE OF CWPRS

- Central Government Departments/ Agencies
- State Government Departments/ Agencies
- State Research Institutes
- Port Trusts/ State Port Organizations
- Public/ Private Sector Undertakings
- Municipal Corporations

DISSEMINATION OF KNOWLEDGE

CWPRS has disseminated the knowledge by contributing 121 Nos. of Technical Reports, 103 nos. of research papers in different National & International Journals/Conferences/Seminars, conducting 19 nos. of training programs for various stakeholders, delivering 75 Nos. of lectures etc.

E- GOVERNANCE ACTIVITIES

E-Gov facility is progressively being used in CWPRS using different modules including eOffice, eHRMS, SPARROW, GeM, eProcurement etc. Currently, about 450 e-office accounts are existing in CWPRS e-office module. All RA and above officials are having access to e-office module. All employees of CWPRS are provided with government email ids for smooth handling of various online platforms.

LIBRARY AND INFORMATION SYSTEM

The Central Water and Power Research Station Library was established in 1938 with the objective of collecting and disseminating of literature on various projects on water resources, energy, coastal and hydraulic engineering etc. dealt in the organization. The library boasts an extensive collection, of 55,190 Books, Reports and Conference Proceedings, 33 Journals, 22,464 Bound Volumes, and 382 CDs. During 2024-2025, Library and Information System has integrated Books, Journals, Bound Volumes, Technical Reports,

Online Subscribed Journals access in e-Granthalaya Library Management Software, enabling users to access the complete information of library collections via OPAC (Online Public Access Catalogue) 24x7 hours.

REPRESENTATION IN NATIONAL LEVEL/ OTHER IMPORTANT COMMITTEES

CWPRS represents the various BIS Committees and is actively involved in evaluation and updating of existing standards and drafting of new standards. In addition, significant contributions are also made on various standards under ISO TC 113 Hydrometry Committee, which is of utmost relevance and essential for the integrated water resources development and its management in the country that is also the target of National Hydrology Project (NHP). CWPRS represents in various National Importance Committees of Kosi High Level Committee (KHLIC), Gandak High Level Committee (GHLC), Ghaggar Standing Committee (GSC), Gangal Flood Control Commission (GFCC), Coastal Protection and Development Advisory Committee, Research Committee of the Ministry of Ports, Shipping and Waterways, Govt. of India, assistance to NDSA etc.

PROGRESSIVE USE OF HINDI IN OFFICIAL WORK

केन्द्रीय जल आयोग मुख्यालय में केन्द्रीय सचिवालय राजभाषा सेवा, राजभाषा विभाग, गृह मंत्रालय के नियंत्रणाधीन एक हिन्दी अनुभाग कार्य कर रहा है जो राजभाषा अधिनियम, 1963 तथा इससे संबंधित अन्य नियमों और विनियमों का समुचित अनुपालन सुनिश्चित करने के लिए अथक प्रयास कर रहा है। राजहित में हिन्दी के प्रगामी प्रयोग को बढ़ाने के लिए निरंतर उपाय किए जा रहे हैं। वर्ष 2024-25 के दौरान हिंदी के प्रगतिशील उपयोग के लिए 'हिंदी दिवस', हिंदी पत्रिका 'जलवाणी' का प्रकाशन, तकनीकी/प्रशासनिक हिंदी कार्यशाला, हिंदी संगोष्ठी आदि सहित विभिन्न उपाय किए गए।

IMPORTANT VISITORS/EVENTS

In 2024-25, CWPRS was honored to host a variety of significant guests, such as, Mrs. Debashree Mukherjee, Secretary, DoWR, RD&GR, MoJS, Dr. M. Ravichandra, Secretary, Ministry of Earth Science, Padmashree Dr. Shailesh Nayak, Ex-secretary, MoES & Director, NIAS Bengaluru. Shri Subodh Yadav, Additional Secretary, DoWR, RD&GR, MoJS, Shri Anand Mohan, Joint Secretary (RD&PP), DoWR, RD&GR, MoJS, Shri Ranbir Singh, Chairman, Brahmaputra Board, Mr. Amitabh Tripathi, Sr. Executive Director, WAPCOS, Vice admiral Deepak Goswami, DGNP, Mumbai, and a delegation from world bank among others have also visited the CWPRS during the past year.

CWPRS has hosted variety of events during the past F.Y. 2024-25, viz. Organizing Hindi workshops, Blood Donation Camp, Yoga event on International Day of Yoga, multiple induction trainings for the newly recruited staff across cadres, inauguration of Dr. Tarapore Lecture Hall, Numerical Simulation Lab, Planation drive under “ek ped maa ke Naam” (Plant4Mother), Swachhta hi Seva Pakhwada, Vigilance Awareness Week among the others. CWPRS has, also, taken part in the proud celebrations of 78th Independence Day, 76th Republic Day through various cultural and physical activities. International Conference HYDRO-2024, Transfer workshop on “Climate Hazards and Climate Resilient Coastal Structures” have been successfully organized by CWPRS along with various training programs for knowledge dissemination and training of outside participants throughout the year 2024-25.

AWARDS & ACCOLADES

Central Water and Power Research Station has showcased its excellence in physical model studies through securing Best Exhibition Award in 8th India Water Week-2024 held during 17th to 21st September 2024 and organized by Ministry of Jal Shakti. CWPRS has also secured 3rd best performing organization award during Swachhata Pakhwara awards. Further, CWPRS was conferred with CII Awards for Excellence in Women in STEM, organized by the Confederation of Indian Industry (CII) showcasing institute's resolve for development of water resources sector through inclusion of all sectors of society.



CWPRS received 3rd best performing organization award during Swachhta Pakhwara Awards



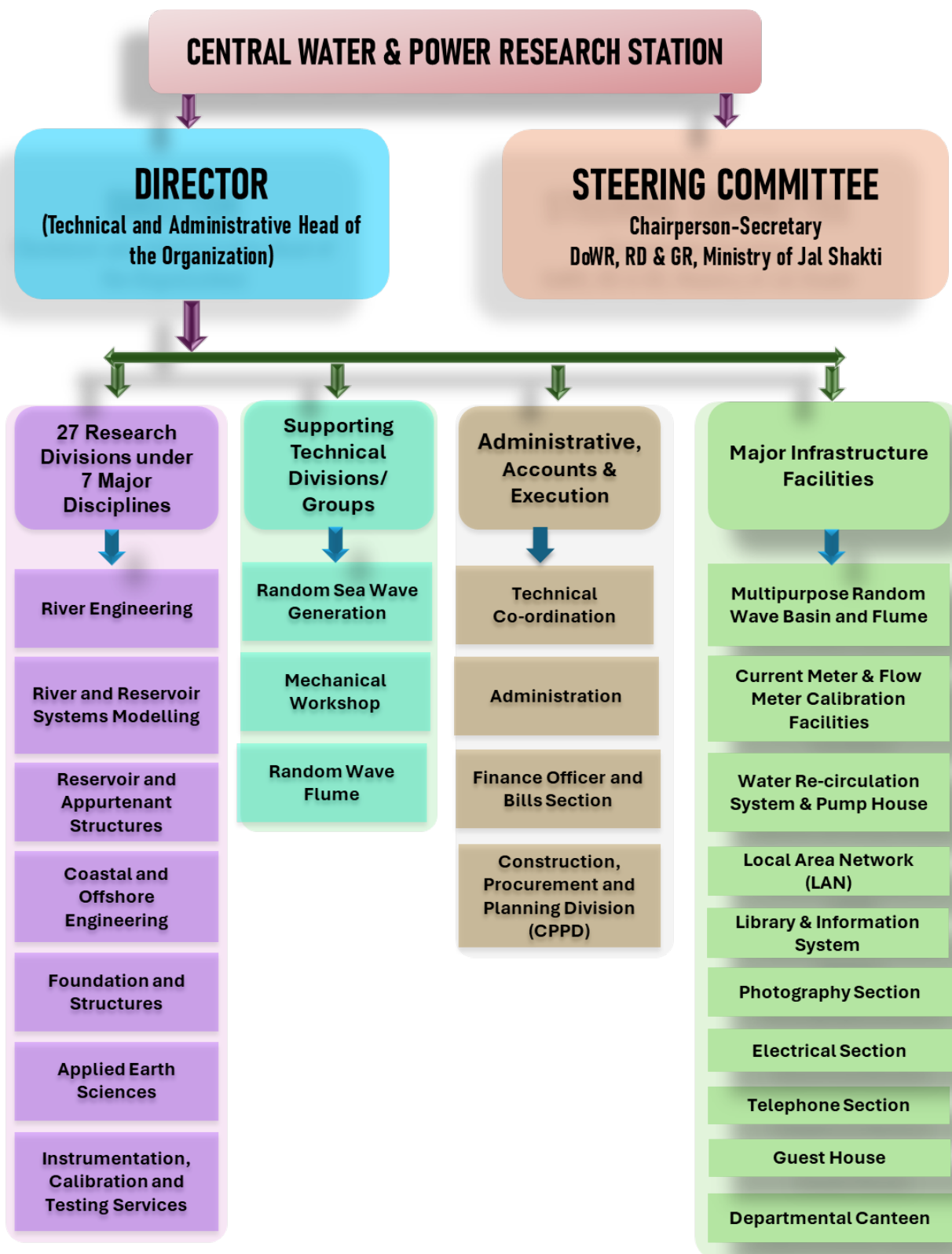
Best Exhibition Award Under Central Government Category in India Water Week- 2024



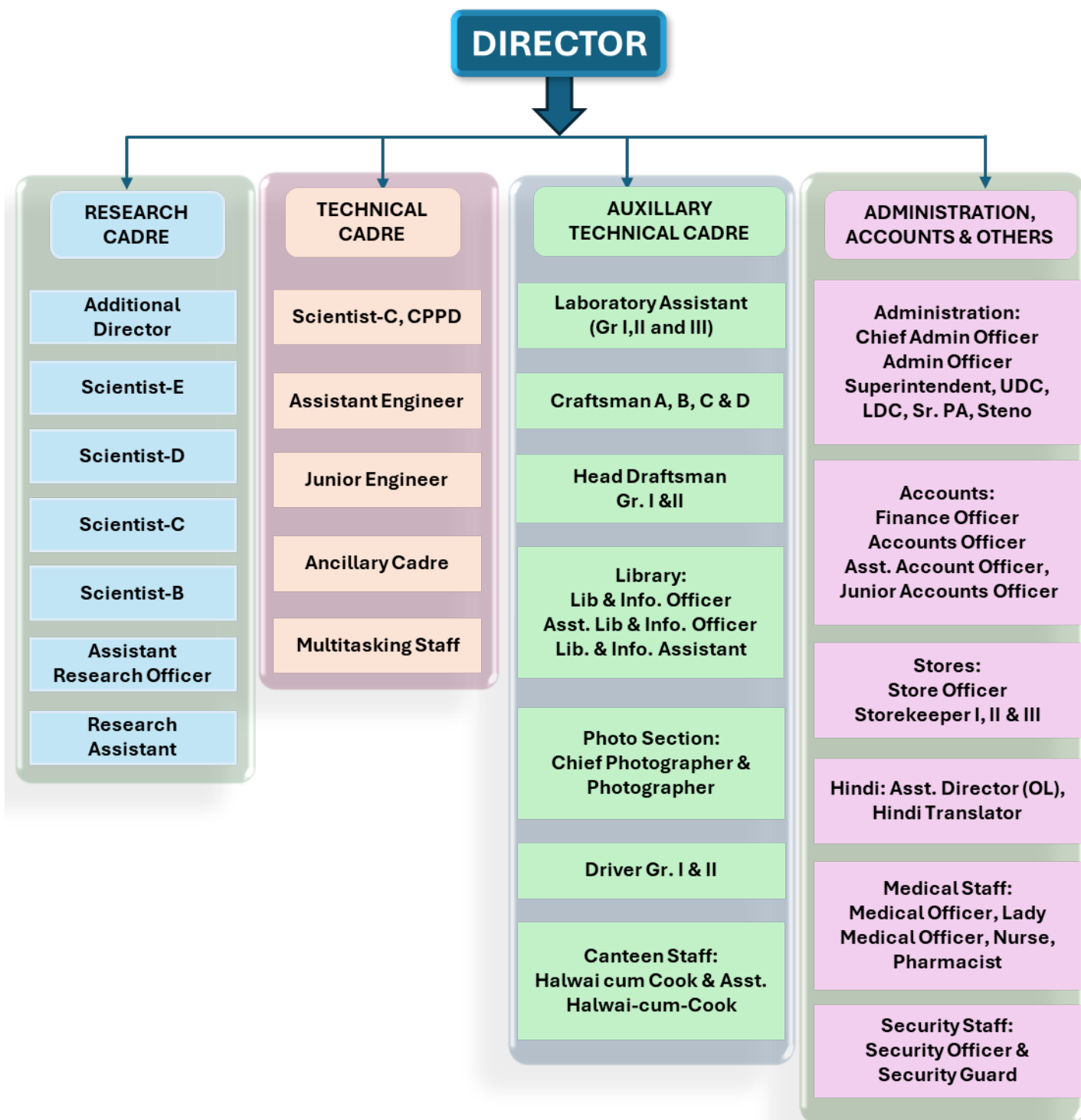
CII Award on Excellence for Women in STEM

PART-I
GENERAL

ORGANIZATIONAL SET UP



ORGANIZATIONAL CHART



BUDGET AND FINANCE

1. Plan Schemes

The main purpose of Plan Schemes is to develop and strengthen the research infrastructure at CWPRS to serve the nation through research more efficiently and effectively. The following scheme was under implementation at the institution during 2024-25.

Name of the scheme	Final Estimate 2024-25
R&D Programme in Water Sector under MoJS, Dept. of Water Resources, River Development & Ganga Rejuvenation– CWPRS component	7.46 Crore

During 2024-25 the following important activities were undertaken under the above-mentioned scheme. R&D in Water Sector, Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation - R&D in Apex organizations – CWPRS component.

Objectives:

Under the Plan scheme “R&D Programme in Water Sector”, CWPRS has mainly aimed at strengthening and modernization of its laboratories, instruments, and infrastructure facilities. Other major items include ICT, Training and Dissemination, Basic Research and Mathematical Modelling Software etc.

Activities:

During 2024-25, actual expenditure of Rs. 7.00 Cr. Against the budget outlay of Rs. 7.46 Cr. Major activities undertaken included:

(i) **Infrastructure:** (Rs. 3.47 Cr)

Activity Undertaken	Cost Incurred (In Cr)
Construction of 2-D flume model for centralized experimental facilities of river engineering studies in REG Hangar	0.40
Construction of Concrete Technology Laboratory	1.90
Extension of Engineering Seismology Observatory	0.10
Upgradation of Vibration Technology Laboratory	0.04
Extension of Rainwater Harvesting, Decomposition unit and amenities	0.18
Renovation and upgradation of residential quarters	0.14
Landscape and Horticulture activities in & around area attached to office campus and guest house/residential complex	0.48
Operation of existing gate of residential complex by maintaining proper gradient and vicinity of existing buildings	0.23

(ii) **Machinery & Equipment** (Rs. 2.73 Cr)

Activity Undertaken	Cost Incurred (In Cr)
Procurement of workstations under development of high-end computing facility for mathematical model in Coastal Engineering	1.49
Upgradation of SMA lab by procurement of Linear electrical resistance strain gauge including workstation and allied IT infra	0.68
Upgradation of Vibration Technology Laboratory by procurement of portable ultrasonic equipment, workstation and IT Infra	0.42
Procurement of ground penetrating radar system for Geo-physical investigation	0.13
Procurement of different electrical and electronic gadgets	0.01

(iii) **Operating Cost** (Rs.0.80 Cr): Expenses for operating cost of training and dissemination, basic research, outsourcing of house-keeping task and electrical usage charges, etc.**2. Non-Plan Budget**

The non-plan budget and expenditure details for the year 2024-25 are given below:

Item/ Head	Amount (Crore)	
	Final Estimate	Actual Expenditure
Salary +DA	82.50	82.50
Non-Salary	10.11	9.64
Total (Gross)	92.61	92.14
Recovery	15.00	15.24
Net	77.61	76.90

MONITORING OF RESERVATION STATUS

1. Minority Welfare

The recruitment of personnel from minority communities and representation of minorities in Selection Committees/Boards is monitored in accordance with guidelines issued by the erstwhile Ministry of Welfare (present Ministry of Social Justice and Empowerment) in March 1990. Three minority officials are appointed at CWPRS from April 2024 to March 2025.

2. Monitoring of Reservation for physically handicapped

Reservation for physically handicapped persons is being made to ensure fulfillment of three percent (3%) quota as stipulated. At present, a total of 28 people with disabilities are working in the Research Station with 03, 08 and 17 in group A, B and C respectively. Benefits earmarked for, like Transport Allowance, Concessions regarding Recruitment fees, Professional Tax exemptions etc. are provided as per Government instructions. Slope ladders and special washrooms are being provided in the Research Station wherever possible.

Group	Position as on 31 st March 2025
	PH
A	03
B	08
C	17
Total	28

3. Monitoring of Reservations for SC/ST/OBC

Monitoring of the recruitment of candidates from SC/ST/OBC category is made following the guidelines issued from time to time. Shri A. V. Mahalingaiah, Scientist 'E' guides the overall matters in this regard as Liaison Officer. A summary of posts filled from SC/ST/OBC categories are given below.

Group	Position as on 31 st March 2025				
	SC	ST	OBC	EWS	UR
A	29	12	35	Nil	79
B	26	11	44	01	97
C	54	23	107	04	155
Total	109	46	186	05	331

4. Preservation and Enforcement of Right to Gender Equality of Working Women

There are five members in the committee for Preservation and Enforcement of Right to Gender Equality of Working Women with the composition of the committee as per the guidelines issued by the Honorable Supreme Court of India. Smt. Lata Gupta, Scientist 'D' is the Chairperson of the committee. Meetings of the committee are held regularly. No complaints were received during 2024-2025.

VIGILANCE AND DISCIPLINARY CASES

Break up of vigilance and disciplinary cases in respect of different categories of staff of CWPRS during 2024-25 is mentioned below in tables, I and II, respectively.

Table - I: Vigilance Cases

Sl. No.	Particulars	Group 'A' & 'B'	Group 'C'
1	No. of cases pending in the beginning of the year	00	00
2	No. of cases added during the year	00	00
3	No. of cases disposed off during the year	00	00
4	No. of cases pending at the end of the year	00	00

Table- II: Disciplinary Cases where the Director, CWPRS, is the Disciplinary Authority

Sl. No.	Particulars	(Categories of officers/staff)		
		Group 'A'	Group 'B'	Group 'C'
1	No. of cases pending in the beginning of the year	NA	01	00
2	No. of cases added during the year	NA	01	00
3	No. of cases disposed off during the year	NA	01	00
4	No. of cases pending at the end of the year	NA	01	00

Vigilance Awareness Week

As part of vigilance awareness Programme, **Vigilance Awareness Week** was observed at Central Water and Power Research Station (CWPRS), Pune from 28th October 2024 to 03rd November 2024.



Essay and Elocution Competitions held during the Vigilance Awareness Week

RTI ACT, GRIEVANCE REDRESSAL MECHANISM AND CITIZEN'S CHARTER

1. RTI Act

Under the provisions of Section 4 (b) of RTI Act 2005, manual giving Suo-moto information on CWPRS has been published on the Website www.cwprs.gov.in as a part of implementation of the act. The manual is periodically being updated.

Further, all efforts are being taken to administer and implement the act. The citizens are also given guidance in obtaining information under the act. The names, addresses, and other details regarding the Appellate Authority, Public Information Officer, Transparency Officer and Nodal Officer are given below.

Appellate Authority	Dr. R. G. Patil Additional Director, CWPRS, Khadakwasla, Pune 411024 Tel.: 020-24103444 E-mail: patil.rg@cwprs.gov.in
Public Information Officer	Dr. M. Selva Balan Scientist-E CWPRS, Khadakwasla, Pune- 411024 Tel: 020-24103391; Mobile: 9423235127 E-mail: cpio-cwprs@cwprs.gov.in
Transparency Officer	Dr. Jireshwar Sinha Scientist-E CWPRS, Khadakwasla, Pune- 411024 Tel: 020-24103293; Mobile: 9422530452 E-mail: sinha.j@cwprs.gov.in
Nodal Officer	Dr. M. Selva Balan Scientist-E CWPRS, Khadakwasla, Pune- 411024 Tel: 020-24103391; Mobile: 9423235127 E-mail: cpio-cwprs@cwprs.gov.in
Asst. Public Information Officer	Smt. Anuja Rajagopalan Scientist-C CWPRS, Khadakwasla, Pune- 411024 Tel: 020-24103409; Mobile : 9421001204 E-mail: anuja.r@cwprs.gov.in

The Department of Personnel and Training (DoPT) has launched a web portal "RTI Online" with URL <https://rtionline.gov.in/RTIMIS> for receiving and processing RTI applications, appeals online, with the facility to align all the Public Authorities (PAs) of Government of India.

As per the directives, CWPRS has aligned with this RTI-MIS online portal of DoPT and started processing of all requests for seeking information under RTI Act, appeals through RTI-MIS portal. All

requests which have been received manually are also being processed and disposed-off through the RTI-MIS online portal.

As per the requirements of this online RTI-MIS system, user accounts have been created for Nodal Officer (RTI), CPIO, FAA and five Deemed Public Information Officers (DPIOs).

Information on requests and appeals handled under the act during 2024-25 is summarized below.

	Opening balance as on 1/04/2024	Received during 2024-25(including cases transferred to other Public Authority)	No. of cases transferred to other Public Authorities	Decisions where requests/ appeals rejected and disposed off	Decisions where requests/ appeals accepted and disposed off
Requests	4	104	7	0	100
First Appeals	1	19	0	0	19
Amount of Charges Collected (Rs) 90					
Registration fee amount		Additional fee & any other charges		Penalties amount	
90/-		Nil		Nil	

2. Grievance Redressal Mechanism

A Grievance Cell under the chairmanship of **Dr. Jiweshwar Sinha, Scientist-E**, functions with the objective of looking into the grievances and for their redressal. The relevant data relating to cases handled during 2024-25 is given below:

Grievance cases pending as on 31 st March 2024	-
Cases received during 1 st April 2024 to 31 st March 2025	19
Cases disposed off during 1 st April 2024 to 31 st March 2025	17
Cases pending as on 31 st March 2025	2

The Centralized Public Grievance Redress and Monitoring System (CPGRAMS), the web-based portal that enables an Indian citizen to lodge a complaint from anywhere and anytime directly, has been implemented at CWPRS. Periodical updating of the entries is being carried out and relevant reports are submitted monthly, quarterly, half yearly and yearly.

3. Citizen's Charter

The Citizen's Charter in respect of CWPRS, formulated by a Task Force specially constituted for the purpose, has been subsequently upgraded/ revised/ modified in pursuance of related instructions/communications from the Ministry from time to time, including the 7-step model for 'Servottam for Citizen Centricity in administration' as per relevant instructions of DARPG. The main components of the Citizen's Charter include Vision and mission statement, details of business transacted and customers/ clients, service provided by the organization, details of grievances redress mechanism in place and expectations from clients. Presently the Charter is in the process of getting formal approval from MoJS, Dept. of WR, RD&GR

IMPORTANT VISITORS



Mrs. Debashree Mukherjee, Secretary, DoWR, RD & GR, MoJS visited CWPRS for the first meeting of the Steering Committee on 13th May 2024 and visited various models during the visit.



Delegation of officials from Nepal visited Exhibition Hall and various models at CWPRS on 15th May 2024



Shri Munish Sharma, Editor of the newspaper 'Dainik Bhaskar' visited CWPRS on 6th June 2024.



Shri Anand Mohan, Joint Secretary (RD & PP), DoWR, RD & GR, Ministry of Jal Shakti visited CWPRS on 08th July 2024.



Shri Ashok Kumar Nautiyal, CEO, Ratle, Hydroelectric Power Corporation Ltd. visited CWPRS on 10th July 2024



Officials from Central Government Health scheme (CGHS) visited CWPRS on 12th July 2024.



Shri Ranbir Singh, Chairman, Bramhaputra Board visited CWPRS on 23rd July 2024.



The delegation, comprising Mr. Amitabh Tripathi (Sr. Executive Director, WAPCOS), Mr. P. S. Mukhopadhyay (Chief Engineer, WBSEDCL), Mr. Yutaro Mizuhashi (Design Engineer, JPOWER) visited CWPRS on 22nd November 2024 to discuss hydraulic model studies pertaining to 1000 MW Turga Pumped Storage project in West Bengal.



Dr. M. Ravichandran, Secretary Ministry of Earth Sciences and Dr. R. Krishnan, Director, Indian Institute of Tropical Meteorology (IITM), Pune visited CWPRS on 18th December, 2024



Shri. Sandeep Tambe, Secretary, Department of Science and Technology, Government of Sikkim visited CWPRS on 02nd January 2025.



Padma Shri Dr. Shailesh Nayak (Ex-Secretary, Ministry of Earth Sciences Government of India & Director, NIAS Bangalore) and other distinguished members of the benchmarking team visited CWPRS on 13th January 2025



The delegation of the World Bank officials visited CWPRS on 17th January 2025.



Shri K. R. Parikh, Secretary along with other officials from Kalpasar Project, Government of Gujarat visited CWPRS during 06th – 07th February 2025.



Vice Admiral Deepak Goswami, DGNP Mumbai along with officials from DGNP and RITES Ltd. Visited CWPRS on 18th February 2025



A Team of Administrative College of India (ASCI), Hyderabad visited CWPRS from 18th March 2025 to 21st March 2025 and held discussions at various levels

IMPORTANT EVENTS



“हिन्दी कार्यशाला” का आयोजन 05 अप्रैल 2024 को किया गया



Mrs. Debashree Mukherjee, Secretary, DoWR, RD & GR, MoJS has chaired the 1st Steering Committee meeting on May 14th, 2024, at CWPRS. Launching of HYDRO-2024 First Bulletin and Address to the scientific community at CWPRS by Mrs. Debashree Mukherjee, Secretary, has taken place during the event.



Blood donation camp organized at CWPRS in Collaboration with Sassoon General Hospital, Pune on "World Blood Donor Day" June 14th 2024.



"Yoga for Self and Society" under "International Day of Yoga" celebrated at CWPRS on 21st June 2024.



Induction training on "About CWPRS activities" for newly recruited staff of CWPRS during 08-12 July 2024 at CWPRS, Pune.



केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 15 अगस्त 2024 को "78 वां स्वतंत्रता दिवस" मनाया गया ।



Inauguration of Padmashri Dr. Tarapore lecture hall on Independence Day by Dr. R. S. Kankara, Director, CWPRS



Plantation event at CWPRS under “एक पेड़ माँ के नाम” –Plant 4 Mother Campaign on 29th August 2024



Pledge taken by CWPRS officers & employees under “Swachhata Hi Seva Pakhwada” on 17th September 2024. The event included activities such as planting of saplings in the office campus and the walkathon by the staff.



संघ की राजभाषा नीति के कार्यान्वयन हेतु केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 'हिंदी पखवाड़ा-2024' के अंतर्गत प्रतियोगिताएँ दिनांक 18-25 सितम्बर के दौरान आयोजित की गयी।



Inauguration of "Numerical Simulation Lab" by Director, CWPRS on 08th October 2024.



Transfer workshop on “Climate Hazards and Climate Resilient Coastal Structures” organized by ABCD Centre; IIT Madras, Chennai and CWPRS, Pune collaborating with IAHR-IIT Madras Institute Chapter and IAHR SI YPN and ISH during 17-18 October 2024



CWPRS conducted an outreach event on 08th October, 2024 at ZP School, Gorhe Budruk, Pune under ‘Public Outreach and Awareness Campaign’ under Community Program.



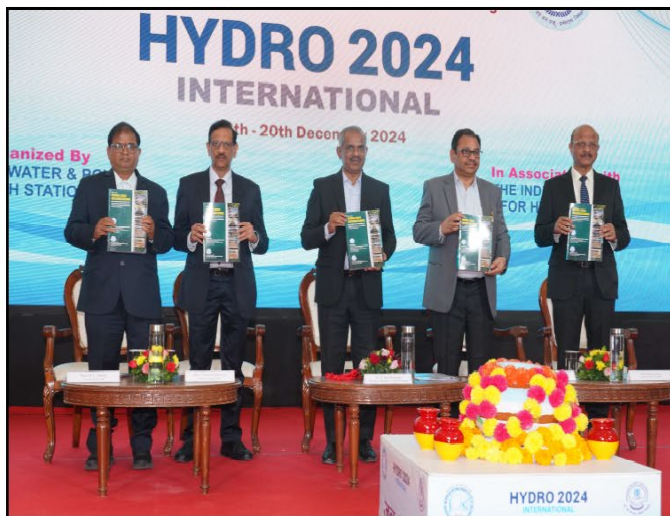
Various activities held under 'Vigilance Awareness Week' at CWPRS during 28th October 2024 – 03rd November 2024



A motivational lecture organized on "Stress management through yoga and laughter therapy" by Shri Sewak Ram Jagwani, Retired. Director, CWC and a motivational speaker on 07th November 2024 at CWPRS.



A Technical Workshop on "Water Resource Management and Conservation" for Women in STEM organized at CWPRS on 26th November 2024



HYDRO-2024, an international conference focused on Hydraulics, Water Resources, River and Coastal Engineering, is organized by CWPRS during 18-20 December, 2024. Various events, such as, launching of re-designed CWPRS website, HYDRO-2024 souvenir, coffee table book, unveiling of CWPRS Brochure, Compendium on Spillway and Energy Dissipators design, Technical Memorandum on Coastal Structures design have taken place during the HYDRO. Multiple keynote lectures on variegated fields from water resources have been delivered by experts from relevant fields. More than 300 technical papers were presented during the conference.



The Apex committee, chaired by Padma Shri Dr. Shailesh Nayak (Ex-Secretary, MoES, Govt of India & Director, NIAS Bangalore), convened on 13th January 2025 at CWPRS to assess the progress of Benchmarking study led by ASCI.



26 जनवरी 2025 को केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 76 वां गणतंत्र दिवस मनाया गया |



Dr. R. S. Kankara, Director, CWPRS and Shri Pradeep Tyagi, Vertical Head-BPA, RITES Ltd signed a MoU at CWPRS, Pune on 18th February 2025.



Women's Day' celebration on 10th March 2025 at CWPRS, Pune



Various programs/activities have been carried out by CWPRS as part of the "Swachhata Pakhwada 2025" special campaign from 17th to 31st March 2025

राजभाषा हिंदी के प्रगामी प्रयोग से संबंधित प्रमुख गतिविधियाँ

(वर्ष: 2024-25)

इस अनुसंधान शाला में कार्यालयीन कामकाज में हिंदी के प्रगामी प्रयोग से संबंधित गतिविधियों के बारे में निम्नानुसार जानकारी प्रस्तुत है :

हिंदी दिवस तथा हिंदी पखवाड़ा :

राजभाषा विभाग, गृह मंत्रालय द्वारा जारी दिशा-निर्देशों के अनुसार माननीय गृह एवं सहकारिता मंत्री जी की अध्यक्षता में दिनांक 14 सितंबर 2024 और 15 सितंबर 2024 को नई दिल्ली में आयोजित हिंदी दिवस तथा चौथे अखिल भारतीय राजभाषा सम्मेलन में अनुसंधान शाला के प्रतिनिधि के रूप में श्री विशाल दिलीप दोंड, मुख्य प्रशासनिक अधिकारी एवं राजभाषा अधिकारी, सुश्री विजया नागपुरे, सहायक निदेशक (राजभाषा) एवं श्री रंजीत निगम, अवर श्रेणी लिपिक ने भाग लिया। प्रति वर्ष की भांति इस वर्ष भी हिंदी पखवाड़े के दौरान अनुसंधान शाला में राजभाषा कार्यान्वयन समिति के मार्गदर्शन में हिंदी निबंध, हिंदी प्रश्नमंच, तकनीकी शब्दों का अनुवाद, हिंदी शुद्धलेखन, तकनीकी संगोष्ठी प्रतियोगिता, हिंदी टंकण, हिंदी पोस्टर आदि प्रतियोगिताओं का आयोजन किया गया। इन प्रतियोगिताओं में संस्था के अधिकारियों एवं कर्मचारियों ने उत्साह से भाग लिया। भारत सरकार द्वारा लागू 'मूल रूप में हिंदी टिप्पण आलेखन पुरस्कार योजना' अनुसंधान शाला में लागू की गई। इन प्रतियोगिताओं में योग्यता प्राप्त अधिकारियों एवं कर्मचारियों को मुख्य अतिथि के करकमलों द्वारा नकद पुरस्कार एवं प्रमाणपत्र देकर सम्मानित किया गया। इस अवसर पर डॉ. सुनील देवधर, भूतपूर्व सहायक निदेशक (राजभाषा), आकाशवाणी, पुणे मुख्य अतिथि के रूप में उपस्थित थे।



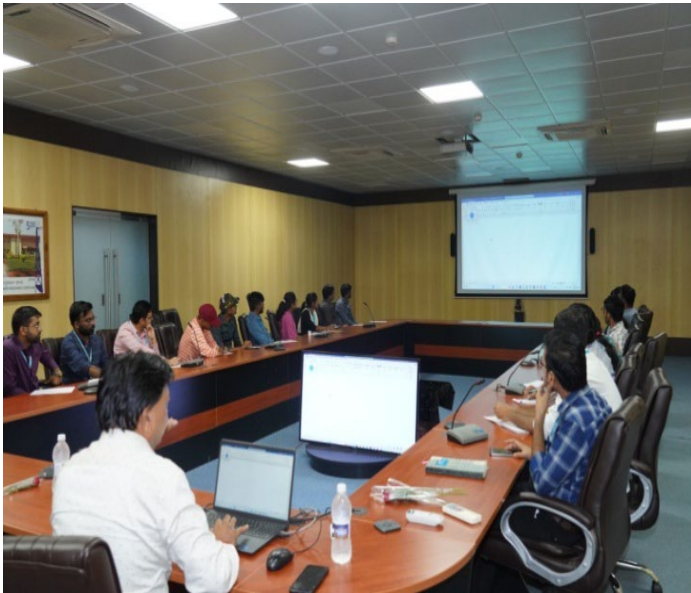
मुख्य अतिथि डॉ. सुनील देवधर, भूतपूर्व सहायक निदेशक (राजभाषा), आकाशवाणी पुणे को दिनांक २९ सितंबर, के दिन केन्द्रीय जल एवं विद्युत अनुसंधान संस्थान के निदेशक द्वारा स्मृति चिह्न प्रस्तुत करके हिंदी पखवाड़ा २०२४ का शुभारम्भ किया गया।

हिंदी गृह पत्रिका “जलवाणी” का प्रकाशन:

हिंदी पखवाड़ा समापन समारोह के अवसर पर मुख्य अतिथि के करकमलों द्वारा अनुसंधान शाला की हिंदी गृह पत्रिका “जलवाणी” के इकत्तीसवें अंक का विमोचन किया गया। अनुसंधान शाला के अधिकारियों एवं कर्मचारियों ने उक्त पत्रिका में विभिन्न विषयों पर लेख, कविता, कहानियाँ आदि लिखकर अपना बहुमूल्य योगदान दिया है।



केन्द्रीय जल एवं विद्युत अनुसंधान शाला की हिन्दी गृह पत्रिका “जलवाणी” के ३१ वें अंक का विमोचन



तकनीकी /प्रशासनिक हिंदी कार्यशालाओं में उपस्थित अधिकारी व कर्मचारी

तकनीकी/ प्रशासनिक हिंदी कार्यशाला का आयोजन:

गृह मंत्रालय द्वारा जारी वार्षिक कार्यक्रम में दिए गए निर्देशों के अनुसार अनुसंधान शाला में दिनांक 5 अप्रैल 2024, 22 जुलाई 2024, 25 अक्टूबर, 2024 एवं 09 दिसंबर 2024 को प्रशासनिक/तकनीकी हिंदी कार्यशालाएँ आयोजित की गई जिसमें अनुसंधान शाला के विभिन्न पदों पर आसीन अधिकारियों/ कर्मचारियों ने भाग लिया। प्रशिक्षण कार्यक्रम में संघ की राजभाषा नीति, सरकारी पत्राचार के नमूने, टिप्पण, आलेखन एवं भाषा और वर्तनी के बारे में उपयोगी सामग्री उपलब्ध कराई गई। तकनीकी व्याख्याताओं ने तकनीकी विषयों पर व्याख्यान दिए। व्याख्याताओं द्वारा आलेख, चित्रों और विडियो के माध्यम से सहज और सरल तरीके से तकनीकी विषयों को हिंदी भाषा में समझाने की कोशिश की गई। इन कार्यशाला में व्याख्यान देने वाले व्याख्याताओं के नाम, पदनाम और उनके व्याख्यान के विषय निम्नानुसार थे :

क्र. सं.	व्याख्याता का नाम पदनाम	विषय/सारांश का नाम
1.	श्री मोहम्मद जियाउल कमर, वैज्ञानिक 'सी'	जलविद्युत परियोजनाएं : जलाशय तलछट प्रबंधन और बाईपास टनल के लिए प्रतिमान अध्ययन
2	श्रीमती शिवानी साहु, वैज्ञानिक 'सी'	तटीय क्षेत्रों पर जलवायु परिवर्तन का प्रभाव एवं संख्यात्मक मॉडलिंग द्वारा उपयुक्त सुझाव
3	श्री राजेन्द्र प्रसाद वर्मा, सहायक निदेशक (टंकण/ आशुलिपि), हिंदी शिक्षण योजना, पुणे	हिंदी में उपलब्ध आधुनिक ई-टूल्स की सुविधाएं
4	सुश्री विजया नागपुरे, सहायक निदेशक (राजभाषा)	संघ की राजभाषा नीति एवं कार्यान्वयन

संगणकों में हिंदी सॉफ्टवेयर :

अनुसंधान शाला के सभी संगणकों में हिंदी सॉफ्टवेयर डलवाए गए हैं जैसे iLeap, ISM Office, ISM Publisher और iTranslator इत्यादि। यूनीकोड आधारित सॉफ्टवेयर ISM V6 नेट वर्जन का प्रयोग किया जा रहा है। साथ ही गुगल आधारित यूनीकोड सॉफ्टवेयर का प्रयोग भी किया जा रहा है। हिंदी कार्यशालाओं के माध्यम से अधिकारियों/ कर्मचारियों को इस संबंध में वर्तमान में उपलब्ध आधुनिक तकनीकों के बारे में प्रशिक्षण दिया जा रहा है।

हिंदी वेबसाइट :

इस अनुसंधान शाला की वेबसाइट www.cwprs.gov.in बनाई गई है जिसमें संस्था के बारे में जानकारी हिंदी में उपलब्ध कराई गई है। इसे 18 दिसंबर 2024 को अद्यतन भी किया गया है।

अनुसंधान शाला के इन्टरनेट पर हिंदी में नेमी प्रपत्र/ मानक मसौदे उपलब्ध कराना:

प्रतिदिन काम आनेवाले नेमी क्रिस्म के प्रपत्र, मानक मसौदे जैसे आकस्मिक छुट्टी के आवेदन, कार्यग्रहण रिपोर्ट, प्रस्थान रिपोर्ट, प्रभागों/अनुभागों के नाम, मंत्रालयों / विभागों के नाम, छुट्टियों के प्रकार, वर्तनी, संदेश, गृह पत्रिका "जलवाणी", हमेशा प्रयुक्त होने वाले वाक्यांश आदि इन्टरनेट पर हिंदी में उपलब्ध कराए गए हैं। हिंदी नियम पुस्तिका,

गृह मंत्रालय के राजभाषा विभाग द्वारा प्रतिवर्ष जारी वार्षिक कार्यक्रम तथा अनुसंधान शाला के सभी प्रयोगशालाओं की तकनीकी शब्दावली को भी इन्टरनेट पर उपलब्ध कराया गया है।

हिंदीभाषा तथा टंकण प्रशिक्षण :

हिंदी शिक्षण योजना, पुणे द्वारा संचालित भाषा, टंकण तथा आशुलिपि प्रशिक्षण पाठ्यक्रम हेतु अनुसंधान शाला से बारी-बारी से अधिकारियों/ कर्मचारियों को नामित किया जाता है। वर्तमान में अनुसंधान शाला के तीन कर्मचारी हिंदी टंकण का प्रशिक्षण प्राप्त कर रहे हैं।

विभागीय निरीक्षण :

हिंदी पत्राचार को बढ़ाने तथा गृह मंत्रालय के राजभाषा विभाग द्वारा समय-समय पर जारी अन्य निर्देशों के अनुपालन को सुनिश्चित करने हेतु सहायक निदेशक (राजभाषा) द्वारा व्यक्तिगत रूप से प्रशासन अनुभाग, निर्माण, क्रय और योजना कक्ष तथा बिल अनुभाग का निरीक्षण किया गया। निरीक्षण के दौरान यह पाया गया कि लगभग सभी प्रभागों में अग्रेषण पत्र, छुट्टी के आवेदन, कार्यभार प्रस्थान तथा कार्यभार ग्रहण रिपोर्ट आदि कार्य नियमित रूप से हिंदी में किए जा रहे हैं। निरीक्षण के दौरान अन्य विषयों से संबंधित पत्राचार को भी हिंदी में करने के लिए मार्गदर्शन किया गया। अनुसंधान शाला में हिंदी के प्रयोग को बढ़ावा मिलने के उद्देश्य से राजभाषा विभाग द्वारा जारी जांच बिन्दुओं को सभी अनुभागों एवं प्रभागों में परिचालित किया गया और सभी से अनुरोध किया गया कि अपने-अपने प्रभागों में उसका अनुपालन सुनिश्चित किया जाए। साथ ही हिंदी में प्रवीणता प्राप्त कर्मचारियों को हिंदी में कार्य करने हेतु व्यक्तिशः आदेश जारी किए गए।

हिंदी में कार्य के लिए अनुभागों का नामांकन:

निम्नांकित प्रभागों/अनुभागों को कार्य की कुछ मदें हिंदी में करने के लिए विनिर्दिष्ट किया गया है:

क्र.सं.	प्रभाग/ अनुभाग	प्रभाग/ अनुभाग द्वारा हिंदी में किए जाने वाले कार्य
1.	प्रशासन	• "क", "ख" और "ग" समूह के कर्मचारियों की सेवा पुस्तिकाओं में प्रविष्टियाँ • छुट्टियों के कार्यालय आदेश • आवधिक वेतन वृद्धि के प्रमाणपत्र • छुट्टी यात्रा रियायत अग्रिम का आदेश • वेतन नियतन के कार्यालय आदेश • सेवा निवृत्ति के आदेश • कर्मचारियों की वरिष्ठता सूची • आवास आबंटन की अग्रता सूची • दौरा अग्रिम के आदेश • कुछ फ़ाइलों में टिप्पण और आलेखन

2.	प्रशासन (नि. औ. स्था.)	•कर्मचारियों की सेवा पुस्तिकाओं में प्रविष्टियाँ •छुट्टियों के कार्यालय आदेश •आवधिक वेतन वृद्धि के प्रमाणपत्र •कर्मचारियों को ज्ञापन •छुट्टी यात्रा रियायत अग्रिम का आदेश •वेतन नियतन के कार्यालय आदेश •सेवा निवृत्ति के आदेश •कर्मचारियों की वरिष्ठता सूची •कुछ फ़ाइलों में टिप्पण और आलेखन
3.	बिल अनुभाग	•चिकित्सा अग्रिम के आदेश •चिकित्सा अग्रिम से संबंधित जाँच सूची •दौरा अग्रिम के आदेश
4.	निर्माण तथा क्रय कक्ष	•बेबाकी प्रमाण पत्र •चेकों के अग्रेषण पत्र •प्राप्त हुए भुगतान की पावती
5.	तटीय इंजीनियरिंग के लिए गणितीय प्रतिमानन (संगणक)	•तकनीकी रिपोर्टों के सारांश तथा अन्य कार्यों में यथासंभव हिंदी का प्रयोग
6.	नदी जलगति विज्ञान	•तकनीकी रिपोर्टों के सारांश तथा अन्य कार्यों में यथासंभव हिंदी का प्रयोग •“जलवाणी” में लेख लिखकर कर्मचारियों का योगदान
7.	जल गुणवत्ता विश्लेषण तथा प्रतिमानन	•तकनीकी रिपोर्टों के सारांश तथा अन्य कार्यों में यथासंभव हिंदी का प्रयोग

तकनीकी काम में हिंदी का प्रयोग :

अनुसंधान शाला के विभिन्न प्रभागों/अनुभागों द्वारा किए जाने वाले अध्ययनों के आधार पर परियोजना प्राधिकारियों को भेजे जाने वाली तकनीकी रिपोर्टों के सारांश, अग्रेषण पत्र, रिपोर्ट प्रलेख पत्र, सार, प्राक्कलन, विषय सूची आदि मर्दे अंग्रेजी के साथ हिंदी में भी भेजी जा रही है।

e-GOVERNANCE ACTIVITIES AT CWPRS

The National e-Governance Plan (NeGP), takes a holistic view of e-Governance initiatives across the country, integrating them into a collective vision. In this connection, various e-Governance activities like e-Office, eHRMS, SPARROW, GeM, eProcurement etc. have been implemented at CWPRS.

1. e-Office

e-Office is a Mission Mode Project (MMP) under the National e-Governance Programme of the Government. The product is developed by National Informatics Centre (NIC) aimed at improving internal efficiencies in organization through electronic administration leading to informed and quicker decision making, which in turn results in better public service delivery. It promotes less paper office with greater collaboration and knowledge sharing. It assures more efficient, effective and transparent inter-government and intra-government transactions and processes. The product is built as single reusable system by bringing together independent functions and systems under a single framework to enhance transparency, increase accountability and transform the government work culture and ethics. As per MoWR order No. F. No. J-11011(1)/1/2017-e-Gov dated 17/02/2017, CWPRS initiated the implementation of e-Office Premium for 500 users and has been operational since 10th October 2018. CWPRS has constituted Project Steering Committee (PSC) under the chairmanship of Director, CWPRS for smooth implementation of e-Office as per guidelines mentioned in e-Office Governance Structure. Project Implementation Committee (PIC) has also been formed comprising representatives from different divisions of CWPRS for overall direction and leadership for the implementation in the divisions. Govt email ids for the employees which is a prerequisite for e-office have been created. E-Office instance for CWPRS www.cwprs.eoffice.gov.in has been created. 34 Mbps NICNET connection has been established between NIC, Pune and CWPRS, Pune which is also a prerequisite for e-Office. As a part of the implementation of e-Office, CWPRS had accomplished the formation of e-Office Helpdesk comprising three experts in e-Office from NIC. This team was providing support to the officials of CWPRS for using e-Office for one year. Employee Master Data (EMD) of staffs from different divisions have been collected through PIC members and completed creation of around 200 e-Office user accounts.

One of the important modules in e-Office is e-File. It is a workflow-based system that replaces the existing manual handling of files with a more efficient electronic system. This system involves all stages, including the electronic diarization of inward correspondence, creation of files, movement of correspondences and files, electronic signing of noting & drafts using Digital Signature Certificates (DSC), e-Sign, and finally, the archival of records.

Setting up of e-Office compatible infrastructure has also been carried out at CWPRS. While switching over to e-Office environment, it was observed that the service divisions like Admin, Bills, CPC, TC Division etc were having very limited number of PCs, Printers, Scanners and that were also 8-10 years old and difficult for working in e-Office environment. In this connection, a proposal for procuring infrastructure had been submitted to Ministry and an amount of Rs.42 lakhs was allotted for the same. Accordingly, 76 PCs, 84 UPS, 3 high speed scanners and 6 Laser printers were procured and distributed to various service divisions.

Currently, about 450 e-office accounts are existing in CWPRS e-office module. All RA and above officials are having access to e-office module. All employees of CWPRS are provided with government email ids for smooth handling of various online platforms.

2. Electronic Human Resource Management System (eHRMS)

e-HRMS is an online portal to provide end to end HR services to the government employees which comprises of e-leave module, reimbursements, tour module etc. eHRMS Manav Sampada hosted by NIC was implemented in CWPRS on 2019 and at present it is migrated to DoPT EHRMS 2.0. Through this module, the organization can manage employee leaves/IPR etc., access and publish Circulars/OM/Orders etc.

3. Smart Performance Appraisal Report Recording Online Window (SPARROW)

SPARROW platform facilitates the electronic filling of Performance Appraisal Reports by officers in a user friendly and secured way through NICNET connectivity. Online APAR submission has been made live for approximately all employees of different cadres such as RA, ARO, Scientist – B, C, D, E and Additional Directors. This includes implementation of Standard and Representation APAR Workflow in the system. The e-Governance Team has provided demonstrations to fill up, submit, disclose, accept, represent and close an APAR to all users.

4. Central Public Procurement Portal (CPPP)

National Informatics Centre (NIC), Ministry of Electronics & Information Technology, in close association with the Procurement Policy Division, Ministry of Finance, has developed, hosted and implemented the Central Public Procurement Portal customized to cater to the electronic procurement/ tendering requirements of the Central Government Departments and other organizations. The primary objective of the portal is to provide a single point access to the information on procurements made across various Ministries and the line Departments. The CPP Portal is accessible at the URL <https://eprocure.gov.in> and it has e-publishing and e-procurement modules.

CWPRS is extensively using CPPP portal for all its Civil Works tenders. All procurement related activities for Goods and Services are being carried out using GeM.

LIBRARY AND INFORMATION SYSTEM

The Central Water and Power Research Station Library was established in 1938 with the objective of collecting and disseminating literature on various projects on water resources, energy, coastal and hydraulic engineering etc. dealt in the organization. The UNDP/UNESCO aided project "Water and Power Information System" was executed during 1982–88 with the inception of HP 3000 Series and MINISIS Library Management Software to manage and process library databases and other services. In 1998, MINISIS databases migrated to LIBSYS 3.2 version with further upgradation to 4.0 version in the year 2009. In that period, it strengthened the library to a state, from where information on any subject of interest to research personnel were made available from a variety of sources, such as databases, compact discs, microforms and through online searches from international databases.

In 2019, the library underwent a significant transformation by migrating its data from LIBSYS 4.0 LMS System to the Cloud based e-Granthalaya Library Management Software. This migration marked a significant step forward in streamlining operations and enhancing user experience with unlimited storage capacity and 24x7 OPAC services through the internet. Bibliographic details for Books, Conference Proceedings, Reports, and Technical Reports of CWPRS, national and international subscribed journals are accessible via e-Granthalaya Library Management Software. Moreover, users have direct access to e-journals through this platform in the campus. The library has an Institutional Repository, providing access to full-text digital collections including annual reports, conference proceedings, and technical papers of various national and international subscribed journals.

From 2021 onwards, the library has further upgraded to become a digital library, under the funding from the National Hydrology Project and Non-plan schemes. As part of these advancements, the library took measures to enhance document security by implementing an RFID security system with enabled self-check-in check-out facility for the users. Moreover, to embrace the digital environment, a digital reading kiosk was established for accessing digital materials. The CWPRS library took a significant step towards improving the user experience by implementing a touchscreen display with the Online Public Access Catalog (OPAC). This enhancement has made it much more intuitive for scientists and engineers to search and access library resources seamlessly. The touch-screen interface offers a user-friendly experience, making the process efficient and enjoyable.

Furthermore, as part of their digitization efforts for rare library documents, an A3 scanner was installed. This scanner allows for the digitization of valuable and scarce materials, preserving them for easy access and future reference. The combination of the above facilities demonstrates the library's commitment to embracing modern technology and facilitating access to its vast collection of resources. The infrastructure has also been enhanced with RemoteXs software, enabling scientists to access e-Journals from remote locations. Besides online services, the library keeps track of document movement very efficiently through e-Granthalaya system. The library is procuring books, periodicals, reports, and related materials and making them available to the research personnel based on their requirements.

The library boasts an extensive collection of 55,190 Books, Reports and Conference Proceedings, 33 Journals, 22,464 Bound Volumes, and 382 CDs. The library provides access to Online Journals, both in-campus via IP-based access and off-campus access through RemoteXs. All available Technical Reports have been digitized and are accessible for researcher's on-demand. Institutional Repository and Digitized Resources are available

for access on campus. Comprehensive Printing, Reprographic and Binding services are also provided for the entire Institution.

During 2024-2025, Library and Information System has integrated Books, Journals, Bound Volumes, Technical Reports, Online Subscribed Journals access in e-Granthalaya Library Management Software, enabling users to access the complete information of library collections via OPAC (Online Public Access Catalog) 24x7 hours.



The background is a light blue gradient filled with numerous water droplets of various sizes, some in sharp focus and others blurred. At the bottom center, there is a white, cylindrical pedestal or platform. The overall aesthetic is clean, fresh, and scientific.

PART-II RESEARCH & DEVELOPMENT

BACKGROUND

CWPRS is mainly engaged in project specific research to evolve safe and cost-effective designs of hydraulic structures involved in development of water resources, River engineering, power plants, and coastal engineering projects. Physical and mathematical model studies coupled with field and laboratory experiments are carried out for this purpose in the seven major areas of expertise of CWPRS as follows:

- 1. River Engineering:** River Engineering mainly deals with River training and bank protection works, hydraulic design of barrages and bridges, and location and design of water intakes using morphological studies. Field studies for measuring water and sediment discharge in Rivers and canals are also conducted.
- 2. River and Reservoir Systems Modelling:** Hydrologic and meteorological studies are conducted to estimate extreme values of various parameters such as rainfall, temperature and humidity. Flood estimation and forecast, reservoir sedimentation and water quality studies are carried out using mathematical models and field surveys.
- 3. Reservoir and Appurtenant Structures:** Spillways and Energy Dissipators are studied on physical models. Water conductor systems including head race and tail race channels/tunnels and surge shafts are studied on both physical and mathematical models. Studies are carried out on physical models for desilting basins, sedimentation and flushing through reservoirs, sediment exclusion devices. Sedimentation in reservoirs is also assessed through remote sensing.
- 4. Coastal and Offshore Engineering:** This discipline deals with optimization of location, length and alignment of breakwaters, jetties, berths, approach channel, turning circle etc. for development of ports and harbours. Estimation of siltation in harbours, their disposal and sand bypassing, location of sand trap and hot water recirculation studies are carried out using both physical and mathematical models. Suggesting suitable coastal protection measures based on locally available materials is an important activity of the group.
- 5. Foundation and Structures:** Laboratory and field tests are carried out to determine soil, rock and concrete properties. Mathematical modelling as well as experimental studies are conducted for studying the stability and structural safety of dams and appurtenant structures. Field studies are being carried out to assess the health of hydraulic structures and suggest suitable repair measures.
- 6. Applied Earth Sciences:** Seismic surveillance of River-valley projects, assessment of site-specific design seismic parameters, controlled blasting studies for civil engineering construction sites, evaluation of quality of concrete and masonry is done by non-destructive methods and estimation of elastic properties for foundation of massive structures for geophysical methods are the main activities of this group.
- 7. Instrumentation, Calibration and Testing Facilities:** Hydraulic Instrumentation is used for data collection on physical hydraulic models. Field data collection is carried out on coastal parameters like water level, velocity, wave-height etc. A Random Sea Wave Generation (RSWG) system is used for wave flumes and basins. Dam instrumentation is provided on prototype. Current meter and flow meter calibration facilities are also available, which are used extensively.

RIVER ENGINEERING

Divisions

- River Hydraulics
- Bridge Engineering
- Hydrometeorology

Areas of Specialization/ Expertise

• Physical and Mathematical Model Studies for

- Flood control measures
- Bridges, River training & diversions
- River morphological studies
- River training works
- Sediment transport

List of Clients

- State Government Authorities
- National Highway Authority of India (NHAI)
- Farakka Barrage Project
- National thermal Power Corporation (NTPC)
- Nuclear Power Corporation of India Limited (NPCIL)
- Damodar Valley Corporation
- Indian Railways
- Inland Water Ways Authority of India (IWWAI)
- WAPCOS Limited
- Municipal Corporations
- Kosi River
- Ganga River

Hydraulic Model Studies for Revision of Gate Operation Schedule of Farakka Barrage, West Bengal

The Farakka barrage gate operation schedule was framed in the year 2007, was required to be revised taking into account flow conditions upstream and downstream of barrage due to large shoal formations. Considering these facts, the Technical Advisory Committee (TAC) of Farakka barrage during its 113th meeting held at Farakka in December 2017, opined to study the revision of gate operation schedule to improve the flow conditions on both upstream and downstream of Farakka barrage. Studies were carried out on an existing 1/80 Geometrically Similar scale model at CWPRS to get an overall idea of flow conditions under the existing and proposed gate operation schedules for various anticipated discharges viz., 5663 m³/s (2 lakh ft³/s), 14158 m³/s (5 lakh ft³/s) and 22653 m³/s (8 lakh ft³/s). Mathematical model simulations were carried out for the discharges corresponding to 28317 m³/s (10 lakh ft³/s) and 39644 m³/s (14 lakh ft³/s) since physical model had a discharge limitation up to discharge of 22653 m³/s (8 lakh ft³/s). Qualitative analysis was also performed to understand the deposition/ erosion pattern of bed in the vicinity of Farakka barrage. The limitation of opening a minimum of 2 ft gate opening was imposed based on the structural safety requirement of the vertical lift gates. It is concluded from various flow conditions observed on physical and 2-D mathematical model including the morphological analysis that the flow pattern upstream is mainly governed by the morphological behavior starting from the upstream nodal point near Rajmahal. The flow conditions near immediate vicinity of the barrage are only affected by the barrage gate opening schedules. It was recommended to follow the gate operation schedule for both rising as well as falling flood but in a reverse direction. To manage the shoal formed in the upstream pond and the bank erosion experienced along the left bank upstream of barrage, river training works were suggested since gate operation schedule had least impact on it. The hydraulic jump formation with the lean season flows were also assessed for the sweep out conditions and was recommended to follow the guidelines as per the computations submitted to the project authorities.



Typical flow pattern near barrage under proposed gate opening schedule for discharge of 22653 m³/s (8 lakh ft³/s)

Sectional Model Studies for the Existing Balegaon High Level Barrage on River Godavari, Dist. Nanded

A high-level barrage having a total waterway of 277.50 m was constructed across river Godavari in Umri taluka of Nanded district, Maharashtra and was commissioned in the year 2015. The barrage was designed for a highest discharge of 17324 m³/s. In the year 2018, it was noticed that some portion of 'End-Sill' of Energy Dissipation Arrangement (EDA) was damaged and there was a huge scouring immediately downstream of the 'End-Sill'. In this connection studies were conducted on a 1:50 scale geometrically similar sectional model for assessing the adequacy of the EDA. Based on the analysis of proto data, site inspection and experiments conducted on the 2-D sectional model for different conditions considering both existing and revised proposal. Recommendations were made for a secondary suppressed stilling basin with modified dented end sill having sloping face in the upstream and vertically in the downstream. The provision of chute blocks in the EDA was not found effective hence not recommended. Critical conditions for crack opening were identified and cautioned to avoid it. Considering the flow velocity at the end of EDA, the required bed and bank protection works were suggested.



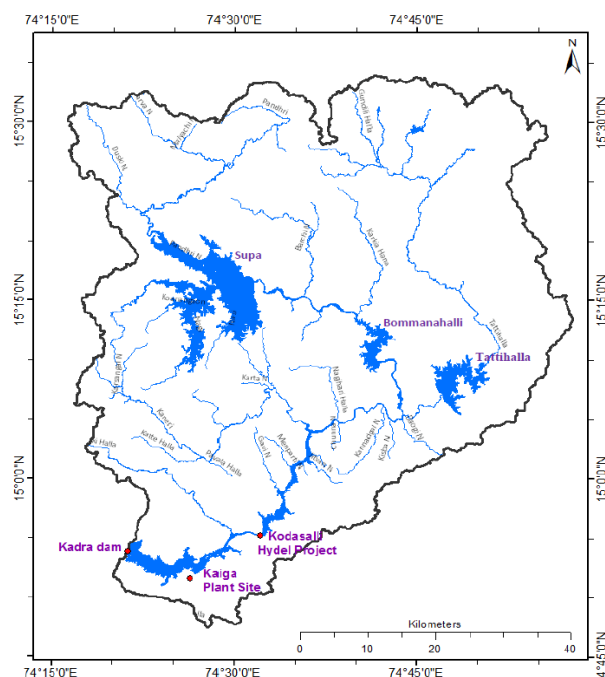
Flow conditions in EDA for Balegaon Barrage



Scour downstream of Balegaon Barrage

Hydrological Impact Assessment and Water Availability Studies for Kaiga Nuclear Power Project, Uttar Kannada, Karnataka for NPCIL, Mumbai

M/s Nuclear Power Corporation of India Limited (NPCIL), Mumbai has proposed expansion of atomic power project at Kaiga, Karnataka by addition of two units Kaiga 5 & 6 with installed power capacity of 700 MWe each in addition to existing four units commissioned in Phase-I Kaiga Generating Station (KGS) (Units 1 & 2) and Phase-II KGS (Units 3 & 4) which are located on the left bank of Kadra reservoir. For the purpose of condenser cooling in power generation through existing operating four units and increased consumptive use of proposed two units, NPCIL will draw 249000 m³/hour quantum of water from Kadra reservoir. After the consumptive use of 7006 m³/hour water, the quantum of water of 241994 m³/hour will be returned back to Kadra reservoir. Regarding this, in order to comply with the Additional Terms of Reference (ToR) by the Ministry of Environment, Forest and Climate Change (MoEFCC) vide dated 12th August 2024, NPCIL, Mumbai requested Central Water and Power Research Station (CWPRS), Pune to carry out the hydrological impact assessment and water availability studies for riparian owners/users in the downstream of Kadra and Kali Nadi due to Nuclear Power Plants/Project at Kaiga Site (operating units 1 to 4 of 220 MWe and proposed units 5 & 6 of 700 MWe) in Karnataka. Accordingly, the studies are carried out by CWPRS and the results are presented in the ensuing technical report.



Reservoirs on Kali Nadi

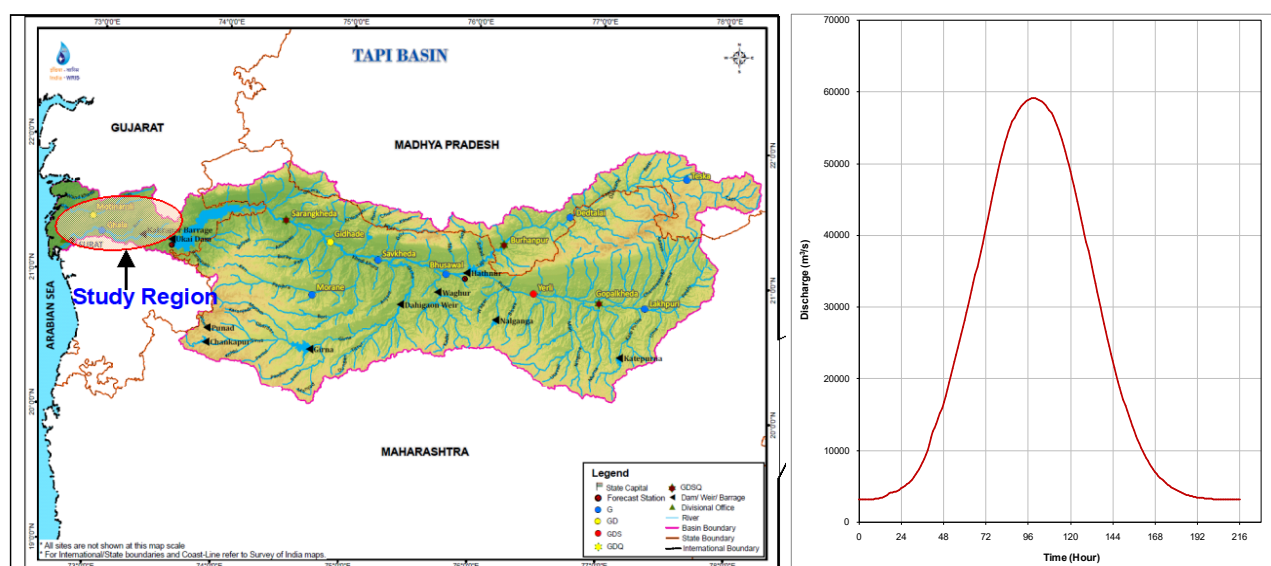
For this purpose, CWPRS collected the inflow and outflow data of Kadra dam, and other data from technical document on 'Water supply scheme to Gotegali, Kerwadi & other habitations in Karwar Taluk of Uttara Kannada District, Karnataka' from the Department of Rural Drinking Water and Sanitation, Government of Karnataka, Bangalore. Also, CWPRS collected the daily rainfall data of five rain gauge stations (viz., Anasi, Haliyal, Kadra, Karwar and Supa) located within and around the study area from India Meteorological Department (IMD), Pune. However, the rainfall data of Karwar was not considered in extreme value analysis (EVA) of rainfall due to inadequacy of data length. An elevation and stream network maps of Kali Nadi upto Kadra dam and land use land cover map of Kali Nadi below Kadra dam was prepared with ArcGIS tool and used in water availability analysis. By using the observed annual 1-day rainfall, the extreme (i.e., 1-day maximum) rainfalls for different return periods at Anasi, Haliyal, Kadra and Supa were computed by adopting Extreme Value Type-1 (EV1) distribution wherein the estimators are determined by method of moments. The effect of climate change in rainfall analysis was carried out by analysing the trend in annual 1-day maximum rainfall (AMR) and annual total rainfall (ATR) through Mann-Kendall and Sen's slope estimator tests. The results of trend analysis of AMRs indicated that there is a decreasing trend for Anasi (1.4 mm/year), Haliyal (0.1 mm/year), Kadra (0.6 mm/year) and Supa (0.2 mm/year). For ATRs, it was found that there is

an increasing trend for Haliyal (4.3 mm/ year) and Kadra (2.3 mm/year) whereas decreasing trend for Anasi (23.8 mm/year) and Supa (11.2 mm/year).

The present and futuristic demands of various riparian users viz., water consumption by NPCIL for Kaiga NPP (Existing Units 1 to 4 & Proposed Units 5 & 6), water for domestic needs with three scenarios (55 litres per capita per day (LPCD) for the years 2023, 2030 and 2038, 90 LPCD and 135 LPCD for the years 2053, 2068 and 2070), requirement of water for irrigation of crops, industrial water demand, institution and commercial water demand and water demand for Livestock were considered while assessing the water availability at the downstream of Kadra reservoir wherein evaporation losses and ecological flow (E-flow) was also considered. By considering all the demands of riparian users, the assessment of water availability was carried out on daily basis and the results showed that there is no shortage of water even after NPCIL withdraws the water from Kadra reservoir for the operation of existing Kaiga (Units 1 to 4) and the proposed Kaiga (Units 5 & 6). The study ensured that the water available could sufficiently meet the futuristic demands of the riparian users for carrying out their activities at the downstream of Kadra reservoir. The study also ensured that the percentage of futuristic NPCIL consumption of water with reference to initial water inventory at Kadra dam during the lean day was computed as about 1.50%. Also, the percentage of futuristic NPCIL (Kaiga Units 1 to 6) consumption is only about 0.05% of the Full Reservoir Level (FRL) of Kadra dam.

Estimation of Design Flood and Water Levels along the Study Reach of Tapi River for the Proposed Conventional Barrage Near Village Rundh Bhatha, Surat, Gujarat.

The Surat Municipal Corporation (SMC) has proposed to construct a barrage across river Tapi near village Rundh-Bhatha in Surat district of Gujarat to meet the requirement of water for domestic purpose. For this purpose, the works related to the survey, investigation, planning and construction work for the barrage has been entrusted to M/s Unique Construction, Surat. In this context, M/s Unique construction requested Central Water and Power Research Station (CWPRS), Pune to carry out the studies related to (i) sedimentation and flushing modeling studies, (ii) estimation of design flood and water level along the study reach, and (iii) geotechnical studies to assess foundation seepage and deformation aspects of the proposed barrage. Accordingly, the Hydrometeorology division of CWPRS carried out the study on estimation of design floods and its corresponding water levels along the study reach of river Tapi for the proposed barrage.



Index map of the study reaches of river Tapi

PMF flood hydrograph of proposed barrage

For this purpose, CWPRS collected the surveyed cross-sectional data, stream flow data (Sarangkheda/ Prakasha site), digital Survey of India (SoI) Toposheets of the study area and the salient features of the proposed barrage from the project authority. Also, CWPRS collected the rainfall data of Akkalkuwa, Kakrapar, Kamraj, Nandurbar, Navapur, Shahada, Surat, Ukai and Visarwadi from IMD (India Meteorological Department) and 30 m grid NRSC-Carto DEM data from Bhuvan portal by using the observed annual 1-day maximum rainfall and annual maximum discharge data, the extreme (i.e., 1-day maximum) rainfall and peak flood discharge (PFD) for different return periods were computed by applying Extreme Value Type-1 (EV1) distribution. Thereafter, the weights of each rain-gauge station were derived by adopting Thiessen polygon method and used to estimate the weighted 1-day maximum rainfall for the study reach of river Tapi. With the weighted rainfall and physiographic characteristics of various sub-basins (SB) viz., SB19, SB20, SB21-1 and SB21-2 of river Tapi, the 2-year (yr), 25-yr, 50-yr, 75-yr, 100-yr and 500-yr return period PFDs were computed through synthetic unit hydrograph approach as detailed in Central Water Commission flood estimation report for Lower Narmada and Tapi subzone-3(b). By adding these PFDs with the estimated PFDs from the stream flow data of Sarangkheda, the 2-yr, 25-yr, 50-yr, 75-yr, 100-yr and 500-yr return period

PFDs for the proposed conventional barrage were computed as 10039 m³/s, 27656 m³/s, 32065 m³/s, 34627 m³/s, 36565 m³/s and 47054 m³/s respectively. In addition, the probable maximum flood and standard project flood (SPF) were computed as 59109 m³/s and 42221 m³/s respectively.

For the determination of water levels/ elevations at various locations of interest of the study reach of river Tapi corresponding to the estimated PFDs for different return periods, specified floods (viz., 1.50, 2.00, 2.50, 6.00 and 9.36 lakh cusec) suggested by the project authority and SPF, these floods were routed through existing stream network by adopting 1-Dimensional HEC-RAS model with steady state condition. The study suggested that the estimated PFDs and its corresponding water level could be used for assessing the flood inundation areas of river Tapi to ensure the rehabilitation and safety of the people, and for execution of conventional barrage across river Tapi near village Rundh-Bhatha, Surat, Gujarat.

Mathematical Model Studies for Surge Analysis of Wambori Chari Lift Irrigation Scheme Stage -2 Taluka Rahuri; District: Ahmednagar, Maharastra

The Wambori Chari lift irrigation scheme stage -2 is located on reservoir Mulla near village Warvandi, taluka Rahuri of Ahmednagar district in Maharashtra State. This scheme envisages lifting water from Mulla reservoir by means of pumping for irrigation of 1122 hectares of land. An intake structure is located in the river wherein one vertical pump of three stage is installed to pump water through single rising main of 620 mm diameter and 31280 m long. The total discharge of pump is 0.395 m³/s and total static lift from pump sump to delivery chamber is 110.70 m whereas the total head of pump is 185.16 m.

APPROACH

- To evaluate transient pressure responses: Assess how the system reacts to sudden changes in flow conditions, focusing on both high and low transient pressures.
- Analyze Worst-Case Scenarios: Identify the most severe conditions that could occur in the pipeline system without any surge protection.
- Effectiveness of Surge Protection Devices: Determine how various surge protection devices can mitigate the effects of transient pressures under the worst-case conditions.

Transient Modelling is carried out

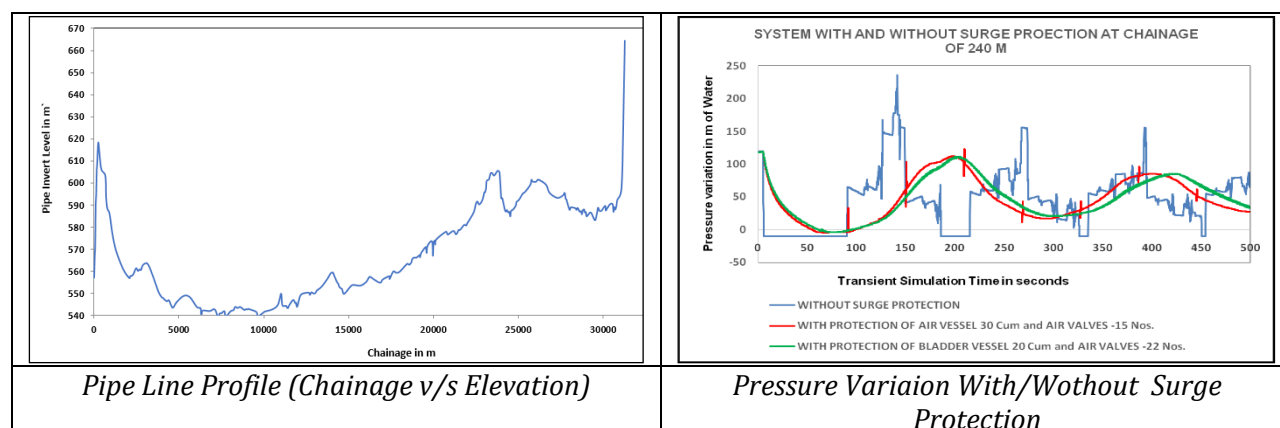
- Without Surge Protection: Initial simulations were conducted to establish baseline transient pressure responses under critical operational scenarios.
- With Surge Protection: Subsequent simulations incorporated various surge protection devices to evaluate their effectiveness in reducing transient pressures.

KEY FINDINGS

Based on multiple transient modelling simulations, the study recommends the following options for surge protection to mitigate the transient pressures in the rising main during critical scenario i.e., tripping of pumps due to power failure.

Option 1: A compressed air vessel with a capacity of 30 m³ near pump, paired with Double-acting kinetic air valves -22 Nos of 100 mm size.

Option 2: A bladder-type air vessel with a capacity of 20 m³ near pump, also coupled with Double-acting kinetic air valves -22 Nos of 100 mm size.



Sr. No.	Technical Report Title	Technical Report No.
1	Estimation of design flood and water levels along the study reach of Tapi river for the proposed conventional barrage near village Rundh-Bhatha, Surat, Gujarat.	6268
2	Sectional Model Studies for the existing Balegaon High Level Barrage on River Godavari, Distt: Nanded, Maharashtra	6271
3	Hydraulic model studies to assess the requirement of an additional spur between Spur at Km 8.09 and Spur at Km 9.18 along Western Kosi Embankment, downstream of Kosi barrage, Birpur, Bihar	6305
4	Hydraulic Model Studies for revision of gate operation schedule of Farakka Barrage, West Bengal	6310
5	Desk and mathematical studies for hydraulic re-assessment of new railway line section between Araria and Galgalia for NEFR, Bihar	6312
6	Mathematical model studies for surge analysis of Wambori Chari Lift Irrigation Scheme Stage-II, Ahmednagar, Maharashtra	6317
7	Mathematical model studies for surge analysis of Wardha Barrage project lift irrigation schemes-1 and 2, Yavatmal, Maharashtra	6324
8	Hydrological impact assessment and water availability studies for Kaiga Nuclear Power Project, Uttar Kannada, Karnataka for NPCL, Mumbai	6343
9	Mathematical model studies for proposed barrage at Sidheswari river for MasaliaRanishwar LIS, Jharkhand.	6345
10	Site inspection to assess the bank erosion along upstream of Sharda barrage from Pilibhit block in Puranpur Tehsil to Paliya block in Lakhimpur Tehsil, Uttar Pradesh	6352
11	Site inspection to assess the flow conditions for construction of bank protection walls near the confluence of Men and Narmada River at village Tilakwada, village Navra and village Guvar, Dist. Narmada, Gujarat.	6353
12	Site inspection to assess the flow conditions for construction of proposed ring bund on the left bank of river Ganga from Chakia Thermal under Barauni Block to Matihani Dhala under Matihani Vlock in Begusarai, Bihar.	6354

RIVER AND RESERVOIR SYSTEMS MODELLING

Divisions

- Hydraulic Analysis and Prototype Testing
- River Rejuvenation
- Disaster Management and Planning
- Canal Automation and Measurement

Areas of Specialization/ Expertise

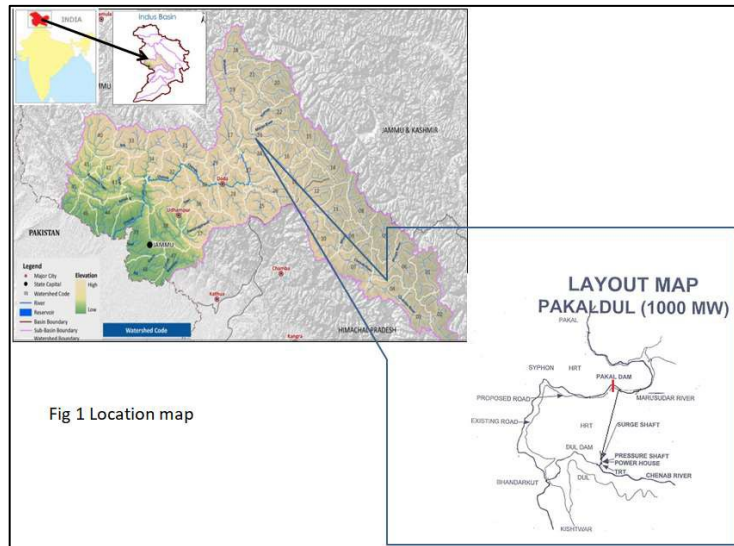
- Rainfall-Runoff and Flood Estimations for River Catchments
- Soil Erosion - Sediment Yield Analysis of River Catchments
- Hydrologic Analysis of Dam Projects
- Flood Forecasting, Extreme Value Analysis (for Peak and Low Flows)
- Water Availability Studies
- Dam Break Flood Analysis
- Determination of Safe Grade Elevation against flooding & Development of Storm Water
- Drainage System for Power Plants
- Nala Diversion studies
- Physico-chemical analysis, plankton studies
- Mathematical modelling for River and reservoir water quality

Major Clients

- CIDCO, Mumbai
- NPCIL
- WRD, Maharashtra
- Reliance Industries Limited
- Tarapur Atomic Power Station, Maharashtra
- NTPC
- State Irrigation Departments
- Satluj Jal Vidhyut Nigam Ltd. (SJVN Ltd.)

Mathematical Model Studies for Reservoir Sedimentation for Pakal Dul HE Project J&K

The Pakal Dul Hydroelectric Project on the Marusudar River in Jammu & Kashmir is designed for a 1000 MW power generation capacity with a 167-meter-high dam. Marusudar River carries a high sediment load during the monsoon season which poses a challenge to the reservoir's longevity and operational efficiency.

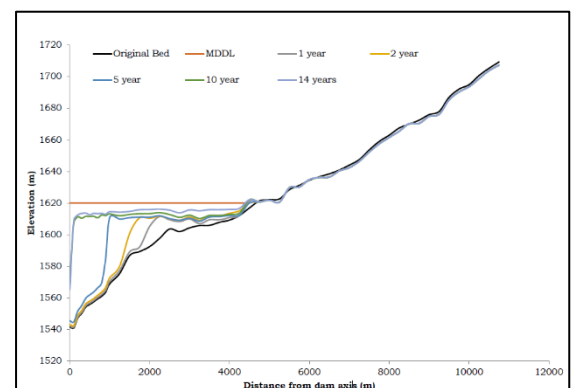


Location Map of Pakal Dul HE Project

The present studies were carried out to estimate sediment deposition in the reservoir. These studies are essential for designing effective sediment management strategies and ensuring sustainable operations. A one-dimensional numerical model was developed covering a reach of 10.75 km upstream of the dam and 1 km downstream. The hydrodynamic model was calibrated using observed gauge discharge data. Analysis of the sediment data revealed that the catchment's annual sediment yield is approximately 2.65 MCM, with 87% contributed during the monsoon season. The reservoir's trap efficiency was calculated at

68% using Brune's relationship with a reservoir life of about 69 years. Churchill's relationship estimated

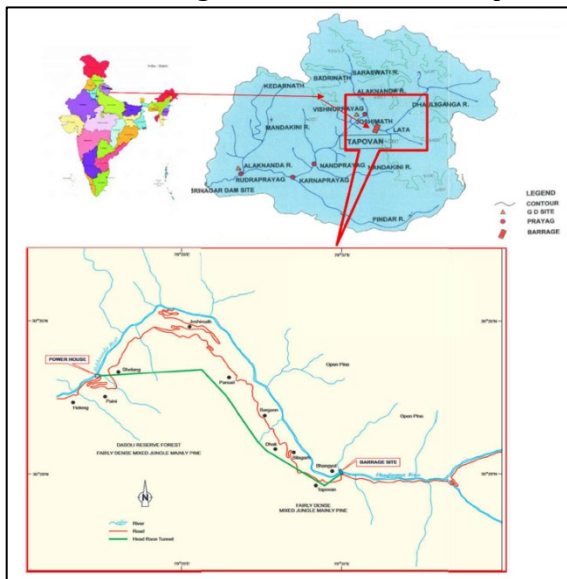
a reservoir life of about 85 years. Morpho dynamic simulations were carried out for different scenarios by maintaining the reservoir at Full Reservoir Level (FRL), Minimum Drawdown Level (MDDL), and Rule Curve operations, using both sediment rating curves and sediment load series with different gradations. Simulations indicated that under FRL operations, sediment deposition advances close to the dam in about 65–70 years, significantly reducing live storage capacity. However, the spillway and intake remain sediment-free during this period. When operated as per the Rule Curve, sediment reaches the intake and spillway within 13–15 years, but live storage is preserved. Under MDDL operations, sediment deposit reaches the dam within 10 years, but loss in live storage is avoided. The findings underscore the importance of operating the reservoir under Rule Curve or MDDL conditions to minimize live storage loss while addressing sediment management near intakes and spillways by reservoir sluicing. These insights are invaluable for ensuring the project's sustainability and effective sediment management over its operational life.



Longitudinal Bed Profile with Reservoir Operating at MDDL

Numerical and Hydraulic Model Studies for The Barrage of Tapovan Vishnugad HE Project, Uttarakhand

The Tapovan Vishnugad Hydroelectric Project is a run-of-the-river scheme in Uttarakhand with an installed capacity of 520 MW. The project suffered extensive damage during its construction phase due to a catastrophic flash flood in February 2021 caused by a glacier burst in the Dhauliganga River. This event resulted in significant sediment deposition, requiring a reassessment of hydraulic and sediment



Location map of the project site

management strategies. Numerical and physical model studies were undertaken by CWPRS to address these challenges, focusing on restoring the hydraulic capacity of the barrage and evolving an effective sediment management strategy. The numerical studies were carried out to simulate the post-flood flow dynamics and sediment deposition patterns. The simulations revealed that the design discharge of $4639 \text{ m}^3/\text{s}$ could not be passed with the existing sediment deposited topography, necessitating dredging operations. By dredging approximately 0.34 MCM of sediment, the reservoir's designed flood capacity could be restored. After dredging, the reservoir's storage capacity at Full Pool Level (FPL) of EL 1803.5 m was estimated to be 0.77 MCM, with 0.64 MCM available as live storage. The combined numerical and physical model studies were also carried out to assess the discharging capacity of the barrage under various conditions. The results confirmed that with the dredged topography, the barrage could pass the design discharge of $4639 \text{ m}^3/\text{s}$ safely under free-flow conditions, with all gates open, at an elevation of EL 1795.0 m, which is below the FPL. Sediment yield analysis indicated that the annual total sediment yield from the catchment is approximately 2.56 MCM ($0.82 \text{ mm}/\text{km}^2$), with most sediment transported during the monsoon season. Numerical simulations showed that the reservoir's dead storage could fill in less than 15 days for discharges of $300 \text{ m}^3/\text{s}$, and even faster for higher discharges. This necessitates frequent reservoir flushing to maintain operational capacity. Physical model studies were conducted to optimize sediment flushing operations, which evaluated different gate operation strategies to maximize sediment removal. Option 4, involving all gates open for six hours followed by selective gate operations, demonstrated the highest flushing efficiency. The studies emphasize the critical need for effective sediment management, regular flushing, and optimized dredging operations to sustain the project's functionality, particularly during the monsoon season.



Simulation run for discharge of $4639 \text{ m}^3/\text{s}$

Physical Model Studies for flood Routing of Nag River in Nagpur City, Maharashtra

In the early morning of 23rd September 2023, Nagpur city experienced severe flooding due to an intense rainfall event of approximately 109 mm. The heavy downpour resulted in a significant outflow from the ungated spillway of Ambazari Dam. As the discharge in the Nag River increased, water levels exceeded the riverbanks, leading to widespread inundation of adjacent low-lying areas and causing extensive property damage.



Study area for the project

Recognizing the severity of the situation, the Hon'ble High Court of Judicature at Bombay, Nagpur Bench, intervened. In response, the Nagpur Municipal Corporation (NMC), in coordination with the Irrigation Department, Nagpur, sought technical assistance from CWPRS to conduct flood routing studies for the Nag River. The studies were structured into two phases: 1) Physical model studies to assess the impact of the Swami Vivekananda Statue on flood levels in the Nag River and 2) Mathematical model studies for flood routing of the Nag River. Given the urgency, priority was given to the physical model studies to evaluate the flood levels of the Nag River with and without the Swami Vivekananda Statue and to recommend any necessary remedial measures for smooth flood passage. A 3D comprehensive

model was developed, covering a 1500 m reach of the Nag River at a geometric scale of 1:25. The model also incorporated three bridges within this reach. Initial simulations were conducted under two conditions: 1) With the compound wall of Krazy Castle intact and 2) With the compound wall partially collapsed, as reports indicated that the wall collapsed approximately an hour after flooding began. The simulations were performed for a discharge of $116 \text{ m}^3/\text{s}$, representing a 100-year return period flood, to replicate the flooding conditions observed on 23rd September 2023. The results indicated that after the partial collapse of the Krazy Castle compound wall, there was a marginal reduction in flooding on the countryside. The returning floodwaters re-entered the main river channel, causing a rise in water levels downstream of the bridges. To specifically assess the effect of the Swami Vivekananda Statue and its pedestal on water levels, further model studies were conducted after removing the pedestal and the statue. These simulations were carried out for the same discharge of $116 \text{ m}^3/\text{s}$ under two scenarios: 1) With blockage of the left bay of the bridge at chainage 140 m due to a JCB and 2) Without blockage of the left bay of the bridge at the same location. For both scenarios, the condition of the collapsed Krazy Castle compound wall was maintained. The findings from the simulations confirmed that the Swami Vivekananda Statue and its pedestal were not contributing factors to the flooding. Instead, the primary cause of flooding at the 140 m bridge location was identified as the limited waterway available under the bridge, which led to significant choking and afflux formation. The obstruction restricted flood passage, leading to diversion and accumulation of floodwaters, which subsequently caused inundation in the surrounding low-lying areas.

The study highlights that the bridge design and its reduced waterway were the primary constraints, necessitating further evaluation of structural modifications or other mitigation measures to enhance flood management in the region.

Sr. No.	Technical Report Title	Technical Report No.
1	Assessment study for diversion of Morcha and Mokha-Nala passing through the Ash Dyke of Anpara Thermal Power Station (ATPS), UPRVUNL, Anpara, and Sonbhadra District, Uttar Pradesh	6338
2	Mathematical and desk studies based on satellite imageries for evolving protection measures for Majuli Island from flood and erosion of river Brahmaputra, Assam	6346
3	Mathematical model studies for reservoir sedimentation for Pakal Dul hydroelectric project, J&K.	6347
3	Numerical and hydraulic model studies for the barrage of Tapovan Vishnugad hydroelectric project, Uttarakhand	6348
4	Mathematical model studies for flood protection measures for river Savitri near Mahad town, Maharashtra	6349
6	Physical model studies for flood routing of Nag River in Nagpur city, Maharashtra	6377
7	Design, selection and development of current meter calibration facilities at Kerala Engineering Research Institute (KERI) Thrissur, Kerala	6379

RESERVOIR AND APPURTENANT STRUCTURES

Divisions

- Spillways and Energy Dissipators
- Control Structures and Water Conductor Systems

Areas of Specialization/ Expertise

Physical and Mathematical Model Studies for

- Spillways and energy dissipators
- Water conductor systems including head race & tail race channels, surge tank, penstock
- Power intake
- Sluices & outlets
- Various types of gates

List of Clients

- NHPC
- WAPCOS
- NJPC
- State Governments
- SJVNL
- Chenab Valley Power Projects Ltd, (CVPPL)
- Brahmaputra Board
- Uttarakhand Jal Vidyut Nigam Ltd. (UJVN Ltd)

Hydraulic Model Studies for Left Flank Head Regulator of Polavaram Irrigation Project, Andhra Pradesh

The Polavaram Irrigation project is a multipurpose project on the River Godavari, located in the West Godavari District of Andhra Pradesh. The project aims to provide irrigation benefits to 7.2 lakh acres in Andhra Pradesh. In addition to irrigation, it will generate of Hydro Electric Power with an installed capacity of 960 MW and supply water to industries in Visakhapatnam. It is proposed to divert 80 TMC of water through the Left Main Canal, which runs for a length of 181.50 km. The Head Regulator is proposed to be constructed at Seethanagaram in East Godavari district, about 50 km from Rajahmundry. The designed and required discharges of the head regulator are $875 \text{ m}^3/\text{s}$ and $566 \text{ m}^3/\text{s}$ respectively and to pass at the Full Reservoir Level (FRL) of El. 45.72 m or with the upstream channel's Full Supply Level (FSL) at El. 41.09 m and the downstream FSL El. 40.869 m. The head regulator will have nine vents, each 8 m wide and 5.65 m high, with crest elevation of El. 35.44 m. The energy dissipator provided is in the form of 23.66 m long stilling basin with an invert level at El. 25.4 m and solid end sill with a top elevation of El. 29.269 m. Chute blocks are provided at the toe of the basin to enhance the dissipation of the energy of the incoming flow.



Side view of dry model of head regulator



*Flow conditions in the stilling basin
($Q = 566 \text{ m}^3/\text{s}$, Upstream FSL El. 41.09 m,
Downstream FSL El. 40.869 m)*

Hydraulic model studies were conducted on 1: 20 scale 2-D sectional model for the original design of Head Regulator. Studies indicated that the design discharge of $875 \text{ m}^3/\text{s}$ could be passed at Upstream Water Level El. 38.92 m, required discharge of $566 \text{ m}^3/\text{s}$ could be passed at El. 38.05 m. In all these cases the downstream water level/ Tailwater level (TWL) was not maintained and was observed as below El. 40.869 m. Hence, the discharging capacity of the head regulator is found adequate. A discharge of $1588 \text{ m}^3/\text{s}$ could be passed at the Minimum Draw Down Level (MDDL) El. 41.15 m, while $1576 \text{ m}^3/\text{s}$ could be passed at El. 41.09 m. With one gate closed at MDDL, $1412 \text{ m}^3/\text{s}$ could be discharged with all other 8 gates fully open. For discharges below $1588 \text{ m}^3/\text{s}$, the TWL was not maintained, and it was observed that the TWL was generally below El. 40.869 m. For discharges above $1588 \text{ m}^3/\text{s}$ the TWL increases beyond El. 40.869 m due to channel constriction effect. Low to strong intensity vortices were forming in front of the breast wall, when water level goes above the bottom level of breast wall. The shape of breast wall may be kept as 'L' against the original shape of 'J' in the direction of flow, to prevent the vortex formation in front of gates. The profiles of the head regulator and the stilling basin are acceptable. Fully submerged hydraulic jump with no visible turbulence is forming in the stilling basin due to high tail water level at El. 40.869 m. The maximum observed velocity at the downstream of the stilling basin for design discharge was 1.5 m/s and 1 m/s, while passing a flood of $875 \text{ m}^3/\text{s}$

m^3/s at El. 41.09 m and $566 \text{ m}^3/\text{s}$ at El. 41.09 m, respectively. The chute blocks are of very small size and offer no resistance to flow or stabilizing the flow and hence need not be provided. The length of the stilling basin is sufficient to fully contain the jump in the stilling basin and may be kept as 23.66 m. Photo 1 shows side view of model of Head Regulator and Photo 2 shows the flow conditions in the stilling basin for $Q = 875 \text{ m}^3/\text{s}$ with gates fully open with tail water level at El. 40.869 m.

Hydraulic Model Studies for Assessment of Scour Downstream of Kwar Dam Spillway, Jammu and Kashmir; 1:70 Scale 3D, Comprehensive Model

Kwar Hydroelectric Project is a run-of-river project, planned across the Chenab River, near Padyarna village in the Kishtwar district of Jammu and Kashmir Union Territories. The project envisages the construction of a 109 m high and 195 m long concrete gravity dam across the Chenab River. An orifice spillway has been provided to pass a design flood (PMF) of 10,534 m³/s along with a Glacial Lake Outburst Flood (GLOF) of 620 m³/s through four orifice openings of size 9.5 m (W) X 13.8 m (H) with a crest level at El. 1330 m. A ski-jump bucket of 38 m radius and 34° lip angle with a pre-formed plunge pool is provided for energy dissipation. Besides orifice spillway, one crest spillway of size 9.5 m (W) X 17 m (H) has been provided with crest at El. 1368 m for passing surplus flood and floating debris. An underground power house has been provided with an installed capacity of 540 MW, 4 units of 135 MW each. Hydraulic model studies were conducted on a 1:70 scale 3-D comprehensive model for assessing the overall performance of modified design of orifice and crest spillway and the results of the studies were submitted to the project authorities vide Technical Report No. 6063 of October 2022.



Flow Condition for Ungated Operation of Spillway for the Discharge of 10534 m³/s (100%) at RWL El. 1367.5 m

The present report describes the hydraulic model studies conducted for assessing the maximum depth of scour and scour pattern downstream of the spillway for the gated and ungated operation of spillway for the modified design of orifice and crest spillway. Maximum scour downstream of the dam axis was observed along the centerline of the spillway as compared to the left and right bank. It was observed that deepest scour reached up to El. 1238 for gated and El. 1229 m for ungated at chainage 270 m and from 290 m to 300 m downstream of dam axis for gated and ungated operation of spillway for design discharge of 10534 m³/s respectively. It was also observed that the throw distances of ski-jump jet of the orifice spillway were varying between Chainage 160 m to 240 m from the dam axis for ungated and gated operation of the spillway for discharges ranging from 2,633.5 m³/s to 10,534 m³/s. Based on the model studies, It was recommended that the transverse slopes on both the flanks of plunge pool may be decided based on

geological conditions prevailing at site. It was also suggested that necessary bank protection works must be provided to prevent the banks from damages and height of which could be decided based on water surface profiles observed in the model, bulking of water in prototype due to air entrainment and free board between chainage 110 - 400 m downstream of the dam axis. It was recommended to protect the toe of the dam from undermining due to the flow cascading over the lip of the bucket by providing a concrete apron downstream of the ski-jump bucket. The concrete apron of 30 m wide was recommended and the same may be properly anchored into the rock and keyed into the rock at the downstream end. It was recommended that the plunge pool bed may be decided based on the scour depth observed by the model studies and the geological/geotechnical nature of the rock at the site.



Scour Pattern for Ungated Operation of Spillway for the Discharge of $10534 \text{ m}^3/\text{s}$ (100%) at RWL El. 1367.5 m

Sr. No.	Technical Report Title	Technical Report No.
1	Site visit report for inspection of river diversion arrangement of Luhri HEP stage-I, Himachal Pradesh	6286
2	Hydraulic model studies for left flank head regulator of Polavaram Irrigation Project, Andhra Pradesh, 1:20 scale 2-D sectional model	6325
3	Hydraulic model studies for assessment of scour downstream of Kwar Dam Spillway, Jammu and Kashmir; 1:70 scale, 3D comprehensive model	6327

COASTAL AND OFFSHORE ENGINEERING

Divisions

- Ports and Harbours
- Mathematical Modeling for Coastal Engineering
- Coastal Hydraulic Structures
- Coastal Data Centre
- Coastal Field Instrumentation

Areas of Specialization/ Expertise

• Physical and Mathematical Model Studies for

- Port layouts
- Shoreline Changes
- Dredging & Disposal
- Coastal Protection
- Breakwaters
- Safe Grade Elevation
- Ship Navigation
- Cooling Water Intake & Outfall
- Tidal Inlets
- Coastal Ecology

• Desk and wave flume studies for

- Design of coastal hydraulic structures
- Design of Coastal Protection Measures

• Field investigation for

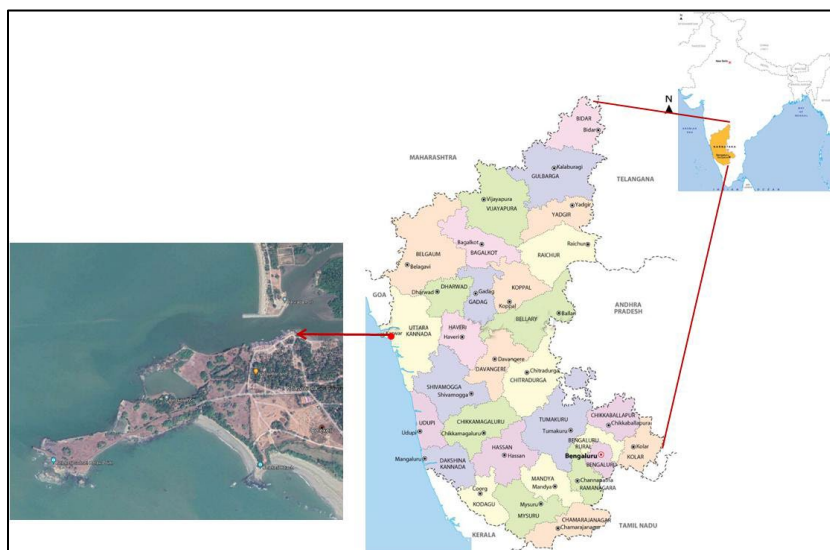
- Coastal parameters for Hydraulic model studies

List of Clients

- Major Port Trusts
- WAPCOS
- Indian Navy
- Andaman and Lakshadweep Harbour Works (ALHW)
- ONGC
- State Maritime Boards
- State Fisheries Departments
- CIDCO
- Vizhinjam International Sea Port Limited
- NPCIL

Mathematical Model Studies to Investigate the Impact of Construction of Breakwater on Hydrodynamics and Sedimentation for Safe Berthing of Fishing Vessels at Belekeri, Karnataka

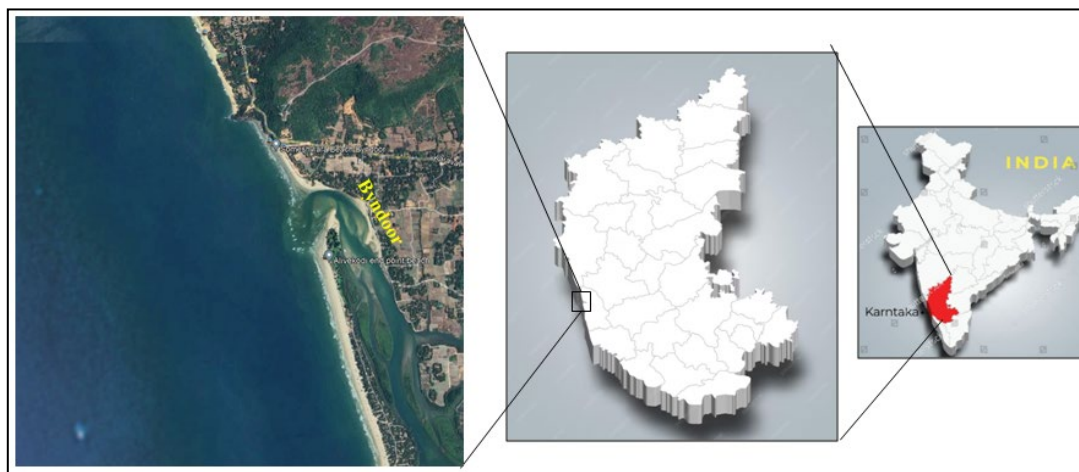
Belekeri fishing harbour is situated in the Ankola taluka of Uttar Kannada District of Karnataka. Presently, almost 150 fishing boats are being operated during non-monsoon season. It is experienced by the local fishermen that due to the presence of the high waves in the harbour during monsoon season, the berthing operations are not possible and parking of the vessels as well. To overcome this problem, Ports & Inland Water Transport (Ports & IWT) Department, Karnataka has a proposal for developing the existing fishing harbour at Belekeri into an all-weather fishing harbour. In this context, Port & IWT department requested CWPRS to carry out the necessary hydraulic model studies. A protective breakwater of 200m length evolved with the help of mathematical wave tranquility studies. In this reference, mathematical model studies by using MIKE -21 HD and MT were carried out to investigate the impact of construction of protective breakwater on hydrodynamics and sedimentation for safe berthing of fishing vessels at Belekeri, Karnataka. The studies indicate that during the non-monsoon season, the maximum current strength observed at the harbour mouth is of the order of 0.49m/s for existing condition and 0.31 m/s for proposed condition. While during the monsoon period, the maximum current strength observed at the harbour mouth is of the order of 0.96 m/s for existing condition and 0.70 m/s for proposed condition. Simulation with MIKE 21 MT results indicated that no significant morphological changes would occur within the harbour area with proposed 200m long protective breakwater. Marginal siltation was noted on the lee side of the proposed breakwater particularly at the foot of breakwater while some erosion is observed in shallow portions especially during peak river discharge conditions of monsoon season. Over all, it is observed that the construction of the proposed 200m long breakwater will not cause any significant morphological changes in the fishing harbour.



Location map of Belekeri Fishing Harbour, Karnataka

Mathematical Model Studies for Littoral Drift Shoreline Change Due To Proposed Development of Multi-Purpose Harbour at Byndur, Karnataka.

Ports & Inland Water Transport Department, Karwar, Govt. of Karnataka have a proposal for development of a Multipurpose Harbour for Marina Facility at Byndur, Karnataka under Sagarmala scheme (DPR7), located at Latitude $13^{\circ} 51' 49''$ N and Longitude $74^{\circ} 36' 54''$ E, along the west coast of India. The location at Byndur Multipurpose harbour is fully exposed to incident waves from the Arabian Sea. The predominant waves from SW to NWN quadrant reach the coast. Govt. of Karnataka have proposed a layout for the development of Byndur Multipurpose harbour with the proposed Marina Facility on the right bank and Fish Landing centre on the left bank of the river. In this regard, the studies were conducted at CWPRS to examine the adequacy of the proposed development of the Marina facility from the considerations of wave tranquility and for Littoral drift and shore evolution studies. Initially the studies have been completed and submitted vide Technical Report No. 6124 of April, 2023 as per the earlier suggested layout of proposed breakwaters. Subsequently, some facilities viz. sea plane etc. was dropped and the revised proposed layout for development of Marina and fish landing jetty and the breakwater layout was further optimized. The studies were undertaken to examine the impact and feasibility of the revised proposed marina facilities from wave tranquility, littoral drift, and shoreline studies for evolving the Optimized layout. The mathematical model studies were conducted in three stages viz., estimation of nearshore wave climate using spectral wave model MIKE 21-SW to derive near-shore wave climate at -10m depth, Wave tranquility studies inside the basin area, Simulation of littoral drift distribution due to the proposed Optimized Breakwater layout. From the model studies, the predominant directions of wave approaching at the development site are from (SW) 225° N to (WNW) 292.5° N. With the Optimized layout, adequate wave tranquility would be available at fish landing jetty throughout the year and a marginal downtime of about 10 days may occur at Marina. At the proposed site, the net sediment transport in a year is towards North and with the construction of breakwaters viz., 480m North breakwater and 320m South Breakwater, shore line changes will not be significant, the proposed breakwaters as per Optimized layout would also serve the purpose of arresting the littoral drift and would help in stabilizing the inlet as well. The Optimized layout is suitable from tranquility and morphological aspects.



Index Plan of Marina Facility at Byndur, Karnataka

Additional Physical Wave Model Studies for Development of Fisheries Berth at Vizhinjam International Seaport, Kerala.

The Vizhinjam International deepwater port is situated in the Thiruvananthapuram district of Kerala state. The physical wave model studies were conducted earlier at CWPRS, adopting a geometrically similar scale of 1/120 on a three-dimensional shallow wave basin equipped with the Random Sea Wave Generation (RSWG) facilities with SCADA control and a multi-channel data acquisition system. The model studies were conducted for five most predominant wave directions in two phases. In the first phase of studies, three predominant wave directions were used, viz., South ($H_s = 1.5$ m, $T_p = 10$ sec), SSW ($H_s = 2.5$ m, $T_p = 10$ sec), and WSW ($H_s = 3.0$ m, $T_p = 10$ sec), and recommendations were



Index plan of Vizhinjam International deep seaport

submitted via CWPRS Technical Report (TR) No. 5983 of January 2022. In the second phase, the remaining two predominant wave directions, viz. SW ($H_s = 3.0$ m, $T_p = 10$ sec) and West ($H_s = 3.0$ m, $T_p = 10$ sec), were studied, and recommendations were submitted via CWPRS Technical Report (TR) No. 6261 of March 2024. The comprehensive studies for all five predominant directions in two phases have established the correct effect of the sea port breakwater on the wave tranquility conditions at the entrance of the existing fishing harbor. The permissible significant wave limit for operation of fishing crafts at berths has been considered as 0.30m at the berth. The model studies indicated that the proposed 140 m mole is not improving wave tranquility at the proposed 500 m long fish landing jetty/platform (which was proposed earlier by VISL) on the sea side of seaport breakwater and rather is causing adverse wave reflections. A suitable extension of 270 m at 45 degrees to the main or seaward breakwater of the existing fishing harbor was evolved as remedial measure to improve tranquility conditions at the fishing harbor entrance and inside basin and berths. VISL officers and local fishermen community members visited CWPRS in July 2024. They expressed their need for a new 500-meter-long fish landing jetty or platform at some suitable nearby location.

Additional physical model studies for wave tranquility for relocated new fisheries berth on the east of the leeward breakwater of the existing fishing harbour have been conducted in a geometrically similar model (Scale: G.S. 1/120) with rigid bed housed in a 3D shallow wave basin at Multi-Purpose Wave Basin Hangar by simulating random wave climate for two predominant wave directions viz., SW ($H_s = 3.0$ m, $T_p = 10$ sec) and West ($H_s = 3.0$ m, $T_p = 10$ sec). It was observed from model studies that configuration of seaport breakwater and tip of seaward breakwater extension has a significant contribution in guiding waves head-on at the entrance of new fishing harbour for SW and West directions. An additional breakwater of 235m is recommended with opening of 120m to provide wave tranquility at the proposed 500m long fishing jetty. It is contemplated that waves would be head-on at the entrance of new fishing harbour for almost all directions. The observed significant wave heights inside the new fishing harbour for incident SW and West directions are about 0.40m to 0.55m which are exceeding permissible wave tranquility of 0.30m. It is also revealed that

Mathematical Model Studies to Estimate the Likely Rate of Siltation in Dredged Area for The Development of Marina in Mumbai Harbour for Mumbai Port

The Mumbai Port (MbP), one of the major and all-weather port of India is situated in the Thane creek on the West coast of Maharashtra at Lat. $18^{\circ} 54' N$ and Long. $72^{\circ} 49' E$. The ships plying to port have access through a wide entrance of about 10 km and maximum tidal range of about 5 m prevails in this region and the waterfront facilities along the coast are well protected from the fury of sea waves approaching from south-west quadrant during monsoon season. The Mumbai port has various major marine facilities viz. Indira Dock, Marine Oil Terminals at Jawahar Dweep (JD) and Chemical Berths (First & Second) at Pir-Pau along with other minor berthing facilities for ferries, fishing crafts at Ferry Terminal (Bhaucha Dhakka), deep & shallow anchorages etc. The Mumbai Port Authority (MbPA) earlier had a proposal to develop the Marina facility in Mumbai harbour inside the Princess dock. This requires removal of material filled inside the dock and transportation thereof, however, due to the complexity in the excavation of material filled in the dock and transportation thereof, Mumbai Port Authority proposes three alternative locations in the Mumbai harbour to be considered for the development of the Marina viz. near the Cross Island, in front of the Prince's dock, stretch from Gateway of India to Radio Club. The location plan of proposed alternative sites of Marina in Mumbai harbour are shown in Fig.1.

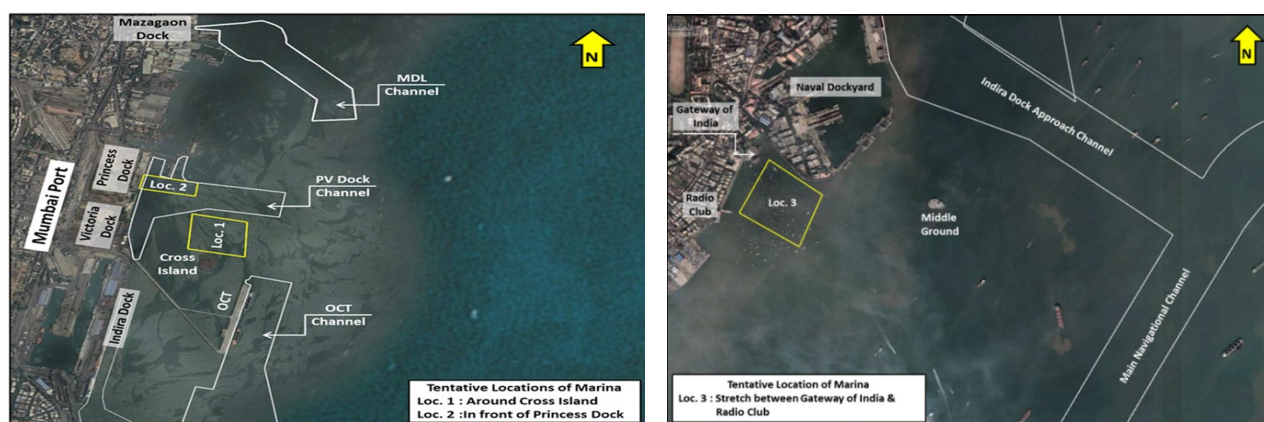
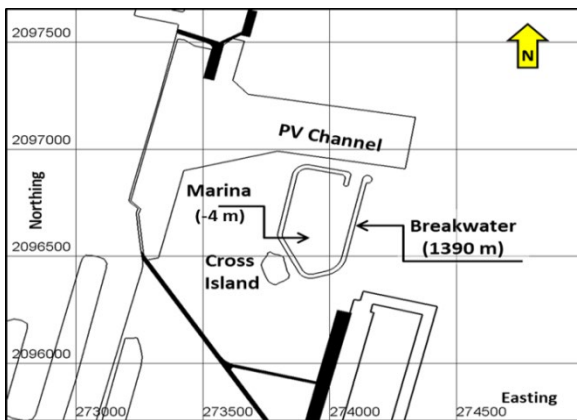


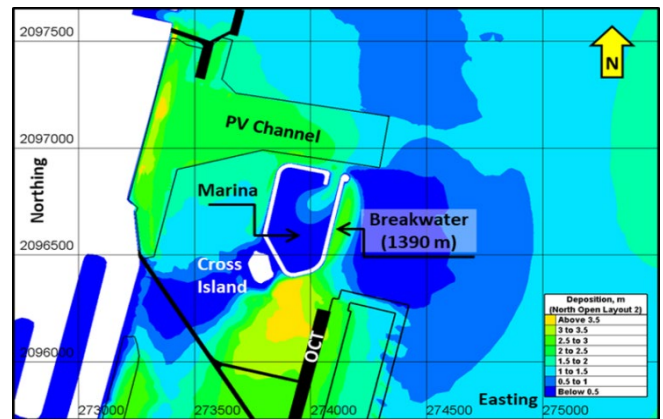
Fig.1: Location plan of proposed alternative sites of Marina in Mumbai harbour

Further, the meeting was held at CWPRS between officials of MbPA & CWPRS wherein, it was decided that the location 2 viz. in front of the Prince's dock may not be considered for the studies due to space limitation and obstruction to the operations of other facilities of MbPA viz. passenger jetty, fish jetty, ferry terminal etc. in the vicinity of marina. The tidal hydrodynamic and siltation studies entrusted to CWPRS to estimate the likely quantum of siltation in marina harbour area were carried out using mathematical model using TELEMAC-2D & SISYPHE software (Telemac software suite). The tidal hydrodynamic model was calibrated by comparing the tide observed in the model with that measured at Apollo Bunder, Mumbai for monsoon and non-monsoon seasons (Year 2015 for MDL, Mumbai & Year 2017 & 2020 for NDY, Mumbai) for prevailing bathymetry condition. The current strength & direction observed in model at 'C2' current-meter location (in the vicinity of Cross Island) & at 'C1' current-meter location (in the vicinity of Gateway of India) was also compared with that measured at site. The studies reveal that the model is reasonably well calibrated for tides as well as current data.

The well calibrated models were used to assess the flow field and estimate likely siltation for various marina layouts near Cross Island as well as near Gateway of India. The studies for 'Layout 1' & 'Layout 2' near Cross Island with detached breakwater reveal that the current strengths observed in proposed marina area is stronger (0.9 m/s – 1.0 m/s) while, 'Layout 3' with breakwater connected to Cross Island creates an eddy inside the Marina area which will pose difficulties to the yachts during berthing/ de-berthing or during navigation through the harbour area. Thus, 'Modified Layout-3' (with two breakwaters each on landward (200 m) and seaward side (530 m) of Cross Island & connected to island) of marina was considered near Cross Island. The tidal hydrodynamic studies carried out reveal that the layout is suitable however, IITM suggested modifications in this layout since, it does not provide protection to berthing arrangements as it is not enclosed (Open from North side). The layout suggested by IITM consists of enclosed harbour with breakwater length of 1363 m & seaward protrusion of breakwater on northern end. This layout creates elongated eddy of about 800 m between the Marina breakwater & OCT Berth during Ebb phase for about 2 Hrs. Also, a steep velocity gradient (0.8 m/sec) at the entrance of the marina will affect the movement of yachts adversely during their entry/exit to marina. Thus, layout is modified to 'CWPRS Revised Layout – 1' (enclosed harbour with 1390 m long breakwater and entrance on landward side of northern face of breakwater) was considered which provides smooth entry/exit of yachts in the marina and the quantum of likely siltation in the proposed dredged area (4 m below CD) will be about 47,000 cum per annum with average depth of deposition of about 2.20 m/annum at the entrance and 0.50 m/annum in proposed dredged area. However, this entrance of marina being near to turning area of PV Channel, movement of yachts may pose hindrance to the existing vessel traffic through PV channel. As such the layout is further revised to 'CWPRS Revised Layout – 2' (with breakwater length of 1390 m) by shifting the entrance to seaward side. The studies reveal that the quantum of likely siltation in the proposed dredged area (4 m below CD) will be about 38,000 cum per annum with average depth of deposition of about 1.75 m/annum at the entrance and 0.40 m/annum in proposed dredged area. The layout is found to be suitable for the development of marina from tidal hydrodynamics and siltation aspects.



(A): Layout of Marina



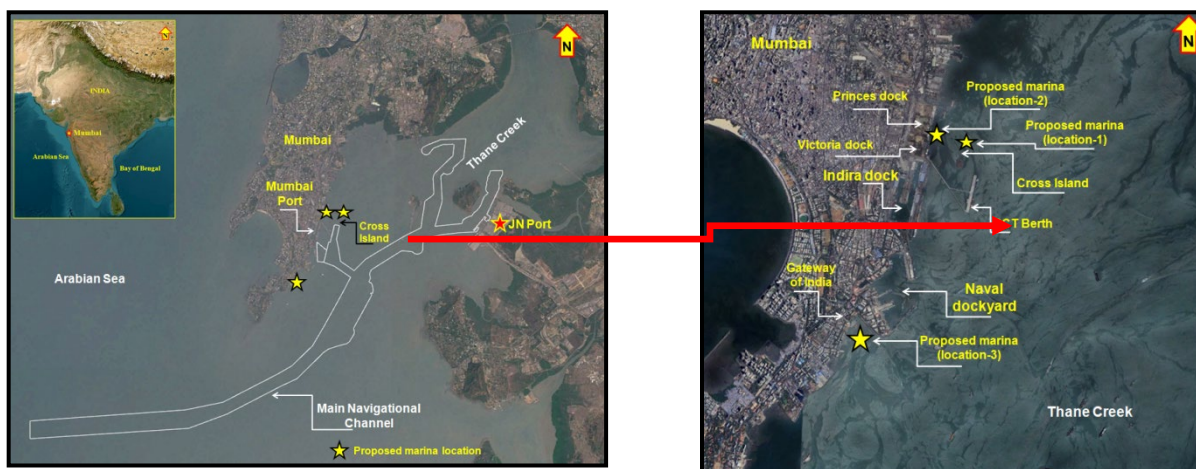
(B): Annual siltation in Marina

'CWPRS Revised Layout-2' & plot of the likely rate of siltation per annum

The studies for the marina in the stretch between Gateway of India and Radio Club were carried out considering the marina layout found suitable near Cross Island viz. 'CWPRS Revised Layout-1' & 'CWPRS Revised Layout-2' by positioning them at the existing bathymetry contours between -2 m and -4 m for minimal capital dredging in the Marina & turning circle/approach area and to avoid long pile trestle for connection to coast. The hydrodynamics and siltation studies reveal that the quantum of siltation in dredged area of 'CWPRS Revised Layout-1' will be about 10500 cum per annum with average depth of deposition in approach channel will be 0.3 m/annum, near the entrance of the marina it is 0.23 m/annum and it is less than 0.1 m/annum inside marina harbour. The siltation for 'CWPRS Revised Layout-2' will be about 6000 cum per annum with average depth of deposition of about 0.3 m/annum in turning circle while it reduces to less than 0.1 m/annum inside marina harbour. 'CWPRS Revised Layout-2' is suitable for the development of marina near Gateway of India since the velocity gradient at the entrance (0.15 m/s) is less than that observed for 'CWPRS Revised Layout-1' (0.3 m/s). The 'CWPRS Revised Layout-2' proposed near Cross Island and Gateway of India will have practically insignificant impact on nearby waterfront facilities.

Physical Model Studies to Study the Tidal Hydrodynamic Conditions for The Development of Marina in Mumbai Harbour for Mumbai Port

Mumbai Port (MbP), one of the major port of India, is situated on west coast of India at Latitude 18°54' N and Longitude 72°49' E. Mumbai Port being situated on the leeward side of Salsette/Mumbai Island in Thane creek, the waterfront facilities situated immediately on leeward face of Mumbai island of this port are well protected from the fury of sea waves approaching from south-west quadrant during monsoon season. However, Thane creek being a macro tide dominated region (maximum tidal range of about 5 m), hydraulic design of the waterfront facilities in the creek are governed by tidal hydrodynamic flow phenomenon. Mumbai Port Authority (MbPA) is planning to develop the Marina in the Mumbai harbour. As a part of Port's master plan activity, to arrive at best suitable location; three alternative locations i.e., i) near the Cross Island, ii) in front of the Princess dock and iii) in the stretch from Gateway of India to Radio Club are under consideration



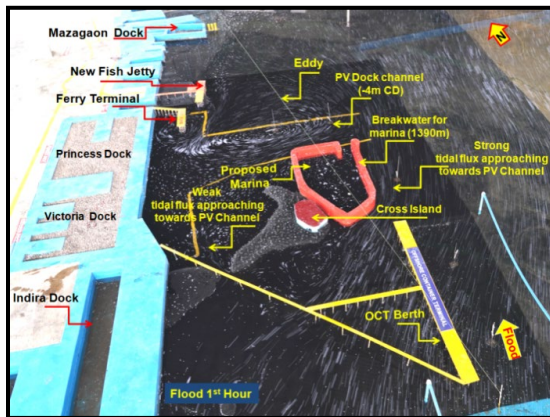
Location plan of proposed sites for Marina in Mumbai harbour

The harbour area (5.2 ha.) of the proposed Marina will have boat pens for berthing of yachts with draft requirement of 2 m & 4 m wherein it is also proposed to have shipyard/ dry-dock area of 0.98 ha, yacht club / commercial area of 2.0 ha. in the nearby area of Marina. In this regard, layout needs to be evolved from tidal hydrodynamic, wave tranquility criteria for yachts and floating structures. After studying various layouts of marina "CWPRS Revised Layout-2" is considered as finalized layout from wave tranquility & siltation consideration based on mathematical model studies carried out by CWPRS. The physical hydraulic model studies are carried out in to assess the suitability of said layout from tidal flow consideration in physical tidal model (1:400 (H), 1:80 (V)) of Mumbai Port available at CWPRS.

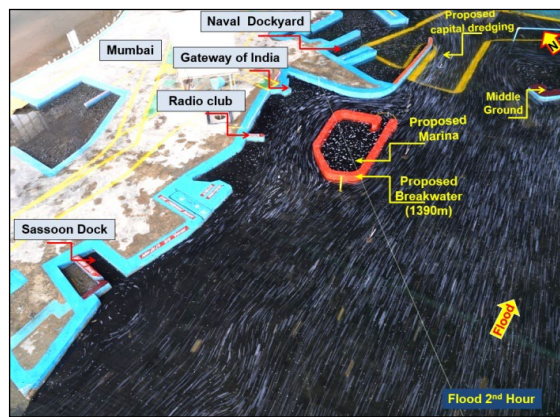
The model studies were carried out by calibrating the physical model for the data on oceanographic parameters viz tide, current available at CWPRS for the proposed locations of Marina under consideration. The reasonably well calibrated model was used to study flow conditions for Marina at Cross Island & Gateway of India, as the MbPA informed that development of Marina near Princess dock need not be considered, which will cause hindrance to the movement of ferry boats departing/arriving at ferry terminal.

The studies carried out for marina near Cross Island area reveal that due to the significant variation in the bed levels on either side of Cross-Island; during the initial hours of flood tide, the majority of the tidal flux moves from the seaward side of Cross Island towards the Princess-Victoria (PV) dock channel compared

to the landward side. The presence of Cross Island creates secondary current/ eddy of 380 m dia. in front of PV dock and thereafter, as the tidal flux approaching from the landward side area of Cross Island increases; for remaining hours of flood, this system moves further north of PV channel. Model studies with layout of marina (1390 m long breakwater) for spring/neap tidal cycles reveal that; with the increase in the flood current, eddy of 620 m dia. formed in the PV dock channel diffuses further and during ebb, eddy disappears. While inside the marina area, eddy of about 90 m to 300 m dia. with weak current strength of about 0.1m/sec prevail during few hours of flood, during ebb; the eddy disappears. As such the flow conditions observed inside the marina was found to be favorable for the plying/berthing of the yachts. This layout does not have adverse impact on nearby area and hence suitable for development from tidal hydrodynamic consideration.



Flow pattern observed during 1st hr. of flood for marina near Cross Island



Flow pattern observed during 2nd hr. of flood for marina near Gateway of India

The hydraulic model studies were also carried out for the Marina near Gateway of India. The layout of Marina finalized for Cross island was considered for development of Marina near Gateway of India. The studies for assessing flow condition for baseline scenario (after incorporating the proposed capital dredging scenario in & around the naval dockyard (NDY) area) reveals that at the proposed marina area, flow patterns remain mostly parallel to the shoreline/south breakwater of NDY for almost entire flood phase. While flow pattern observed during ebb indicates that from 2nd - 5th hour of ebb, eddies of varying dia. 400 m – 500 m formed in front of Gateway of India/Radio club area. Studies carried with proposed layout of marina reveals that due to the presence of relatively deeper depths on seaward side of marina breakwater (1390 m) during flood tide, majority of the tidal flux is more on seaward side compared to lee/landward side. As the tidal flux moves from seaward and landward side of breakwater during subsequent hours of flood tide, it meets beyond entrance of the marina, with eddy of varying dia. of about 80 m – 100 m along with maximum current strength of about 0.1 m/sec inside the marina. During ebb phase of tide, eddy diminishes. Flow pattern observed on seaward side of southern breakwater of NDY indicates that during entire flood/ebb phase of tide, flow remains mostly parallel to the south breakwater. The measured current strength at the entrance/inside the marina being feeble, it will be favorable for the movement of yachts. This layout does not have adverse impact on nearby area and hence suitable for development from tidal hydrodynamic consideration. Thus, proposed layouts of marina near the Gateway of India and near Cross Island are found to be suitable and project Authority may take appropriate decision to select suitable site for development of Marina taking in to consideration the aspects of constructability, economy and aesthetics.

Physical Hydraulic Model Studies to Finalize the Alignment of Additional Berthing Facility and To Assess the Impact of Proposed Reclamation on Nearby Areas at Elephanta Island, Mumbai

Maharashtra Maritime Board (MMB), Government of Maharashtra organization is serving the state by carrying out various developmental works such as development of jetties, wharfs, construction of breakwater, seawalls as well as fishing harbours along Maharashtra coastline to facilitate smooth movement of passenger crafts, safe-guarding the coastline from erosion as well as berthing facilities for fishermen and passengers. Presently many developmental activities like marina, passenger jetty, cruise terminal etc. are taking place to promote the tourism activities in Mumbai. Elephanta Island in Thane creek is a one of the top ten tourist destinations of Maharashtra and is situated on the East of Mumbai at Latitude $18^{\circ} 57' 39''$ N and Longitude $72^{\circ} 55' 58''$ E. Currently, lakhs of national/international tourists visit Elephanta Island every year through ferry services and the existing Shetbunder jetty at Elephanta Island is being used for embarkation / dis-embarkation. This jetty is maintained by MMB. The Thane creek wherein existing jetty is located is dominated by macro tides (max. tidal range of 5 m) and the waves approaching from south-west quadrant attenuates significantly before reaching to the waterfront facilities. Therefore, the hydraulic design of waterfront facilities is mainly governed by tidal hydrodynamic phenomenon in the creek. The existing Shetbunder jetty has approach of about 500 m in length from Elephanta Island and is partly consist of solid rubble mound bund and remaining with solid concrete blocks with arches to have free flow of tidal water during flood / ebb phase of tide. The orientation of existing jetty is 76° N having size of 60 m x 4.5 m. Elephanta Island in Thane creek is shown in Fig.1.



Overall view of Thane Creek and Elephanta Island

MMB, in order to cater the need of growing traffic of tourists, have a proposal to develop additional berthing facility near the existing jetty. The proposed berthing facility (jetty) will be on South side of existing jetty with protrusion of 30 m in the sea beyond existing jetty face. The size of jetty will be 85 m x 17 m with orientation of jetty head same as that for the existing jetty and it will be also on concrete block work with

arch type opening. The existing approach will be widened by 10 m and reclamation is proposed over an area of about 100 m x 150 m in shallow region at Elephanta Island.

In order to finalize the alignment of additional berthing facility (jetty) and impact of proposed reclamation in inter-tidal region from tidal hydrodynamic considerations, physical hydraulic model studies were carried out in physical tidal model (1:400 (H), 1:80 (V)) of Mumbai Port available at CWPRS. The studies were carried out by calibrating the physical model based on recent oceanographic data of year 2024. The tidal hydrodynamic studies carried out with reasonably well calibrated model reveal that the maximum velocity near existing jetty head for existing bathymetry condition varies between 0.18 m/sec and 0.14 m/sec at jetty head for spring & neap tides respectively. The maximum strength of current observed during ebb tide was about 0.29 m/sec and 0.25 m/sec for spring & neap tides respectively and the tidal flow is almost aligned to the jetty head.

Further, the studies with incorporation of proposed additional berthing facility and reclamation in physical model reveal that the maximum observed current strength during flood phase of tide reaches to about 0.16 m/sec and 0.15m/sec at proposed jetty face while during ebb tide is about 0.32 m/sec and 0.27 m/sec for spring & neap tides respectively. The flow direction during flood/ebb remains almost parallel to the proposed jetty face (76° N). The comparison of current strength and direction at existing Shet bunder jetty for existing and proposed scenario indicate that there will insignificant reduction in current strength due to proposed development and there will be no change in flow directions. This indicates that there is no adverse impact of proposed jetty on the flow field near existing jetty and will not have any difficulty in maneuvering as well as berthing/de-berthing of passenger vessels at existing as well as proposed jetty. The reclamation proposed is between the existing jetty approach bund and old jetty and in the inter-tidal zone and thus, there will not be any significant impact on the flow field at existing and proposed jetties. Thus, the alignment of proposed additional berthing jetty at 76° N, is feasible for berthing / de-berthing of passenger vessels from tidal hydrodynamic considerations with proposed reclamation of 150 m x 100 m.



Location of Existing Shetbunder jetty & proposed Additional Berthing Facility at Elephanta Island

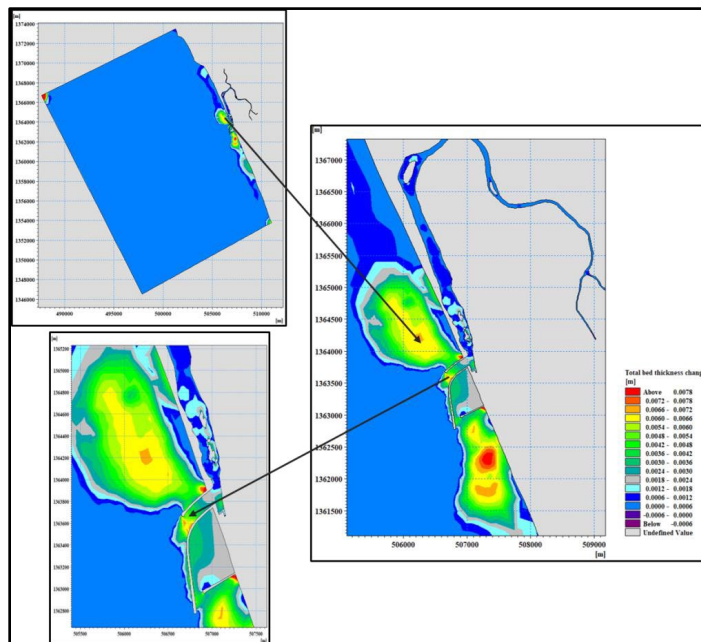


Flow pattern showing well aligned flow during flood flow for Additional Berthing Facility at Elephanta Island

Mathematical Model Studies to Assess Hydrodynamics and Siltation Due To Construction of Fishing Harbour at Ajanur, Kerala

The Harbour Engineering Department (HED), Government of Kerala proposed to develop a fishing harbour at Ajanur village situated 15km from Kasaragod district to provide fish landing facilities for the fishermen and surrounding villages. In this regard, HED requested CWPRS to conduct mathematical model studies to examine the changes in hydrodynamics and sedimentation before and after the proposed fishing harbour with the revised layout consisting of 1150m long north breakwater, 425m long south breakwater and 435m breakwater as a river training work near the mouth of Chittari River.

The mathematical model studies were conducted for both existing and proposed development. The model studies reveal that the annual sedimentation i.e. loss of depth for the proposed condition in the Harbour basin would be about 0.01m per year whereas loss of depth in the river approach channel would be about 0.045m in a year. A reduction in current speed due to the proposed development in the channel, i.e. dredging of the channel up to -2m as well as in the proposed Harbour basin would cause the loss of depth in the site. Further, an annual sedimentation of about 0.05m along the north and south of the break waters is also observed in the model results. Based on the model results the proposed layout of the training works, and the Harbour basin is found to be suitable for the prevailing conditions at the site. The capital dredging in the fishing harbour area, in the river mouth and along the river is calculated to be about 1.1Mm³.

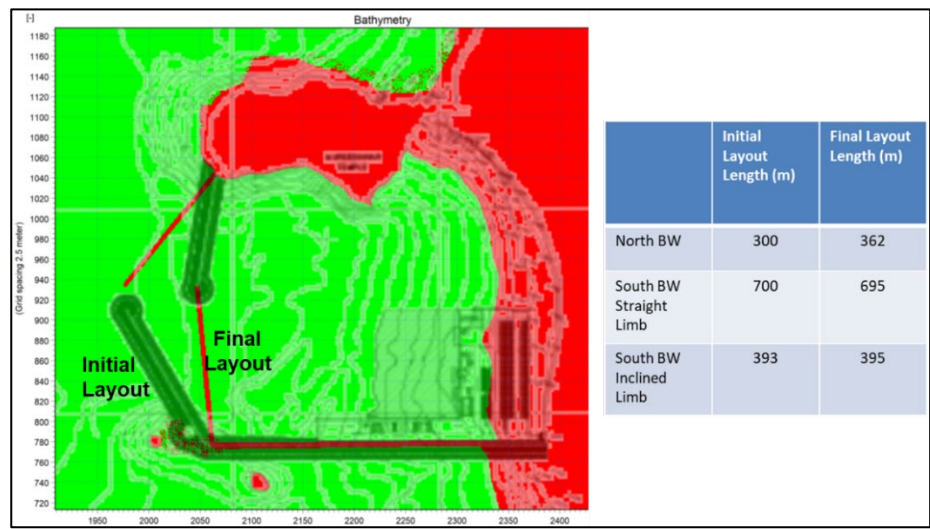


Sedimentation pattern for the proposed condition (monsoon)

Mathematical Model Studies for Development of Outer Harbor at Murdeshwar, Uttar
Kannada, Karnataka

Director of Fisheries have a proposal of development of outer harbor at Murdeshwar of Uttar Kannada district, Karnataka. The proposed site is situated along the west coast of India at about 11Km north of Bhatkal. The location of the site at Murdeshwar is fully exposed to incident waves from the Arabian sea with maximum incident wave up to 4.5 m height. It is observed that no sand movement appears on the north of the development location at Murdeshwar due to the presence of rocky headland of about length 500 m and width 370 m but sediment movement is visible in a stretch of about 7.5km on the south till the river Tenginagun which act like sink. With the analysis of Google images during different seasons, it has been observed that the net littoral drift direction appears from North to South but the overall drift does not appear to be very high and beach advancement on the north side of the headland generally remains within 100 m from the shore and on the Southside, it is comparatively less.

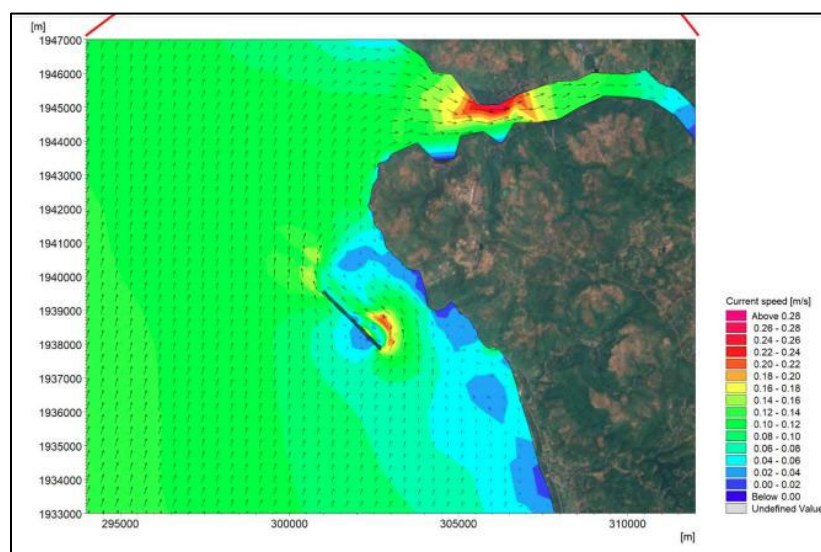
Director of Fisheries, Karnataka have evolved a layout for development of outer harbour at Murdeshwar with the proposed north break water straight limb of 362m length and south breakwater straight limb 695 m length extending upto the rocky outcrops with an inclined limb of 395 m. The tip of the breakwater proposed at (-) 5 m CD with inlet width of about 175 m. The basin is required to be dredged to (-) 3 m for parking of the vessels and berthing operations. The permissible wave height limit for the fishing harbour is allowed up to 0.3 m. In this regard, project authority refereed the mathematical model studies for the development of the outer harbour at Murdeshwar, Uttar Kannada, Karnataka. In the present report, mathematical model studies for wave tranquility have been described in details for the proposed layout and based on the study, outer harbour recommended for the proposed fishing harbour at Murdeshwar.



Proposed breakwater layout

Mathematical Model Studies to Assess Hydrodynamics and Sedimentation for the Development of an Offshore Breakwater at the Konkan LNG Limited, Dabhol, Maharashtra

Konkan LNG Limited (KLL) is located in Village Anjanwel, Taluka Guhagar, and District Ratnagiri on the west coast of India. The LNG terminal has a single berth connected to the shore by a 1.5 km piledriven trestle structure. The existing terminal has a partially built offshore breakwater extending towards the west-north-west of the LNG berth. The LNG terminal is characterized by an approach channel of 8 km long, 300 meters wide, and a turning circle of 700 m diameter basin. As part of the development plan, KLL is proposed to complete a partially built offshore breakwater to fully construct with an overall length of 2300 m, protecting the final approach, manoeuvring area, and berth. In this regard, KLL requested CWPRS to conduct mathematical model studies to assess the hydrodynamics and sedimentation in the navigation channel and surrounding region of KLL. The mathematical models MIKE 21 HD and MT were used for tidal hydrodynamics and to estimate siltation quantity rates. A regional hydrodynamic model was developed for the Dabhol coastline, and flow characteristics (water level and currents) were simulated for the offshore breakwater layout condition. Simulated results show good agreement with measured datasets and it reveals that a maximum current speed of 0.18 m/s was observed close to the KLL berth area. The current speed is slightly high with the offshore breakwater due to the closed region behind the structure; however, it may not affect the Konkan LNG terminal's operation. Based on the sedimentation study results, it is observed that the maximum annual siltation rate for the layout conditions at the outer navigation channel and turning circle cum berthing area is 0.39, and 0.57 m, respectively. To maintain the navigation channel depth of -14.5 m w.r.t CD, the predicted annual dredging quantity is 490359, 962560 m³ /year in the outer navigational channel and turning circle cum berthing area for the proposed layout condition.



Simulated flow pattern around the proposed structure during flood tidal cycle

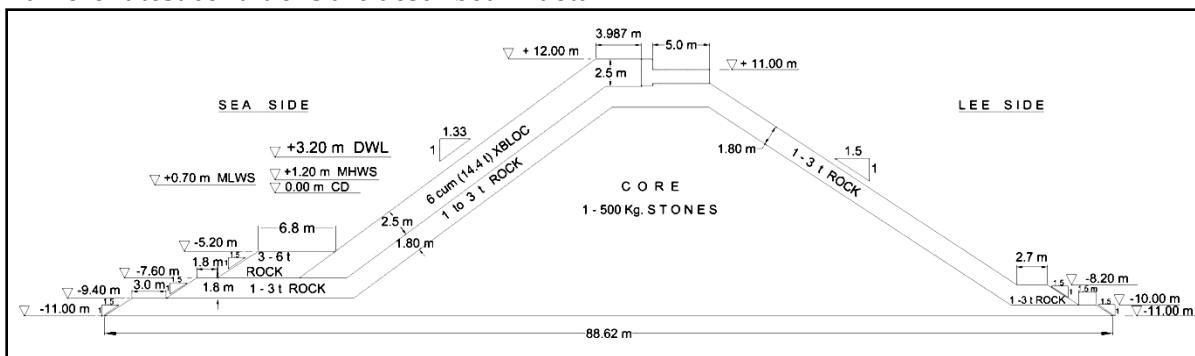
Additional Desk & Wave Flume Studies for Trunk Portion of Breakwater Section Using Xbloc Armour Units for Development of Ramayapatnam Greenfield Port, Prakasam District, Andhra Pradesh, India

Ramayapatnam village is located in Prakasam District, Andhra Pradesh on the East coast of India. The Andhra Pradesh Maritime Board (APMB) has proposed to develop Greenfield all-weather Port at Ramayapatnam as World class terminal trade facilities to meet the present and future needs. The proposed layout consists 1350 m long North Breakwater and 3700 m long South Breakwater.



Location map of proposed site and the Proposed layout plan of breakwaters for the development of Greenfield Port at Ramayapatnam, Andhra Pradesh, India and

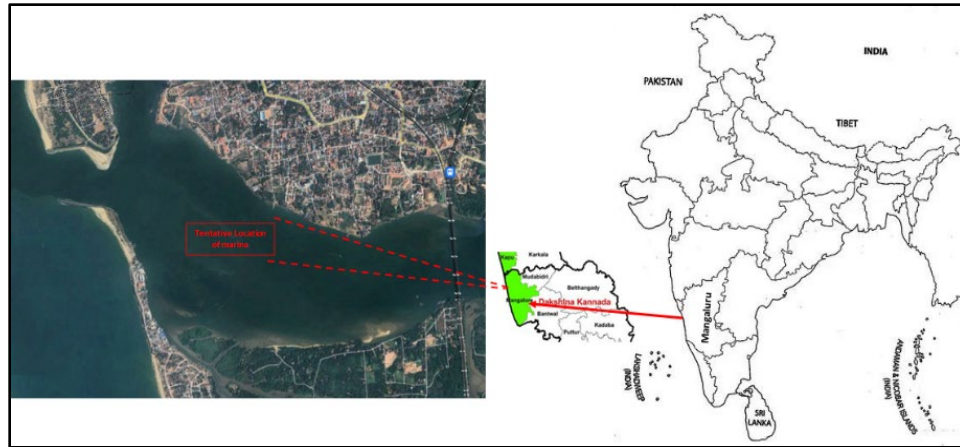
The Central Water and Power Research Station (CWPRS) has conducted 2D wave flume studies for trunk portion of breakwater sections with XblocPlus armour model units and 3D wave flume studies for roundhead portion of breakwater sections with Xbloc armour model units for development of Greenfield Port at Ramayapatnam, Prakasam District, Andhra Pradesh and submitted vide CWPRS Technical Report No. 6112 of March 2023. Further, M/s Auro Infra Private Limited, Hyderabad has approached CWPRS to conduct additional 2D wave flume studies for trunk portion of breakwater section using 6 m³ Xbloc armour units for development of Greenfield Port at Ramayapatnam, Prakasam District, Andhra Pradesh, India. In this regard, the hydraulic stability of the trunk portion of breakwater section 6 m³Xblocarmour units has been confirmed through the wave studies with random wave generation (P-M Spectrum) by reproducing the sections to a Geometrically Similar (GS) model scale of 1:54. The additional 2D wave flume studies with random wave generation conducted for trunk portion of breakwater cross-section using 6 m³ Xbloc Armour units at (-)11.0 m for different test conditions are described in detail.



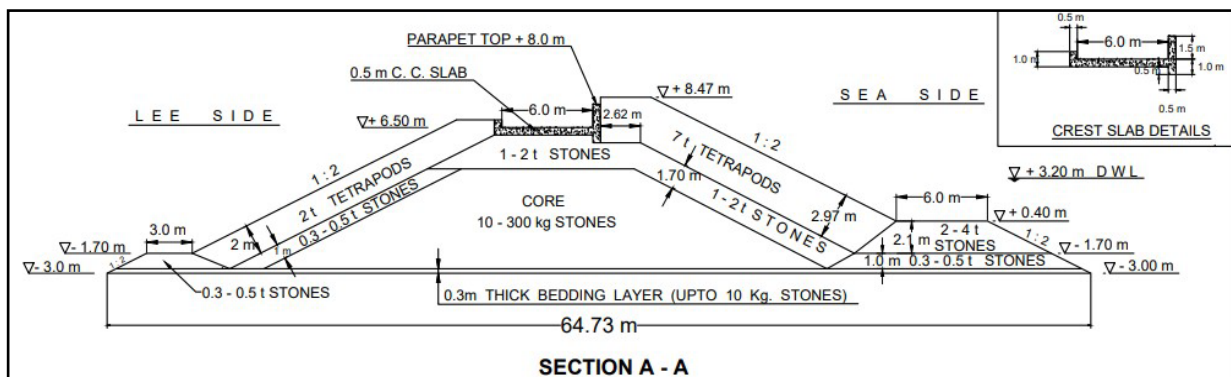
Proposed trunk cross section of breakwater at -11.00 m seabed level

Desk And Wave Flume Studies for the Design of Breakwaters for the Development of Marina at Old Mangaluru, Karnataka

The Karnataka Maritime Board, Govt. of Karnataka, have proposed the development of Marina facility in the Netravati River at Old Mangaluru. Accordingly, various mathematical model studies have been conducted by CWPRS vide Technical Report No. 6055 of September 2022, Technical Report No. 6138 of June 2023 & Technical Report No. 6269 of June 2024, for the development of Marina and other allied activities. Based on mathematical model studies, it is proposed to extend North breakwater by 450m length and South Breakwater by 75 m. The desk and wave flume studies have been carried out to evolve design cross-sections of breakwater at different sea bed level considering the maximum breaking wave height (H_b) of 4.85 m and Design Water Level of +3.20 m. The trunk portion of North breakwater cross-section consist 7 t tetrapod armour units at -3.0 m sea bed level, 10 t tetrapod armour units for round head portion of North breakwater at -5.0 m sea bed level and South breakwater at -3.0 m sea bed level. The hydraulic stability of breakwater section was confirmed through wave flume studies and section was found to be safe from hydraulic point of view.



Index map, location plan of Mangaluru, Karnataka



Design of cross-section of breakwater at -3.0 m seabed level at Mangaluru, Karnataka.



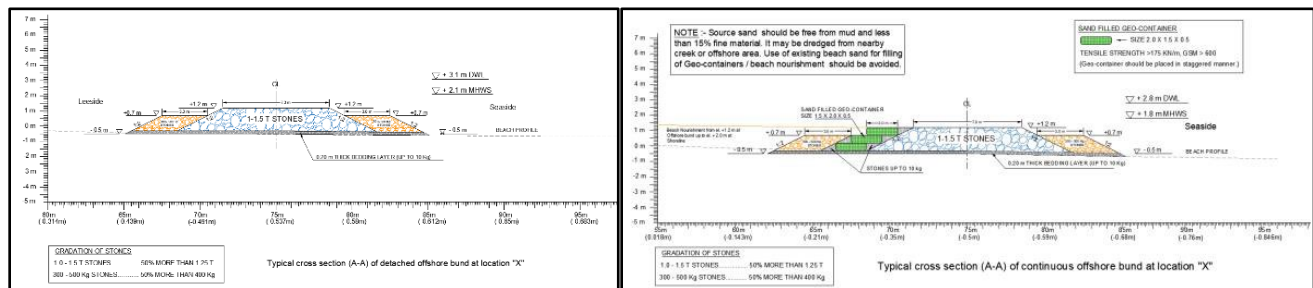
Wave action on armour layer of breakwater consisting of 7t tetrapod's at -3.0 m bed level with + 3.20 m water level and 4.80 m breaking wave height.

After the proposed extension of the 450 m of north breakwater and 75 m south breakwater, the navigational problems will be faced by the vessels due to the presence of extra bend and additionally, most of the supply of sediments coming from rivers will get accumulated on the northern side of north breakwater and the Ullal side will be deprived of the sediments and which may initiate erosion in this area. Hence, some alternative option may be evolved to obtain desired tranquility at Marina like providing skirt piled wall / spurs or the proposed Marina may be relocated in more protected waters.

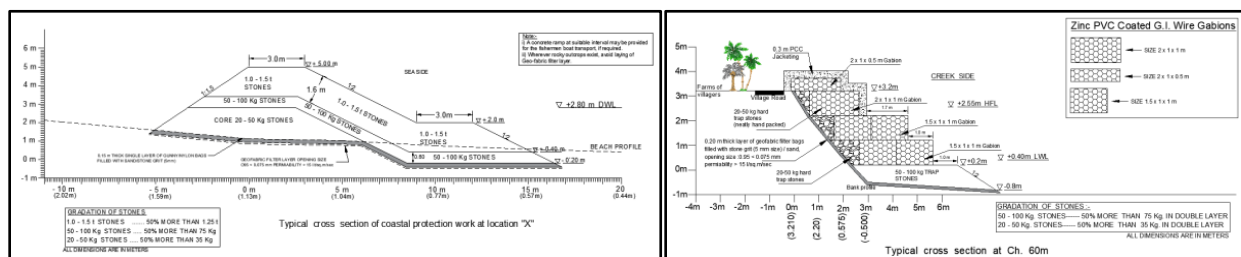
Desk Studies for the Design of Coastal Protection Works Under Konkan Disaster Mitigation Scheme at Various Sites in Sindhudurg District, Maharashtra.

Government of Maharashtra has proposal to protect eroding coastline under Konkan Disaster Mitigation Scheme at various sites in Sindhudurg district of Maharashtra. In priority, project Authority identified 18 sites to be protected against coastal erosion. A site visit was carried out to assess the severity of erosion at the proposed sites for coastal/bank protection works under Konkan Disaster Mitigation Scheme in Sindhudurg District, Maharashtra. The littoral drift and shoreline evolution assessment was carried out by using mathematical model studies.

Desk studies were conducted to evolve a design cross-section for coastal/bank protection works based on the Mathematical model studies report, site inspection and data such as beach/bank profiles, tidal levels, waves and the site conditions. The design of coastal protection works in the form of seawall with stones in the armour are evolved for 03 sites viz. Kolamb, Redi and Ubhadanda. The detached offshore bund with stones in the armour are evolved for 03 sites viz. Taramumbari. Achara and Tondwali. A continuous offshore bund with stones in the armour along with the beach nourishment are evolved for 05 sites viz. Jamdul, Mithmumbari, Talashil, Dandi and Shiroda. A soft solution in the form of sand filled geo-containers is suggested at Nivati Medha. A hybrid solution with the soft measures and seawall protection is suggested at Bhogawe. The design of bank protection works in the form of retaining wall and stone filled gabions with stones for toe protection are suggested at Hindale, Masure and Kavthani. A Design Water Level (DWL) of 2.8m is used for Malvan and Vengurla region while a DWL of 3.1 m is used for Devgad region for the computation by considering 0.8 m Storm surge and 0.2 m Sea Level Rise above respective MHWS.



Typical cross-section of (a) detached and (b) continuous offshore bund

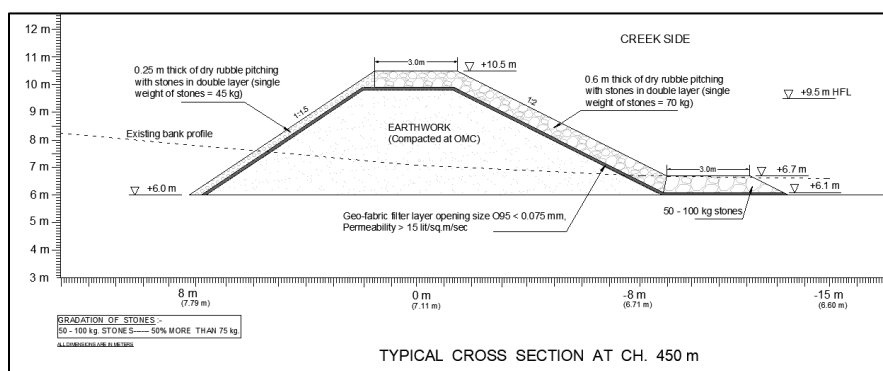
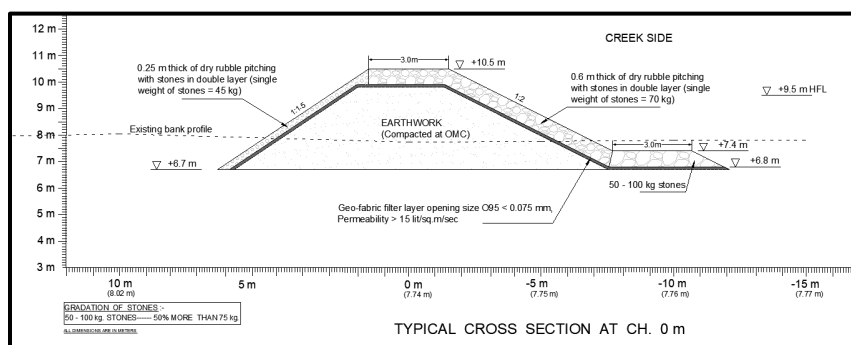


Typical cross section of (c) coastal and (d) bank protection works.

Studies For the Design of Bank Protection Work at Village Krushanpur, Tal. Jalapore, Dist. Navasari, Gujarat.

Executive Engineer, Drainage Division, Navasari had a proposal to protect the residential areas from flooding and submergence due to high tidal activity at village Krushnapur and Chormalabhatha/ Kaniyet, Tal. Jalapore, Dist. Navasari, Gujarat. Project Authority demarcated a total length of 950 m on the left side of drain at Krushanpur and 1050 m on the right side of drain at Chormalabhatha to be protected against the flooding and erosion of banks.

Accordingly, the design cross-section of bank protection works in the form of earthen bund with stone pitching is worked out based on the data such as bank profiles, tidal levels, velocity of flow, availability of materials, site conditions etc. The finalization of bund cross-section is dependent upon thorough assessment of geotechnical stability of both the foundation as well as embankment structure. Therefore, studies were carried out to assess the Geotechnical stability of Earthen Bunds at both sides of the drain at village Krushnapur, Dist. Navsari, Gujarat based on the Geotechnical investigation report provided by project authorities. A High Flood level (HFL) of + 9.5 m is considered for the design of bank protection work. The maximum flow velocity (V) of 2.0 m/s is assumed for the design of protection works.



Typical cross section of bank protection works at (a) Krushanpur and (b) Chormalabhatha, Tal. Jalapore, Dist. Navasari, Gujarat.

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1	Field data collection for mathematical model studies for hydrodynamics and siltation for Muthalapozhy Fishing Harbour, Thiruvananthapuram District, Kerala.	6265
2	Mathematical Model Studies to simulate Littoral Drift and shoreline changes due to the development at Gurupura Netravati Karnataka	6269
3	Desk studies for the design of Coastal protection works at various sites in Ratnagiri, Maharashtra (2020-21)	6272
4	Desk studies for the design of Protection work for the approach road at Vengurla, Dist. Sindhudurg, Maharashtra	6273
5	Desk studies for the design of protection work at Madh and Gorai in Mumbai suburban, Maharashtra	6274
6	Additional Desk & wave flume studies for Trunk Portion of Breakwater section using XBLOC Armour units for development of Ramayapatnam greenfield port, Prakasam district, Andhra Pradesh, India	6275
7	Mathematical Model Studies for hydrodynamics, siltation along with wave transformation for finalizing the alignment of proposed jetty at Vengurla, Maharashtra	6278
8	Mathematical Model studies to investigate the impact of construction of breakwater on Hydrodynamics and sedimentation for safe berthing of Fishing vessels at Belekeri, Karnataka	6282
9	Mathematical model studies to assess hydrodynamics and siltation due to construction of fishing harbour at Ajanur, Kerala	6283
10	Hydraulic model studies for the development of coastal berth at Hangarakatte, Udupi District, Karnataka	6285
11	Desk Studies for the design of coastal protection works at various sites in Sindhudurg District, Maharashtra (2021-22)	6288
12	Desk Studies for the design of coastal protection works at various sites in Tal. Dapoli, Dist. Ratnagiri, Maharashtra	6289
13	Mathematical Model Studies for wave transformation and wave propagation for the proposed breakwater at Konkan LNG limited, Dabhol, Ratnagiri, Maharashtra	6290
14	Desk and wave flume studies for the design of break waters for the development of Marina at old Mangaluru, Karnataka.	6291
15	Desk and wave flume studies for the development of outer harbour at Murudeshwar, Karnataka.	6292
16	Mathematical Model Studies for development of outer harbour at Murdeshwar, Uttar Kannada, Karnataka	6293
17	Mathematical model studies for Hydrodynamics and Sedimentation in Common approach channel for Container berth and multi-purpose cargo terminal near Tuna Tekra, Deendayal port, Gujarat	6296

18	Field survey, mathematical modelling and remote sensing studies for coastal processes associated with coastal erosion, shoreline changes assessment at few locations in Maharashtra state.	6297
19	Mathematical Model Studies for assessment of coastal protection works under Konkan Disaster Mitigation Scheme at selected sites in Sindhudurg district Maharashtra	6298
20	Mathematical Model Studies for wave transformation and wave propagation for the proposed breakwater at Konkan LNG limited, Dabhol, Ratnagiri, Maharashtra	6299
21	Desk and wave flume studies for the extension of south breakwater for the development of fishery harbour at Muthalapozhy, Kerala	6300
22	Desk and wave flume studies for the design of breakwaters for the development of Coastal Berth at Hangarkatte, Karnataka	6301
23	Desk studies for the design of cross-section & restoration of existing anti sea erosion bund at Varsoli, Raigad dist., Maharashtra	6302
24	Review of mathematical model studies for hydro dynamics and siltation along Kandla creek due to the proposed oil jetties, Gujarat	6304
25	Desk studies for the design of coastal protection work under Konkan Disaster Mitigation Scheme at various sites in Sindhudurg District	6306
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46	Mathematical model studies to estimate the likely rate of siltation due to development of additional berthing facility at Elephanta Island for Maharashtra Maritime Board, Mumbai	6356
47	Mathematical model studies for assessment of wave tranquility for development of RO-Ro jetty at Mandwa, Maharashtra	6358
48	Studies for ship navigation and navigational risk at Konkan LNG terminal, Dabhol, Ratnagiri, Maharashtra	6359
49	Desk and wave flume studies for the extension of existing breakwater for development of RO-RO jetty at Mandwa district Raigad, Maharashtra	6365
50	Desk studies for the design of coastal protection works at Khera Phase-II, Near village Khera, Taluka Rajula, Dist. Amreli, Gujarat	6366
51	Desk studies for design of coastal protection works at Shirgaon, Dandi-Uchheli Arnala, Dahanu in Palghar District, Maharashtra	6368
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53	Desk studies for the design of coastal protection works at Adgaon and Bordi, Taluka Shrivardhan, Raigad District, Maharashtra	6370
54	Mathematical model studies for hydrodynamics and sedimentation to assess the impact of extension of offshore breakwater at Mandwa Port, Mumbai, Maharashtra.	6371

55	Physical hydraulic model studies to estimate the alignment of additional berthing facility and to assess the impact of proposed reclamation on nearby areas at Elephanta Island, Mumbai	6372
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57	Desk studies for design of coastal protection works at various site in Ratnagiri District (2022-23), Maharashtra	6375
58	Physical model studies to study the tidal hydrodynamic conditions for the development of Marina in Mumbai harbor for Mumbai Port.	6378
59	Field data collection for mathematical model studies for Karaikal port, Puducherry	6383

FOUNDATION AND STRUCTURES

Divisions

- Geotechnical Engineering
- Structural Modelling Analysis
- Concrete Technology

Areas of Specialization/ Expertise

- Analysis and Interpretation of instrument data of concrete gravity dam and powerhouse
- 2D & 3D stability and stress analysis of Gravity dam by FEM
- Measurement of strains on Penstock bifurcation, manifolds, penstock ferrules, water pipeline ferrules etc.
- Assessment of suitability of materials for rehabilitation of distressed hydraulic structures
- Temperature control studies for mass concrete gravity dams
- Stability of slopes and settlement analysis

List of Clients

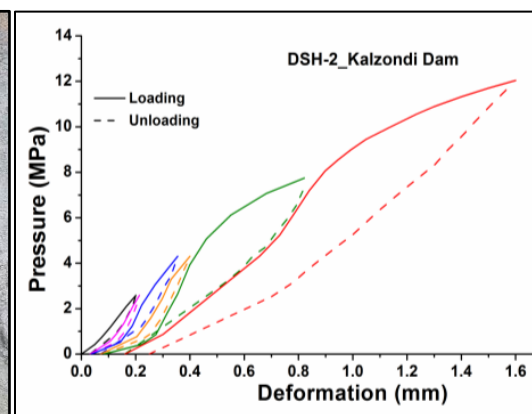
- State Government Authorities
- Polavaram Irrigation Project Head Works, Andhra Pradesh
- Sardar Sarovar Narmada Nigam Limited, Gujrat
- Satluj Jal Vidyut Nigam Limited, Himachal Pradesh
- Karnataka Neeravari Nigam Limited, Karnataka
- Indian Railways

Post Grouting Studies for determining In-Situ Properties of the Kalzondi Masonry Dam, District – Ratnagiri, Maharashtra

Kalzondi dam having a total length of dam 165 m has been constructed across nalla Kalzondi in Ratnagiri district of Maharashtra. Construction of dam started in 1980 and has been completed up to RL 98 m and 2 m planking during the year 1989. The height of overflow section from deepest foundation level is 16.00 m having a length 64 m. To fulfil the increased demand of drinking water of villagers, Project Authority has decided to raise the height of the dam by 5.5 m from the existing level. Before raising the height of the dam, it has become necessary to assess the in-situ strength of the existing dam masonry. Hence, Flat Jack test has been carried out by CWPRS for determining in-situ strength parameters at different locations in the existing structure of dam before carrying out any treatment and a report has been submitted. The result of that study has indicated very poor quality of the stone masonry in the dam body. Therefore, to improve the strength of the existing dam body masonry, extensive cementitious grouting has been carried out in the stone masonry of Kalzondi dam. For assessing efficacy of the grouting in improving the strength of the dam body, Flat jack has been repeated at post grouting stage in the dam body at unjacketed portion of dam body having a size of 5m x 5 m on overflow section at two locations on left and right side (refer photo 1a, 1b). After analysis of the measured data, it has been observed that significant improvement has taken place in the strength parameters of the dam body masonry at post grouting stage. The value of Modulus of Elasticity has been observed to improve from 0.16 - 3.42 GPa at pre grouting stage to 12.23 - 19.69 GPa at post grouting stage (refer Fig. 2). The evaluated compressive strength of the order of 13.01 Kg/cm² at pre grouting stage has now improved to 78.61 Kg/cm² at post grouting stage. Poisson's ratio estimated values are 0.21 & 0.24. Hence, it is suggested to carryout stress analysis of the spillway section to know the stress levels in the dam body. The compressive strength of the dam body masonry should be five times of the induced stresses in the dam body under most adverse load combinations. It is further mentioned that overall qualitative assessment of dam body should be carried out by Non-Destructive Techniques to locate the weak pockets if any in the dam body.



*Vertical and horizontal test for determining In-situ
Poisson's ratio*



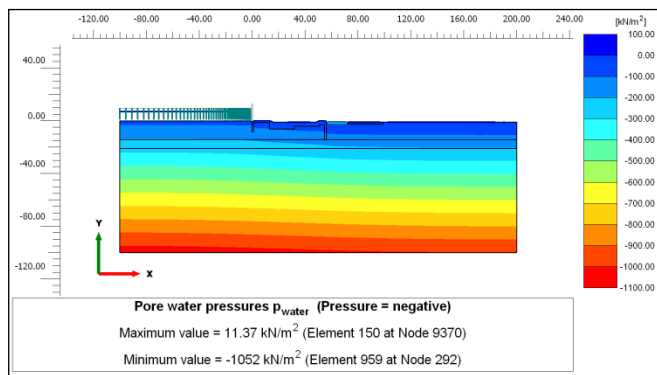
*Pressure V/s Deformation cycles,
Secant Modulus of elasticity*

Geotechnical Studies for Proposed Barrage Across River Tapi Near Village Rundh-Bhatha, dist. Surat, Gujarat

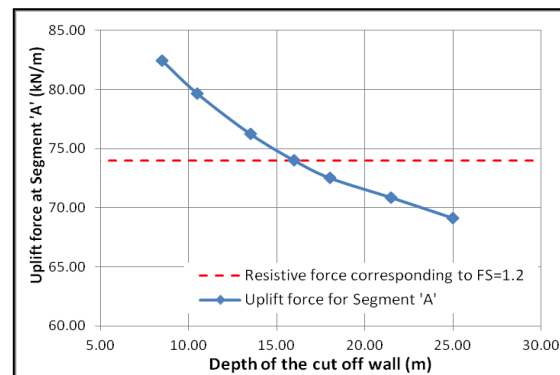
The Surat Municipal Corporation (SMC) has proposed to construct a barrage across river Tapi, 10 km downstream of the existing Singanpore weir, near village Rundh – Bhatha in Surat district of Gujarat. Total length of the proposed Rundh - Bhatha barrage is 1028 m and reservoir storage capacity is 18.735 MCM. Geotechnical studies of the proposed barrage were entrusted to CWPRS for assessing safety with respect to foundation seepage for suggesting suitable remedial measures if required.

Seepage analyses by mathematical modeling using software PLAXIS 2D have been conducted for two design cross-sections viz. A-A and B-B of the proposed barrage. Two important safety aspects viz. piping (exit gradient) at the downstream and uplift at the base of barrage floor have been assessed. Geotechnical investigation along alignment of the barrage indicates presence of varying foundation strata consisting of alternate layers of high and low permeability soil layers with varying thickness.

When assessed for safety against piping both the design cross-sections have been found to be safe with exit gradient values lower than the safe exit gradient as per IS standards. However, the cross-sections have been found to be unsafe against uplift indicating requirement of modifications in the design cross-sections to satisfy uplift criteria. These modifications include increase in barrage floor thickness for the entire stretch and provision of upstream cutoff in some stretches. Optimized barrage floor thickness for cross-sections A-A and B-B are recommended in the present report. Also, the optimized depth of cut-off wall is recommended. Liquefaction studies conducted for the barrage foundation using Simplified Seed's method indicates that foundation strata are not susceptible to liquefaction for earthquake magnitude of 7.0 and below.



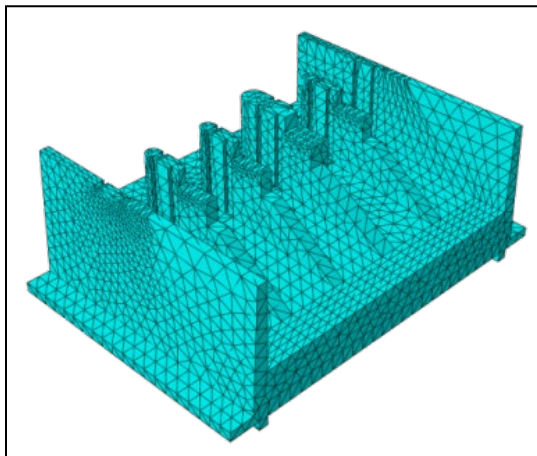
2D seepage studies - Steady state pore pressures distribution for cross-section B-B



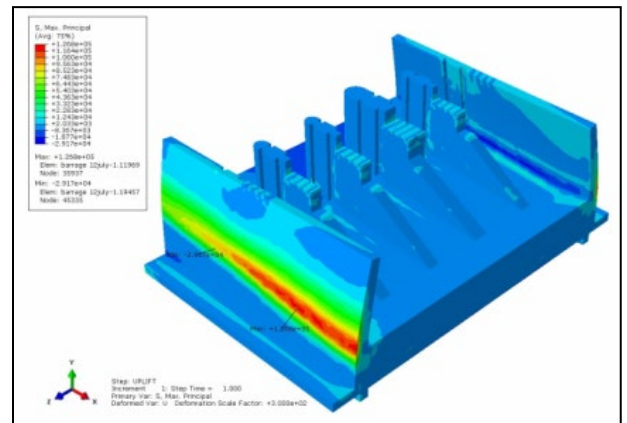
Variation of uplift force at barrage floor base with depth of upstream cut-off

3D Stress Analysis of Bindu Barrage Using Finite Element Method, West Bengal

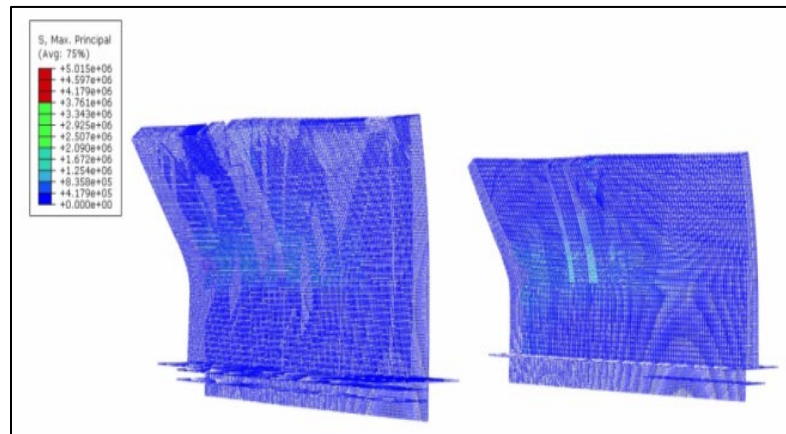
The Jaldhaka Hydro-electric Project is a run of the river project that utilises the confluence water of Jaldhaka River (Dichu), Nichu and Bindu Khola by constructing Bindu barrage in Kalimpong District of West Bengal, on the Indo-Bhutan border. Over the years, the barrage has developed many distresses raising apprehensions over the structural integrity of the barrage structure. Hence, Project Authority awarded the study to carry out 3D Stress Analysis by FEM of Bindu Barrage to CWPRS, Pune. Accordingly, the study has been carried out by reproducing various components of the barrage such as apron, piers, gate details and abutments using 56281~69716 nodes and 35762~45549 quadratic tetrahedral, type C3D10 elements. The analysis has been carried out as per IS:6512(1984) and IS:11130(1984) loading combinations with incorporating in-situ material properties using ABAQUS general purpose Finite Element software version R2019X. Based on 3D stress analysis it is found that under static as well as earthquake loading conditions, the maximum and minimum principal stresses (tensile and compressive) and deflections in the barrage as whole are within permissible limits except the abutments. The excessive stresses in the abutment will be borne by the steel reinforcement as it is designed and constructed as RCC member. It is suggested to carry out qualitative assessment of abutment walls gates, lifting arrangements and piers by NDT and status of steel reinforcement should also be assessed by GPR and other techniques.



FEM Model of the barrage



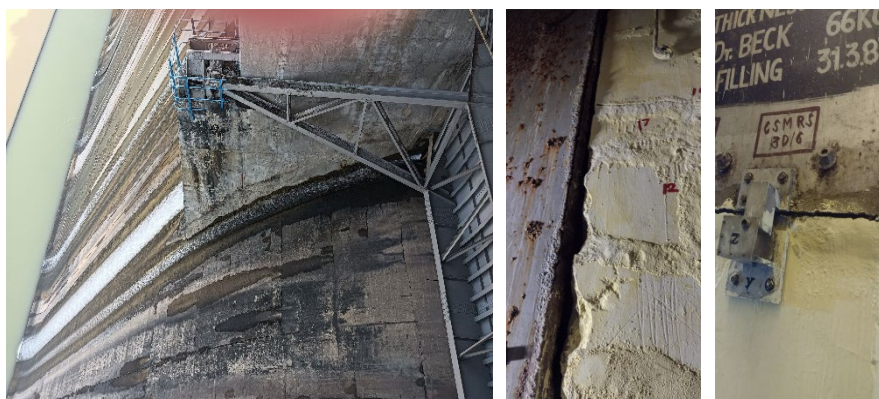
Maximum Principal Stress Distribution in whole barrage under Load Combination B



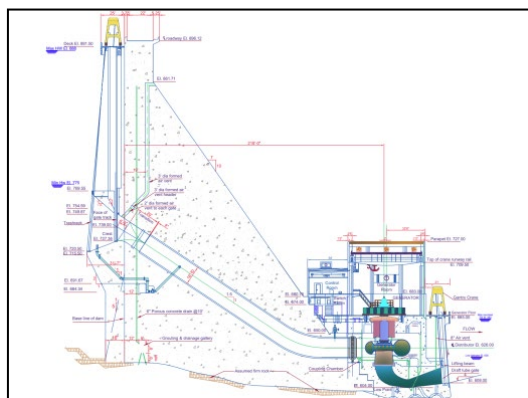
Maximum Principal Stress Distribution in steel in whole barrage under Load Combination B

Site Visit in Connection with Inspection of Damages in The Penstock Gallery of The Power House And Dam Body of Rihand Dam, Sonebhadra, Uttar Pradesh.

Rihand dam is a concrete gravity dam constructed on Rihand river, a tributary of the Sone River, in Renukoot, Uttar Pradesh built for multipurpose reasons during the period 1955 to 1962. The reservoir impounded by the dam is called Govind Ballabh Pant Sagar and it is one of the largest artificial lakes in India. The Dam is also associated with a powerhouse. The powerhouse consists of six generation units with a total installed capacity of 300 MW ($50 \text{ MW} \times 6$) is located at the toe of the Rihand dam. The powerhouse is managed by Uttar Pradesh Jal Vidyut Nigam LTD (UPJVNL). The powerhouse is mostly operated during the peak demand of power. Due to ageing and during operation of the HEP distresses have been observed in the Penstock Gallery of Power House and also in dam body. Therefore, the Project authorities requested CWPRS to carry out a detailed inspection of the Power House structure, Rihand dam and other appurtenant structures towards suggesting suitable remedial measures. Based on detailed inspection and discussions held at site it has been concluded that Alkali aggregate reaction may have initiated the cracks in the beginning as pointed out by various experts in the past and the expansion/contraction gaps present at various structural components such as dam- power house, bay to bay and power house-tail race may have been affected due to unknown forces or induced vibrations. Further, the framed structures may be getting damaged due to excessive vibrations and the RCC support system needs to be replaced with steel ring girder support system to allow free movement along the length of penstock during transient conditions. It has also been mentioned that the vibration induced on the structure due to operation of generation units is also contributing towards development and expansion of the existing cracks.



Distresses observed in Power House and dam



cross section of power block of the dam

Cementitious Grouting for Stabilizing/Fortification of Rock Mass Near Panshet Hydro Power Station for Arresting Rock Fall, Pune, Maharashtra

Panshet Dam is constructed across River Ambi about 50 km southwest of the Pune city in Maharashtra. The dam was constructed in late 1950's and the Hydro Power Station has been commissioned in the year 1972. The project comprises of an earthen / masonry gravity dam with a maximum height of 63.56 meters and length of 1039 meters. The dam has a toe powerhouse with a power generation capacity of 8 MW. The rock mass surrounding the hydro power station has been posing a risk due to frequent rock fall. The Powerhouse was constructed by excavating the basalt rock mass about 20-25m deep near the downstream side of the dam. Powerhouse station building is situated below ground level and flush with excavated rock. In the year 2003 during rainy season first rock fall occurred and subsequently every year rock fall has been taking place on the powerhouse building. During the drilling/anchoring work towards stabilization of the rock mass, there was a risk of rock fall surrounding the hydro power station. The NDT tests carried out on this rock revealed voids, cavities and jointed rocks up to a depth of about 6 m and suggested to grout the top portion up to a depth of about 10 m before carrying out anchoring of rock mass to prevent further rock fall. Therefore, the project authorities requested CWPRS to carry out the laboratory studies for Cementitious grout material mix design through laboratory studies for stabilizing rock mass adjacent to HPS building. The laboratory studies have been conducted on numerous combinations by varying proportions of cement, fly ash, silica fume, admixtures and quantity of water and after satisfying most of the requisite criteria about strength, flowability, impermeability, segregation, bonding and based on these results the grout mix designs has been recommended. It has been suggested that the quality control of grout mix should be maintained by conducting tests on site such as marsh cone test, settlement test, setting time etc. and the desired minimum 7 days and 28 days compressive strength for grout specimens needs to be more than 75 kg/cm² and 150 kg/cm² respectively. After the grouting work on rock mass, no further degradation of rock mass in the form of fall, sliding and disintegration has been reported by the Project Authorities, thereby ensuring the effectiveness of grouting in stabilization of weak rock mass. Hence, the stabilization of rock mass around Powerhouse through cementitious grouting has ensured the safety of Powerhouse Structure.

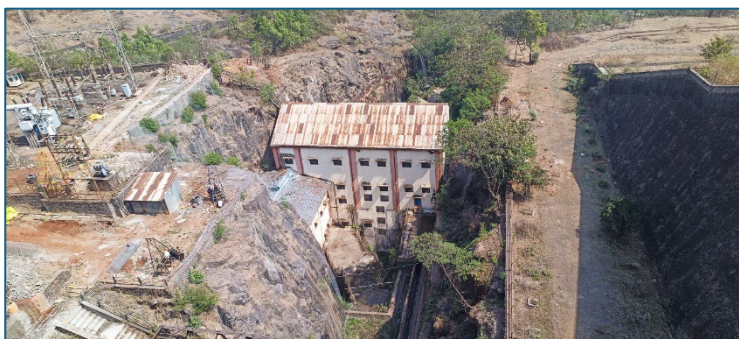


Photo 1: View of Panshet Dam HE Power Unit

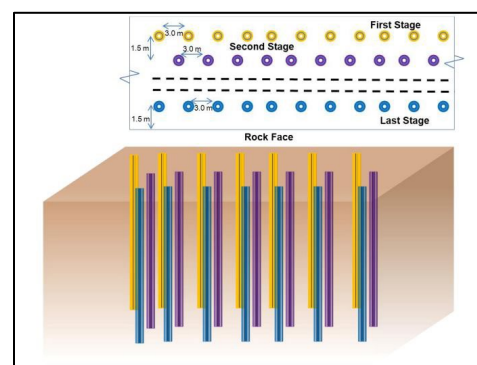


Photo 2: Grouting pattern proposed

Sr. No.	Technical Report Title	Technical Report No.
1	Site visit towards inspection of damages and discussions for undertaking studies for rehabilitation of 10 minor irrigation projects in Ratnagiri District, Maharashtra.	6263
2	Site visit to Baglihar H. E. project towards inspection of damages and discussions for undertaking studies for rehabilitation of Baglihar dam, Ramban, J&K.	6267
3	Site inspection report of Lendi Dam, Tal- Mukhed, Dist. Nanded	6276
4	2D Dynamic Stress Analysis by FEM of One Deepest Non-Overflow section of Bhatsa Dam, Thane, Maharashtra	6280
5	Post Grouting studies for Determining In-Situ Strength Properties of Kalzondi Masonry Dam, Dist. Ratnagiri, Maharashtra	6295
6	3D stress analysis of Bindu barrage using finite element method, West Bengal.	6303
7	Site visit to Bhadra Dam under KNNL, towards inspection of the dam and discussions for undertaking studies for controlling seepage through the body of Bhadra dam, Karnataka	6308
8	Site visit in connection with inspection of damages in the penstock gallery of the power house and dam body of Rihand dam, Sonbhadra, Uttar Pradesh	6351
9	2D static and Pseudo-dynamic stress and stability analysis of one non-overflow section of Vani Vilas Sagar Dam, Karnataka.	6355
10	Geotechnical studies for proposed barrage across river Tapi near village Rundha-Bhata, Surat, Gujarat	6357
11	Inspection report in connection with re-evaluation of hoist capacity, structural audit/health status and other issues of Kosi and Gandak barrages	6367
12	Site visit to assess impact of Sitamma Sagar Multipurpose Project on heavy water plant, Manuguru, Telangana	6376
13	Cementitious grouting for stabilizing/ fortification of rock mass near Panshet Hydro Power Station for arresting rock fall, Panshet, Pune, Maharashtra	6380

APPLIED EARTH SCIENCES

Divisions

- Engineering Seismology
- Vibration Technology
- Geophysics
- Isotope Hydrology

Areas of Specialization/ Expertise

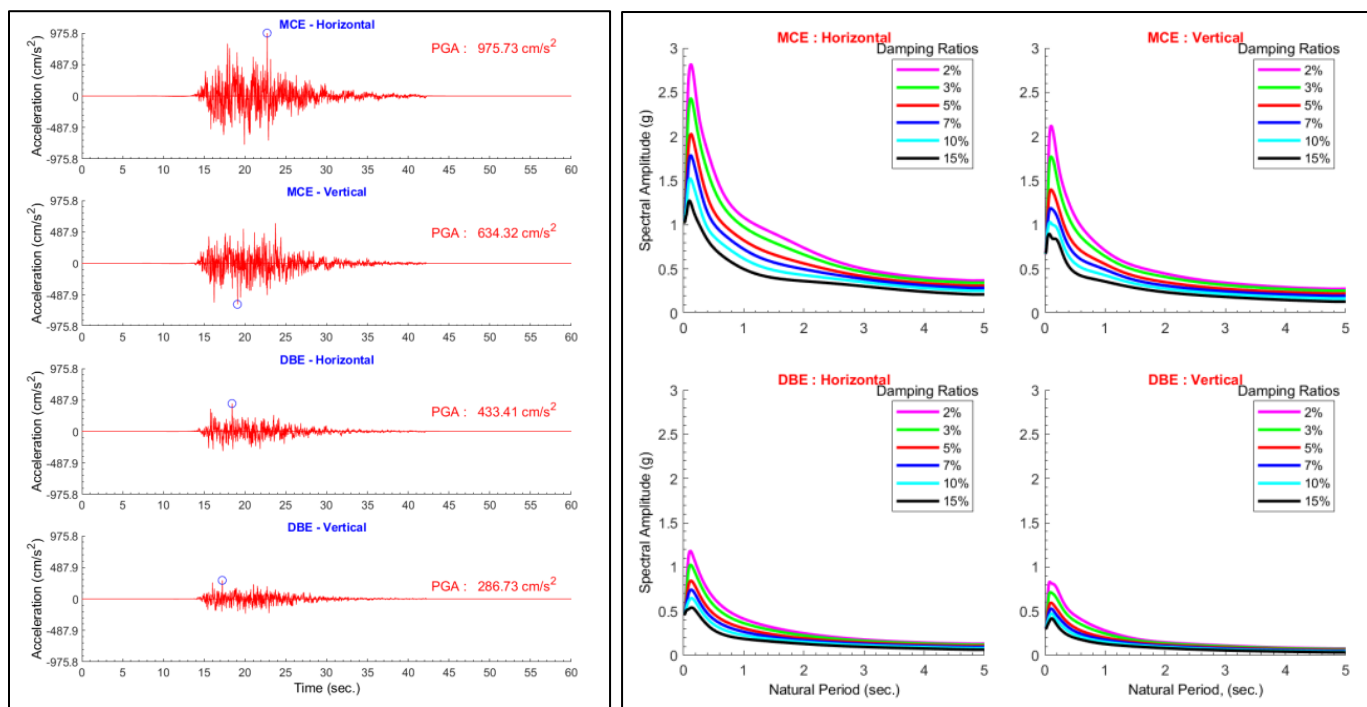
- Site Selection & Installation of Instruments for setting up of Seismological Observatories
- Analysis & Interpretation of Instrument Data (MEQ) for Epicenter Location, Source Parameter & Magnitude Estimation etc.
- Analysis & Interpretation of Data for estimation of Strong Motion Parameters for Peak Ground Acceleration, Response Spectra, Acceleration Time History & Seismic Coefficients
- Estimation of Site-Specific Seismic Design Parameters
- Non-destructive tracer and bore hole geophysical logging techniques
- Delineation of seepage zones in hydraulic structures
- Determination of ground water characteristics
- Solutions to problems related to foundation of dam sites, structures of River valley, maritime and nuclear power projects

List of Clients

- Govt of Karnataka
- NHDC
- Govt. of Maharashtra
- JKSPDC
- Govt of Mizoram
- WAPCOS
- NHPC
- Mazgaon Dock Ltd., Mumbai
- Govt. of Goa
- Central Water Commission
- NPCIL
- NWDA

Estimation of Site-Specific Seismic Design Parameters for West Seti Hydroelectric Project, Nepal

The West Seti Hydro Electric Project (WSHEP) envisages construction of 195m high and 460m long concrete faced gravel-fill storage dam with storage capacity of 1452 MCM at FRL on the Seti River, 550m downstream of the Seti River/Chama Gad confluence in Sudurpaschim Province of Nepal. The project includes surface/underground power house with installed capacity of 800 MW. The dam site is located at Lat. 29° 21' 36.96" N and Long. 80° 46' 16.23" E and the power house site is located at Lat. 29° 17' 48.02" and Long. 80° 51' 41.21" E. The WSHEP site lies close to seismic zone V as per the zoning map of India. In the present report, site-specific design ground motion has been estimated for dam site separately by carrying out detailed analysis of the data on seismo-tectonic and geological features and past seismicity in the region.



Horizontal and vertical components of design accelerograms for MCE and DBE levels for dam site.

The design response spectra with different damping ratios of horizontal and vertical components of MCE and DBE levels for dam site.

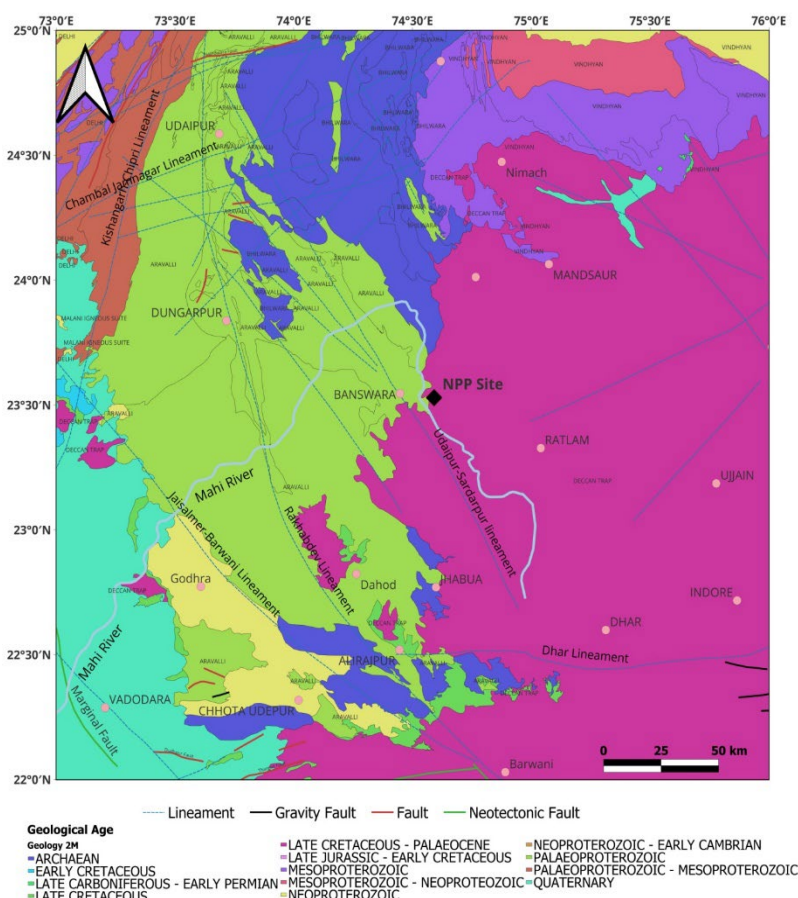
As per investigation carried out at the project site, VS30 value for the dam site has been calculated as 1598 m/s and that for Powerhouse (surface) is 726 m/s and Powerhouse (underground) is 1080 m/s respectively. Both deterministic and probabilistic (PSHA) approaches have been used to estimate the ground motion under MCE condition. The PSHA is carried out for traditional uniform ariel seismicity and spatially smooth gridded seismicity as well as per new NCSDP guidelines. The target response spectra for the WSHEP sites (Dam and powerhouse sites) were decided after comparing the MCE level of TRS obtained from both PSHA and DSHA methods as per NCSDP guidelines (Revised 2024). For all the three WSHEP sites the MCE horizontal level of PSHA due to uniform seismicity showed higher spectral amplitudes for all the periods. The PSHA estimates were higher than the DSHA estimates for all the periods. Hence, the ground motion from

PSHA due to uniform areal seismicity was considered as TRS for MCE and DBE levels for all three WSHEP sites. The design accelerograms of horizontal and vertical components of motion were obtained separately using the respective target spectra and suitable phase differences for WSHEP dam and surface and underground powerhouses. The peak ground acceleration (PGA) values of horizontal and vertical components of motion at MCE level are found to be 0.9950 g (975.73 cm/s²) and 0.6468 g (634.32 cm/s²) respectively and the DBE level of motion are found to be 0.4419 g (433.41cm/s²) and 0.2924 g (286.73 cm/s²) respectively. Smoothed design response spectra were computed for damping ratios of 2%, 3%, 5%, 7%, 10% and 15% of critical from these design accelerograms. Site specific seismic design coefficients (α_h and α_v) were estimated as per the NCSDP (2024) guidelines.

Estimation of Reservoir Induced Seismicity for Mahi Bajaj Sagar Dam, Rajasthan

A Nuclear Power Plant (NPP) at Mahi Banswara Atomic Power Project (MBAPP) located at District Banswara, Rajasthan is likely to be set up by M/s Nuclear Power Corporation of India Limited (NPCIL). The location of the NPP site is $23^{\circ} 31' 46''$ N and $74^{\circ} 35' 26''$ E as shown in figure.

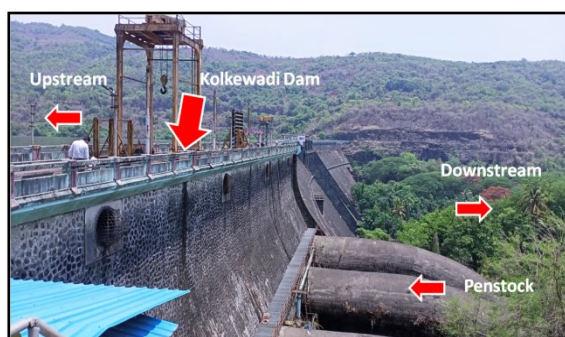
As a standard practice, prior to construction of any Atomic Power Plant near an existing reservoir, effect of reservoir induced seismicity (RIS) around the project site is required to be studied. Accordingly, the RIS potential of the region has been evaluated in the present study using a statistical method proposed by Baoqi (1991), based on the characteristics of the Mahi Bajaj Sagar reservoir. The NPP site is situated on the upstream of Mahi Bajaj Sagar Dam along the river course. As per the seismic zonation map of India (IS - 1893:2016), the project site lies in seismic zone II. The distance of the dam from the NPP site is 11.5 km, as supplied by the NPCIL. The depth of the reservoir has been calculated as the weighted average of depths over various blocks from the longitudinal cross-sectional diagram of the dam, received from NPCIL.



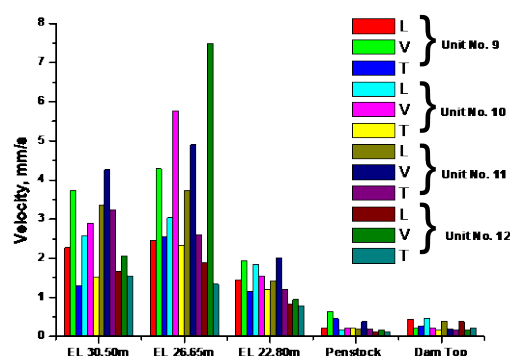
This inducing probability, being greater than the critical probability of 0.3, the Mahi Bajaj Sagar reservoir can be considered significant for assessing the RIS potential for NPP site. The expected magnitude due to RIS is computed as $M = 4.4 \pm 1.2$. To calculate the deterministic peak ground acceleration (PGA) due to the RIS, the magnitude is taken as 5.6 for reasons of conservatism. The Log-likelihood (LLH) method, proposed by Scherbaum et al. (2009), is employed here to judge the suitability of GMPEs for the determination of PGA. From the LLH scores (for PGA) of the 12 candidate GMPEs, the GMPEs due to Kanno et al. (2006) and Zhou et al. (2006) are found to show lowest LLH score for PGA and hence these two GMPEs are finally selected to calculate the PGA with 50% weight factors to each of these two GMPEs. The average median (50th percentile) PGA is found to be 0.0925 g while the same for median minus one standard deviation (16th percentile), is found to be 0.0575 g.

Vibration Studies for Kolkewadi Power House, Koyna Hydro Electric Project (KHEP) Stage II, Maharashtra

Koyna Hydroelectric Project (KHEP) is the largest completed hydroelectric power plant of Maharashtra. The project has been constructed in four stages in stage I installation capacity of 280 MW(4 X 70 MW), stage II installation capacity of 320 MW(4 X 80 MW), stage III installation capacity of 320 MW(4 X 80 MW), stage IV installation capacity of 1000 MW(4 X 250 MW). The total power generation capacity of the Koyna HEP is 1,920 MW. The project is maintained by the Maharashtra State Power Generation Company Limited (MAHAGENCO). During the operation of these generation units, excessive vibration level was observed by Project Authority in the power house structure. Moreover, excessive seepage has been observed through dam body above the embedded penstock location raising apprehension about the vibration transmission to dam body during power generation. Therefore, Project Authority decided to carry out the vibration measurement studies for the Kolkewadi dam underground power house and dam body in order to assess the structural safety of these structures against induced vibrations during power generation in stage 3 power house. Accordingly, two field visits have been undertaken for conducting vibration measurement studies under different load operating conditions. Vibration measurement has been carried out at different floor levels such as at KRL 30.50 m (Exciter Floor); at KRL 26.65 m (Generator Floor); at KRL 22.80 m (Turbine Floor); on penstocks and at dam top, in different running conditions.



View of Kolkewadi dam

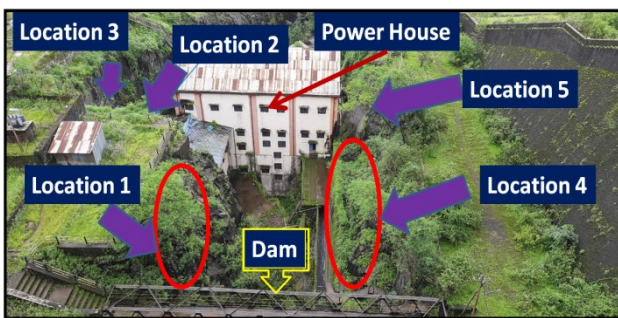


Vibration levels at different test locations

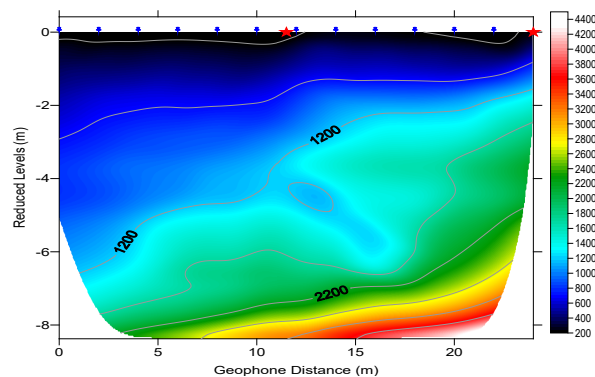
The present technical report comprises of details of the vibration study conducted at site during Phase- I and II. Out of all the vibration observations, vibration level recorded at Generator floor has been found to be relatively higher which is about 4.29 mm/s, 5.77 mm/s, 4.9mm/s and 7.49mm/s at Unit No. 9, 10, 11 and 12 respectively. The vibration levels recorded at all the locations at power house are found to be less than safe vibration level of 10 mm/s. Maximum vibration level recorded at dam top is 1.45 mm/s which is very less than safe vibration level of 5 mm/s. It has been found that the recorded PGA level is in the range of 0.001 to 0.02 g. The measured PGA level stands much below the computed PGA at all locations of measurement under all conditions of power house operation. Vibration studies thus indicate that the dam and powerhouse structure are safe with respect to the vibration level induced due to the operation of generation units at the mentioned load variation conditions. However, as the structures are aging and continuously subjected to vibrations, therefore it is suggested to monitor the vibration levels frequently or at least once in a year to further ensure the safety of the dam as well as powerhouse.

Assessment of In-Situ Quality of Rock mass Around the Powerhouse by NDT Methods at Panshet HEP, Maharashtra

Panshet Dam constructed on Ambi River, is located at about 50 km southwest of the Pune city. The dam was constructed in the late 1950's and the water from the reservoir is mainly used for irrigation, drinking water and hydro power generation for fulfilling the requirement of Pune. The power house is located at the toe of the dam with an installed capacity of about 11 MW. The power house was constructed by excavating hard basalt rock about 20 to 25 m deep vertically near downstream toe of the dam.



Locations around the powerhouse



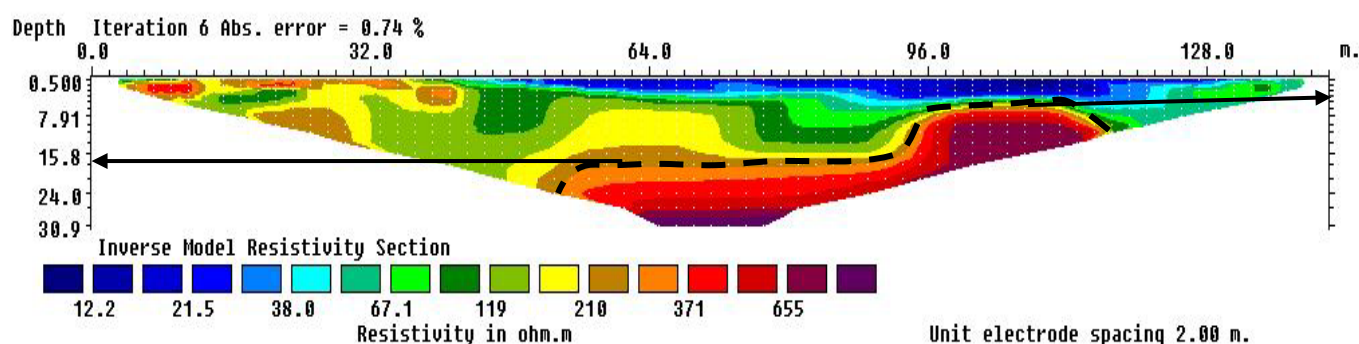
Contour map showing the distribution of velocities with depth

The powerhouse building is located very close i.e. about 1 to 2 m from the vertical rock cliff as shown in Fig.1. Due to vertical cutting of the rock, frequent rock cliff falling has been observed during rainy season since 2003 putting the powerhouse structure in danger. Considering the importance of the powerhouse structure, it becomes very much essential to ensure the safety of the powerhouse from rock fall. In this connection, based on the request from the project authority, NDT study has been carried out by using different methods such as Ground Penetrating Radar, Seismic Refraction and Sonic wave transmission methods for in-situ quality assessment of the rockmass around the power house. The results of the NDT study identified the weak zones in the rockmass as shown in Fig.2 and based on the analysis of the results; necessary remedial measure were suggested for strengthening of the rockmass around the power house. It was recommended to carry out cementitious grouting at all the locations in order to improve the strength of the rockmass. Accordingly, cementitious grouting using grout mix design, has been carried out at site by following the suggestions made by CWPRS. Further in order to assess the efficacy of the grouting at site, GPR study has been carried out at one location. GPR study results revealed that grouting materials have travelled into the voids located in the rockmass and which in turn significantly improved the quality of the rock mass after grouting. Hence, it is suggested to continue with the same procedure of grouting at other locations at the site to further improve the quality and strength of rockmass at other distressed locations.

Geophysical Investigations at Various Components of Damanganga (Ekdare) Godavari Link Project, Maharashtra

The Damanganga (Ekdare)-Godavari (DEG) pipeline link project is a proposal by the Government of Maharashtra for an intra-state link. It aims to transfer 138.6 MCM of surplus water from the catchment of the west-flowing Damanganga river basin to the proposed Ekdare dam site, then onward to the east-flowing Godavari basin at the existing Waghad reservoir. This initiative is intended to address the irrigation, domestic, and industrial needs of the drought-prone Marathwada region in the Upper Godavari sub-basin. The plan involves diverting surplus water through lifts at three stages: Ekdare, Nirgude, and the proposed Circular sump, with a total static lift of 327.40 meters.

The bedrock topography along the 10.82/10.42-meter pipeline route has been delineated for foundation laying purposes. Various locations have been chosen at approximately 500-meter intervals for data collection, focusing on accessible areas and avoiding steep slopes and hills. Geophysical investigations have been conducted at both Hatti and Nirgude Weir sites. Electrical Resistivity Imaging (ERI) and Seismic Refraction techniques have been utilized to ascertain the depth to bedrock and bedrock topography from the Damanganga river basin to the Ekdare dam site, extending to the east-flowing Godavari basin at the existing Waghad reservoir. Eleven profiles have been surveyed using ERI, with eight along the pipeline route and one each at Nirgude and Hatti Weir sites. Seismic refraction surveys have been undertaken at specific pipeline locations to validate the ERI results.

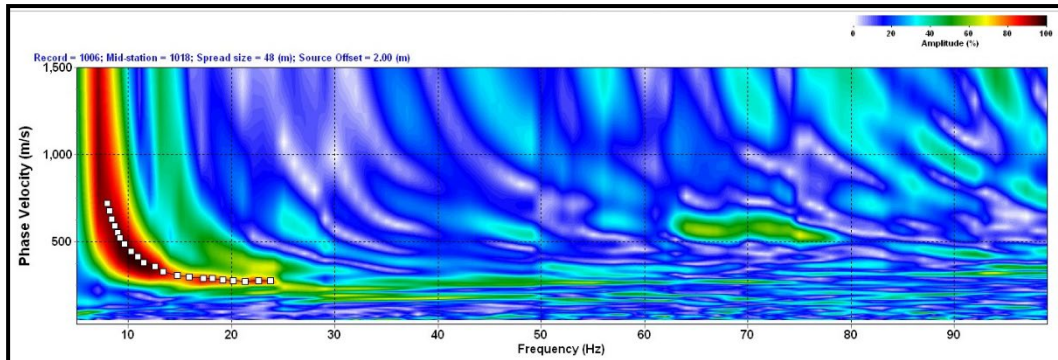


Resistivity imaging section of Profile P9 at RD 8.25 Km near TBM 6, Behind Gangodvari village

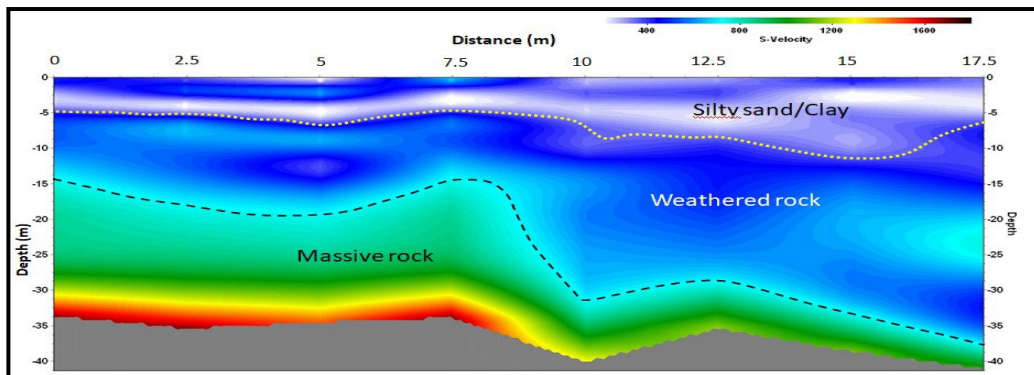
Estimated depth to bedrock/compact basalt of 8 profiles have been carried out along proposed pipeline. Shallow bedrock depth (1 m to 8 m) has been observed up to RD 6.94 m. The rock depth increases beyond this RD and bedrock is encountered at 18 m depth from surface at some locations. The depth of the bedrock at Hatti weir site varies from 1 to 5 m and at Nirgude Weir site, it is approximately 3 m. At proposed tunnel site near Inambari, the bedrock depth is very shallow (approx.1m). However, the rock is fractured after the chainage 33 m. Though the initial interval of ERI profile has been selected 500 m but at some places ERI data could not be acquired due to rugged topographical condition. Interpolation has been used for plotting depth to bedrock in those places. Subsurface strata at this interpolated area can be delineated by borehole lithologs at required spacing to determine the depth to hard rock strata/bed rock.

Estimation of Average Shear Wave Velocity (V_{s30}) at Nilmati Dam of Damanganga-Vaitarna-Godavari (Dvg) Link Project, Maharashtra

The Intra-State Damanganga–Vaitarna–Godavari (DVG) link project aims to divert 202 Mm³ of surplus water from four reservoirs to the east-flowing Godavari River. The DVG link project envisages four RCC dams viz. Udhale, Nilmati, Met and Koshimshet and four tunnels viz. Upper Vaitarna to Kadva tunnel 1 and 2, Nilmati and Met. The Nilmati dam project involves a 87.5 m high, 395 m long RCC dam with a gross storage capacity of 24.02 MCM across Nil River near Nimati village in Palghar district. The proposed barrage site is located in the seismic zone-III, which is seismically moderately active region in India. The purpose of geophysical investigations is to estimate the average shear wave velocity (V_{s30}) at different locations in vicinity of barrage site by Multi Channel Analysis of Surface Waves (MASW) technique. V_{s30} is one of the parameters used in estimation of the Peak Ground Acceleration (PGA) by generating synthetic accelerograms for MCE and DBE level of earthquakes at the site. The shear wave velocities observed less than 300 m/s may indicate the silty clay soil and occurs at different depths along both the profiles on left and right banks. The shear wave velocities observed in the range of 300m/s to 700 m/s reveals the fractured/weathered strata of Basalt. The average depth at which shear wave velocity obtained at 1000 m/s and above for the site is 40.94m. The final V_{s30} value of the project site is 535.76 m/s, which is calculated by taking the average V_{s30} values obtained for different shot gathers on left bank of the river.



Dispersion curve extracted from the dispersion image obtained for one of the shot gathers along profile



2-D Shear wave velocity section

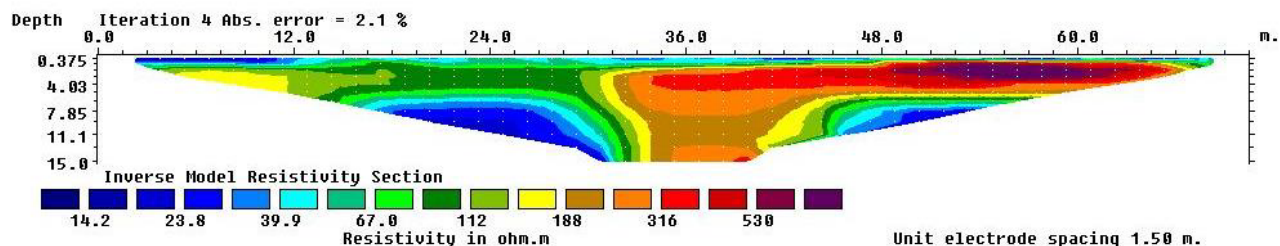
Delineation Of Subsurface Strata by Geophysical Investigations at Sani Dam, Gujarat

The Sani Dam, located in Jetpur, Devbhoomi Dwarka, Gujarat, is an earthen and masonry dam built on the Sani River, with construction starting in 1974. A project to reconstruct the spillway, spanning 194.5 m, began on February 23, 2021, with the total dam length being 4,158 m. It serves a cultivated command area of 2,791 Ha and an irrigation area of 2,325 Ha.

The geophysical investigations for this purpose are carried out in the spillway section, left bank and right bank of the dam along the various profiles to delineate the subsurface strata. Electrical resistivity survey has been carried out in both land and underwater at various portion of proposed dam site. Also, seismic refraction survey is also conducted at bottom of the Right and left embankments of Dam for validation of ERI results. ERI profiles of bucket section indicates presence of low resistive strata (fractured rock) underlain below high resistive strata (massive basalt). ERI profiles at Apron section reveals presence of moderately fractured basalt saturated with water between depths of 6 m and 23 m. Whereas the ERI profiles at the upstream face of the dam axis shows presence of moderately fractured basalt saturated with water up to depth of 15 m and massive basalt formation has at shallow depths near the left (18 m) and right banks (40 m). ERI profiles at the top of the right and left embankment reveals presence of three distinctive resistive layer i.e. a moderate resistive layer is followed by a very low resistive layer and further followed by a high resistive layer. The middle layer indicates presence of impervious core (clay) saturated with water whereas the third layer indicates presence of bed rock. The depth of bed rock varies from 26 m to 15m in right embankment and 7.5 m to 10 m in the left embankment. ERI profiles at the bottom of the right embankment shows presence of high resistive layer underlying a low resistive layer (>250 ohm-m). This high resistive layer interrelated as a bed rock whose depth varies from 7 to 13 m approx. ERI profile at the bottom of the left embankment, characterized by a high resistive layer appearing near the surface which further indicates presence of shallow bedrock strata.

Two seismic refraction profiles SP1 & SP2 have been conducted at the bottom of right embankment and bottom of left embankment respectively for validation of results of resistivity. Depth to bedrock profile has been delineated for SP1 & SP2 which agrees well with the resistivity sections.

The delineation of bedrock strata provides critical insights that will aid in the design of a resilient dam structure. It will empower the project authorities with valuable information for effective planning, optimizing both the design and construction processes.



Electrical resistivity imaging profile of P8 at 6.8 m upstream from upstream face of dam

Sr. No.	Technical Report Title	Technical Report No.
1	Cross hole seismic tomography studies at Bhandardara dam, Maharashtra	6264
2	Borehole logging for estimation of In-situ density at Bhandardara dam, Maharashtra.	6266
3	Geophysical Investigations at various components of Damanganga (Ekdare) Godavari link project, Maharashtra	6277
4	Vibration studies for Kolkewadi Power house, Koyna Hydro Electric Project (KHEP) stage III, Maharashtra	6279
5	Estimation of Reservoir Induced Seismicity for Mahi Bajaj Sagar Dam, Rajasthan	6294
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7	Estimation of Average Shear Wave Velocity (VS30) at Nilmati Dam of Damanganga - Vaitarna-Godavari (DVG) Link Project, Maharashtra	6329
8	Estimation of Average Shear Wave Velocity (VS30) at Koshimset Dam of Damanganga - Vaitarna-Godavari (DVG) Link Project, Maharashtra	6330
9	Estimation of Average Shear Wave Velocity (VS30) at MET Dam of Damanganga - Vaitarna-Godavari (DVG) Link Project, Maharashtra	6331
10	Estimation of Average Shear Wave Velocity (VS30) at Udhale Dam of Damanganga - Vaitarna-Godavari (DVG) Link Project, Maharashtra	6332
11	Estimation of site specific seismic design parameters for West Seti hydroelectric project, Nepal	6344
12	Delineation of subsurface strata by geophysical investigations at Sani dam, Gujarat	6350
13	Parallel seismic test at upstream and downstream secant piles of Annaram barrage of Kaleshwaram Lift Irrigation Scheme (KLIS), Telangana	6360
14	Estimation of site specific design parameters for Met dam of DVG link, Maharashtra	6361
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18	Site inspection visit for checking out the feasibility of undertaking necessary studies towards detection of leakage at CW channel for Parli Power Station, Maharashtra.	6373
19	Vibration and sound level studies for Dudhganga Hydro Electric Project, Kolhapur, Maharashtra	6382

INSTRUMENTATION, CALIBRATION AND TESTING SERVICES

Division

- Hydraulic Instrumentation
- Hydraulic Machinery and Cavitation
- Current Meter Calibration

Areas of Specialization/ Expertise

- Calibration / Testing of turbines, pump sets, flow meters, filter, valves, field tests etc.
- Design, fabrication and installation of ATG and RSWG systems on models
- Hydrographic survey
- Fixing and installation of dam instruments
- Testing and calibration of Current Meters
- Canal Automation Facility

List of Clients

- CWC
- Pump manufacturers
- BWSSB, Bangalore
- SAIL, Bokaro
- NEEPCO
- NHPC
- MAHAGENCO
- NPCIL
- GERI, Govt. of Gujarat
- KOPT, Kolkata
- NHDC, MP
- State Governments

Site Calibration of Ultrasonic Flow Meters Installed at Pench Iv Water Supply Project of Nagpur Municipal Corporation

Nagpur Municipal Corporation (NMC) is an 'A-class municipal corporation and manages water supply, waste water collection, treatment and disposal for Nagpur city. Pench water supply scheme is one of the recent closed conduit water transmission projects which caters water requirement for Nagpur City. Pench IV water supply project intake facilities located at Pench (Navegaon Khairi) reservoir at Pench River course. The system is designed for 521 MLD raw water transmission main from back pressure tank to bifurcation at Mahadulla for the length of about 27 Kms. Executive Engineer Pench IV Project Cell, Nagpur Municipal Corporation, Govt. of Maharashtra have referred CWPRS to undertake studies on the flow measurement and calibration of installed flow meters at Pench IV Water Supply Project. As an outcome, a team of officials from CWPRS had visited Pench IV Water Supply flow metering installations at site in the first week of July 2016 for assessing and to undertake the wet calibration by secondary methods. The flow metering units near to the pump house and Mahadulla bifurcation sections were calibrated for their accuracy. The deviation of water meter readings against ultrasonic flow meter was observed within $\pm 1\%$ of rated flow. Hence the site calibration confirmed performance of the meters within reasonable and acceptable limits.

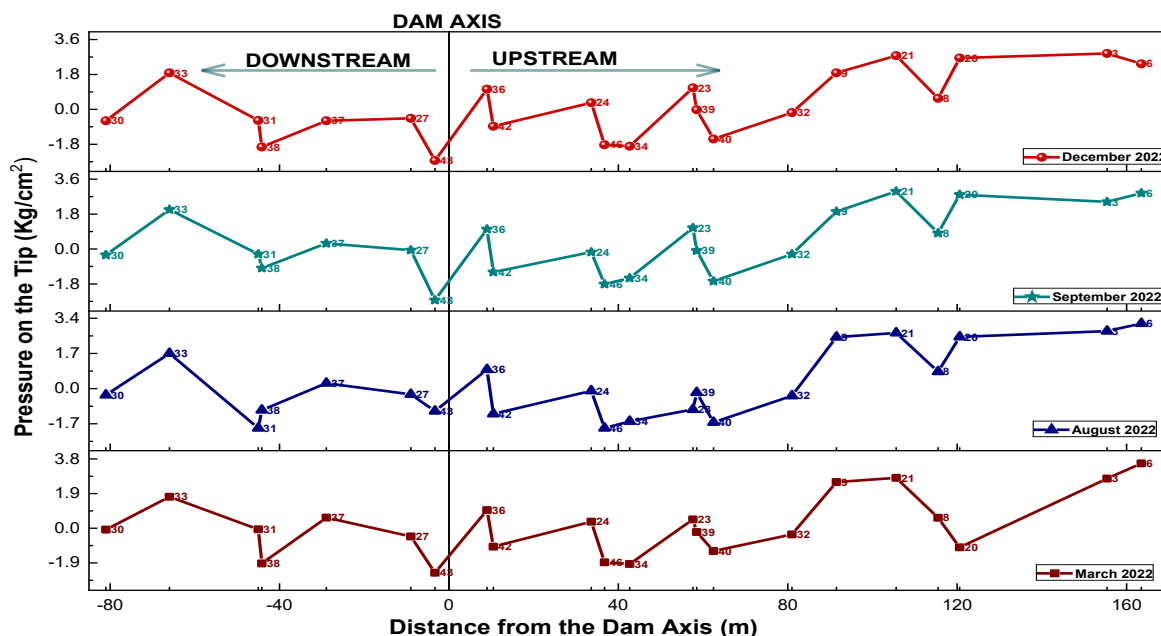


Insertion types of ultrasonic flow meter between pumping station and break pressure tank

Revival of Dam Instrumentation of Sukhi Dam, Gujarat: Twin Tube Piezometers

The record of pore pressure developed and its variation would indicate the effectiveness and adequacy of the drains in a dam. Any sudden unusual increase in the pore pressure will be indicative of chocking up of these internal drains and any unusual reduction from the normal would indicate possibility of formation of cracks or establishment of flow channel in the body of the dam.

The instrumentation system installed at Sukhi was old and in non-working condition. CWPRS dam instrumentation team had crucial role in revival of Twin Tube Piezometers (TTPs) at Sukhi Dam through thorough inspection of existing instrumentation, appropriate solutions and suggestions and continued consultancy throughout the whole revival process span. Revival of the Twin Tube Piezometers has been carried out according to the Indian standard code IS-7356 Part-2 revised in 2003. During revival of instrumentation system in all the terminal wells at the Sukhi Dam, 24 new hydraulic piezometers display units for measuring pore pressure were replaced with the PVC tubes, bronze control valves, connected bronze tubes, etc. Flushing of all piezometers inlet and outlet tubes was carried out with the compressor unit. The new control panels were fitted in the terminal wells and the old mechanical hand-held pump flushing units were replaced with the new motorized flushing unit. After flushing, the existing instrumentation has been made operational replacing with the new units of gauges and tubes. The inlet pressure and outlet pore pressure output values generated by sensors embedded in the dam body were observed in the piezometer display units and found to be in normal range. Out of 24 nonfunctional existing TTPs, 22 have been revived. Continued observation of TTPs measurement were maintained for next few years after revival and analysed data confirms the proper working of revived TTPs over the time



Sr. No.	Technical Report Title	Technical Report No.
1	Site calibration of Ultrasonic Flow meters installed at Pench IV water supply project of Nagpur Municipal Corporation	6270
2	Testing of In-pipe Hydro Turbine at CWPRS for Kirloskar Energen Private Limited, Pune, Maharashtra	6281
3	Numerical studies of pump sump of Bhandara Flood Protection Scheme, Gosikhurd Project, Nagpur	6284
4	Site Performance of Insertion Type Ultrasonic Flow meter on River water and Waste water recovery pipeline of Nashik TPS, Eklahare, Nashik	6287
5	Selection, Supervision, Calibration, Testing & assistance in installation of automatic flow monitoring device in Sardar Sarovar Project (SSP) canal network.	6307
6	Revival of dam instrumentation of Sukhi dam, Gujarat: Twin Tube Piezometers	6316
7	Framing of Terms of Reference for Development and Implementation of Web Based Real Time Dam Instrumentation and Structural Health Monitoring (WBRTD & WBRTSHM) for Indira Sagar Power Station (ISPS) and Omkareshwar Power station (OPS)	6339

Projects of National Importance

National Hydrology Project (NHP)

The Government of India has approved the implementation of National Hydrology Project (NHP) under the Department of Water Resources, River Development Ganga Rejuvenation (DoWR, RD&GR) with an outlay of Rs 3679.7674 crore vide order No. F. No. X- 92021/1/2016-NHP/1118-1258 dated 23rd June 2016. The project duration is 8 years beginning from FY 2016-17. The Project Implementation Plan (PIP) of CWPRS has been approved by Secretary, DoWR, RD&GR vide OM No. X-88014/1/2016-NHP/2524-2528 dated on 30th Nov 2016. The total fund allocation for CWPRS component of NHP was then Rs 60 crore. After Mid Term Review Meeting, PIP has been revised as per actual progress and execution of proposed activities. CWPRS revised PIP has been approved by the Ministry vide NO X-63013/1/2017-NHP-2962 dated 08.12.2021 amounting Rs.39.74 crore. By the end of financial year 2024-25, the total cumulative expenditure of the project is Rs. 31.05 crore.

CWPRS, one of the central implementing agencies under National Hydrology Project has been identified as centre of excellence for providing technical expertise for Hydro-Met-WQ Instrumentation including Data Loggers, Telemetry systems etc. to support water resources management program of State Implementing Agencies. CWPRS proposal under NHP included establishment of state-of-the-art Hydro-Met-WQ Instruments testing, calibration and certifying facility, Training and support to IAs on Hydromet instrumentation, Bathymetry survey etc, strengthening existing research facilities, Infrastructure development, Capacity building, Purpose driven studies involving special technical support within the overall framework of National Hydrology Project.

A) Purpose Driven Studies (PDS) & Studies/ Knowledge Product:

CWPRS carried out and completed three PDS under NHP namely; 1) Study of Surface and Subsurface Water Interaction using Remote Sensing, Geohydrological and Geophysical Techniques and its Modelling, 2) River Rejuvenation of Mutha River Reach Flowing through Pune City and Suburbs, Maharashtra 3) Field survey, mathematical model and remote sensing studies for coastal processes associated with coastal erosion, shoreline changes assessment at few locations in Maharashtra Coast.

In addition to above, three studies/ Knowledge product assign to CWPRS have also been completed.

- 1) Bathymetry Survey of Three Dams in state of Manipur (Singda, Khuga, Khoupum Reservoirs)
- 2) Bathymetry survey of three dams in state of Jharkhand (Dhruwa, Tenughat, Getalusand reservoirs)
- 3) Sedimentation Survey using Sentinel Satellite Remote Sensing Technology for Dhruwa, Tenughat, Getalusand Reservoirs

B) Establishment of Testing, Calibration and Certification Facility under NHP

Various laboratories established and functioning fully at CWPRS under NHP. These laboratories accommodate Testing, Calibration and Certification Facility (TCCF) for Surface Water Level measurement, Ground Water Level measurement, Automatic Weather Station and Rain gauges, Water Quality Instrumentation, Calibration of ADCP, Current meter, ADV etc. and Data logger and Telemetry. and

Following major activities under NHP have been completed:

- 1) Up-gradation of CMRT Lab for Testing/ Calibration of Current Meter, ADCP etc

- 2) Establishment of Lab Calibrator for AWS Sensor
- 3) Establishment of Reference AWS for Testing/ Training Purpose to IA'S
- 4) Establishment of Field-Testing setup (Field Calibrator) for AWS Sensor
- 5) Establishment of Reference GW Station for Testing/ Training Purpose to IA'S
- 6) Establishment of Field Testing/ Calibration (Field Calibrator) Setup for GW level Sensor
- 7) Establishment of laboratory Calibrator Setup for GW level Sensor
- 8) Establishment of Field and lab Testing/ Calibration Setup for Telemetry-GSM/GPRS
- 9) Establishment of Reference Data Logger Setup for Training Purpose to IA'S
- 10) Establishment of Lab Testing/Calibration Setup for Data Logger
- 11) Establishment of Reference Surface Water Level Station for Training Purpose to IA'S
- 12) Establishment of Testing/Calibration Setup for Water Quality Sensor
- 13) Establishment of INGRESS PROTECTION (IP XX) Test Lab.

C) Capacity Building

Sixty-two national trainings (in physical /online/on field) and one international conference were successfully completed till end of March, 2025 under NHP.

Coastal Management Information System (CMIS)

Field observed data on coastal processes is one of the essential requirements for evolving long term plans and coastal protection measures. In view of this, for collection of such data a scheme of Coastal Management Information System (CMIS) was approved by the Government of India under the on-going Scheme 'Development of Water Resource Information System (DWRIS)' of Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR). Central Water and Power Research Station (CWPRS) was awarded the work as Project Executor for implementation of CMIS at two sites viz. Satpati in Maharashtra (Northern region) and Nani Danti- Moti Danti in Gujarat (Southern region). The total cost of the project is Rs. 6.95 Crores with total duration of the work as 6.5 years (up to December 2025) wherein various coastal data such as wave, tide, tidal currents, shoreline and cross-shore profile, suspended and bed sediments, river /creek discharges, winds, rainfall etc. is being collected. Further, these data would be processed to be used at front-end and linked to Centralised Data Centre (CDC). The equipment viz., detailed bathymetric survey instruments, tide gauge, Marine Current Profiler, Automatic weather station, Sieve shakers, Beach survey instruments, river discharge profiler, LISST for in situ sediment data and CTD meter, have already been procured and installed for data collection at both sites.



Comprehensive Monthly beach profile surveys and beach sediment analysis are being carried out at both the sites for a reach of about 1.5 km each as per the mandate of scheme. Bathymetric surveys have been carried out for pre monsoon and post monsoon periods. Similarly, wave data consisting of significant wave height, wave Direction etc. are being collected through wave rider buoy installed at site. Riverine data which include river discharge, salinity, temperature and river sediment load are being collected in pre-monsoon, monsoon and post monsoon periods. The meteorological data of rainfall, temperature, wind, humidity etc. have been collected for about four years.

The deliverables of this project will setup a comprehensive field monitoring programme which will help in the decision making in the long term and in a sustainable manner. This project will also provide data relevant to the designers, decision makers and modelling group that are not available otherwise. This project is very significant as it will reduce the risk on the stability of the shoreline by reducing dependence on assumed wave and current climate conditions because of sparse field networks and relatively limited historical records.



Dam Rehabilitation and Improvement Program (DRIP)

Most of the existing dams constructed during last century in India have been designed by simple design methods and construction procedures compared to the present day's state-of-the-art design and construction techniques, construction materials and construction equipment adopted in construction and commissioning of dam projects. Moreover, due to ageing effect and old technologies adopted in the construction of dams during that period and exposures to frequent earthquakes, many dams have been showing distress in the form of cracks, large deformations, seepages, bulging of faces of dams and galleries, loss of mortar in joints of masonry dams and dislodging of concrete from faces etc. On an average these dams have completed more than 50% of their design lives. Due to these distresses, their conditions have become scary and have created apprehensions about their safety and performances in the minds of public. Based on the above facts, Central Water Commission (CWC) working under Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, has taken up a project titled 'Dam Rehabilitation and Improvement Project' (DRIP) starting from 2012 with the financial support from World Bank under Phase I and Phase II & III. For this purpose, CWC has set up a Dam Safety (Rehabilitation) Directorate at CWC, New Delhi to coordinate the different activities of implementing agencies. Under Phase I, DRIP envisages rehabilitation of 198 dams in seven Indian states, viz., Karnataka, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, Uttarakhand and Jharkhand with fund allocation of Rs.3500 Cr. Under Phases II & III, fund allocation of Rs.10,200 Cr. has been sanctioned and about 736 Dams have been identified for rehabilitation. The aim of this project is: -

- To improve the safety and performance of selected existing dams and associated appurtenances in a sustainable manner.
- To strengthen the dam safety institutional set-up in participating states as well as at central level.

Under DRIP-I, capacity building of CWPRS was proposed to be carried through procurement of equipment and software and by imparting training to Research Personnel of CWPRS. In this connection, a proposal amounting Rs.1223.65 lakhs were approved by CWC, World Bank and DOWR, RD&GR, Ministry of Jal Shakti. Capacity building of CWPRS has been carried out successfully by procuring various equipment and software utilizing an amount of Rs.9.88 Cr out of the total allocated amount of Rs.12.23 Cr under DRIP - I. The expenditure of balance amount towards imparting training at reputed International Institutes could not be incurred due to COVID pandemic. Under DRIP - I many studies have been conducted for Almatti dam, Karnataka, Hirakud dam, Odisha, Mahi dam, Madhya Pradesh etc. After capacity building of CWPRS, so many studies in the field of structural safety review, field investigations, arresting seepage, earthquake safety review, dam instrumentation etc., are being taken up as per Ministry of Jal Shakti, DoWR, RD&GR guidelines for the projects under DRIP.

After successful completion of DRIP Phase I, DRIP-II & III phases are also being implemented. Under DRIP-II and III, 18 states and two central organizations are included. The total financial outlay for the Project is about Rs.10,200 Cr. As per advice from Secretary, DoWR, RD & GR, Ministry of Jal Shakti, Government of India, a proposal towards Capacity Building of CWPRS in Dam Safety Areas, Development of Centre of Seismology & Dam Safety and Establishment of High Power Computing facility in Water Resources under Dam Rehabilitation and Improvement Project (DRIP) -II & III during the period 2024-2033 has been submitted to Ministry of Jal Shakti.

The main objectives of the proposal are as follows:

1. To develop capability of the institute through procurement of proposed machinery, equipment and software.
2. To establish Center of Seismology & Dam Safety at CWPRS, Pune
3. To establish High Power Computing (HPC) facility at CWPRS
4. Capacity Building of Research Personnel through training at Reputed national and International Research/ Academic Institutes

Total Cost of the proposal is Rs.154.70 crores for the duration 2024-2033. Approval of the proposal is awaited.

Engagement of CWPRS in DRIP and Dam Safety Act 2021

CWPRS is well equipped with necessary infrastructures and laboratories with state-of-the-art equipment and software and has adequate expertise in dam design and analysis, planning, operation and maintenance aspects. As such, CWPRS, with its experience, is contributing towards DRIP activities and Dam Safety in a multi-disciplinary approach. CWPRS has dedicated divisions which are catering to the needs in controlling seepage, improving structural safety for smooth operation, rehabilitation of distressed hydraulic structures and associated issues of dams. Major Categories of Work/Study are as follows:

- vii. Diagnostics and Investigative Field studies
- viii. Laboratory Studies
- ix. Site specific desk studies/ Seismic Hazard Studies
- x. Numerical studies by Finite Element Method
- xi. Dam Break Analysis & Emergency Action Plan
- xii. Hydraulic Model, Dam Instrumentation and Miscellaneous Studies

Nearly 150 research personals are engaged in conducting several types of studies pertaining to rehabilitation and structural safety audit. Moreover, five Scientists from CWPRS have been nominated as dam instrumentation and seismic instrumentation experts. They are carrying out inspection of distressed hydraulic structures along with DSRP members and suggesting suitable remedial measures as well as identifying studies required to be conducted for structural safety audit and rehabilitation. Till date nearly, 110 projects have been inspected in states participating in DRIP.

CWPRS is deeply involved in carrying out structural safety audit of Multi-Purpose Hydroelectric projects spread all over India.

PART-III

**DISSEMINATION
OF
INFORMATION**

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57. R. K. Chaudhari, S. K. Kori, Prabhat Chandra," Significance of wave tranquility studies in design of passenger jetty in open coast near the Janjira Marine Fort" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
58. R. K. Chaudhari, S. K. Kori, Prabhat Chandra," Impact of proposed expansion of Karwar Port on the North coast of the Karnataka" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
59. V. K. Shukla, V. D. Kokane," Locating the dumping ground in the nearby areas for disposal of dredged material from river Hooghly, West Bengal by using Mathematical Model" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
60. Kuldeep Malik, Kasturi V. Katte, R. G. Patil," Studies for the location of intake and its Hydraulic design in Chambal river for water supply to Morena city, Madhya Pradesh" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
61. Kuldeep Malik, N. A. Sonawane, Kasturi V. Katte, R. G. Patil," Hydraulic model studies for the proposed barrage across river Kamla at Jaynagar, dist. Madhubani, Bihar" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
62. G. V. R. Murthy, V. S. Telgote," Transient analysis and protection of water transmission pipelines for irrigation systems" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
63. V. S. Ramarao, M. G. Muni Reddy, K. C. Sahu," Optimization of layout of spillway approach channel using numerical model studies" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
64. Vijay K. Ghodake, Prakash K. Palei, S. Santhosh Kumar, Rajendra Singh Gurjar, Rizwan Ali, R. S. Kankara," Determination of dynamic elastic properties of rock core from the frequency of natural vibrations by using resonance frequency test method for Kudankulam Nuclear Power Plant (KKNPP)- A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
65. Sudheer S. Chavan, M. D. Sawant, M. Phani Kumar, Prabhat Chandra," Role of physical wave model in evolving harbour entrance by studying wave reflections from adjacent breakwater – A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune

66. Shivani Sahu, Vaibhav Konde, V. B. Sharma, M. Phani Kumar, Prabhat Chandra," Identification of dredged disposal ground for Sogal channel, Deendayal port" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
67. Shivani Sahu, V. B. Sharma, Vaibhav Konde, M. Phani Kumar, Prabhat Chandra," Development of inland water way in Kali river, Karnataka" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
68. Bhowmick S," Assessment of foundation rock using geophysical and geotechnical parameters prior to the design of foundation for critical civil structures" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
69. Sushma Vyas, M. K. Verma, R. G. Patil," Physical and Mathematical transient analysis for adequacy of surge tunnel of water conductor system" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
70. Rolland Andrade," Self-Potential, Resistivity and Tracer an Integrated approach in Seepage studies for Earthen dams" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
71. Amol S. Borkar, Santosh Kori, Phani Kumar, Prabhat Chandra," Numerical model studies for optimizing layout on West Coast of India using ERA5 wind data" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
72. K. T. More, S. A. Beturkar, M. K. Verma," Comprehensive physical model study approach for efficient hydraulic design of spillway and energy dissipator of a dam project from Himalayan region- A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
73. Annapurna Patra, Azharuddin Golandaj, Ujjal Chowdhry, C. Srishailam, R. G. Patil," Modelling of surface run-off for Indian river basin : A review" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
74. M. Z. Qamar, M. K. Verma, A. P. Meshram," Hydraulic model studies for Desilting basin- A case study of Teesta H.E. project, Stage-V" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
75. Uday B. Patil, A. V. Mahalingaiah, Kumaran V, Ganesh N. S," Design & Restoration of existing training walls at Varsoli Creek, Alibag, District Raigad, Maharashtra, India" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water &

Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune

76. P. A. Kashyape, S. J. Shinde, Jamir Bagwan, M. Phani kumar, Prabhat Chandra," Long term analysis of artificial beach nourishment of northern coast of Visakhapatnam port" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
77. Govind A. Panvalkar, Amol D. Chunade, Archana Pund, Sunit Kumar, B. Suresh Kumar, Rizwan Ali," Strategy for assessment of gravity dam seepage- A case study of Temghar dam" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
78. Muhammed F. Rahman, T. K. Swain, Raghuchandra Garimella, Chandan Gupta," Remaining life assessment of electric generator in hydropower plant by partial discharge techniques" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
79. Satheeshkumar Jeyaraj, Singh A. K., Sinha J.," Assessment of beach morphodynamic changes at Aaravi, Anjarle and Guhagar along Central Maharashtra's coastline" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
80. Anil Bagwan, Vaibhavi Roy, Jireshwar Sinha," Mathematical Model Studies to Assess the Impact of a Groin System on Shoreline Evolution at Kozhikode, Kerala" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
81. Naren A., Sinha J.," Hydroclimatic Modelling regional sea level rise over Arabian sea and its future projection" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
82. Omkar Kiran Sakurikar, Golak chandra Sahoo," Enhancing dam safety through magnetic inspection technique for wire ropes" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
83. Kumaran V., A. V. Mahalingaiah, Uday B. Patil, Ganesh N. S.," Design of coastal protection measures proposed for multi purposes utility of coastline at Puducherry, India" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
84. Jotsana G. Ambekar, B. Raghuram Singh, R. G. Patil," Studies to assess the afflux due to modification of waterway arising out of strengthening the railway bridge piers" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water &

Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune

85. Raghuchandra Garimella, M. Selva Balan, Rama Rao V. S., "AI/ML based flood estimation with decision support systems- An overview" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
86. Praveen K. M., B. R. Tayade, G. R. Pardeshi, A. V. Mahalingaiah," Design of breakwater for the development of fish landing centers: A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
87. Naval Jagatap, A. K. Singh, J. Sinha," Comprehensive mathematical modelling and hydrodynamic analysis for jetty expansion at Salaya, Gujarat: A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
88. Akhil P. S., Kuldeep Malik, R. G. Patil," Prospective techniques for treatment and protection of groundwater systems: Special focus on the role of Zerovalent Iron in Permeable Reactive Barriers (PRBs) for in-situ groundwater remediation" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
89. Shyamli Paswan, Hanumanthappa M. S., Khalil Bagwan, Rizwan Ali, R. S. Kankara," Stress analysis of non-overflow block of ageing gravity dam by finite element method during strengthening – A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
90. Komal Vighe, Rahul Sawant, A. K. Singh, J. Sinha," Optimization of proposed fishery harbour layout using mathematical model at Bharadkhol in Raigad district, Maharashtra" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
91. Archana S. Shinde, N. Vivekanandan, C. Srishailam, R. G. Patil," Hydrological assessment study for the railway bridge in Araria- Galgalia section" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
92. Naga Sai Viswanath B., Sreedevi S., Arun Kumar, R. G. Patil," Hydraulic modelling for controlling flood-induced river bank erosion: Case study of Chenab River reach" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
93. Vivek Saxena, Y. R. Bhagat, G. V. Ramana Rao, N. Vivekanandan," Meteorological behavior at Kalingpatnam coastal site, Andhra Pradesh- A case study based on the relative humidity and air temperature" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics

(ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune

94. Manasi M. Mulay, N. Vivekanandan, R. G. Patil, "Comparison of parameter estimation methods of EV1 distribution for intensity-duration-frequency analysis of rainfall" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
95. Supriya Nath, Akhil P. S., Jitesh N. Vyas, Kuldeep Malik, "An appraisal of trends of water quality of Khadakwasla reservoir and its downstream area, Pune, Maharashtra: A case study" published in 29th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune from 18th to 20th December 2024 at CWPRS, Pune
96. Archana Pund, Govind Panvalkar, B. Suresh Kumar, "Harmonizing Borehole Geophysics and Tracer Techniques: A Holistic Approach to Solve Civil Engineering Problems" published in "Indian Geotechnical Conference (IGC)-2024" jointly organized by Indian Geotechnical Society (IGS) Aurangabad Chapter and Maharashtra Institute of Technology (MIT), Chhatrapati Sambhajinagar (Aurangabad) from 19th to 21st December 2024 at MIT Campus, Chhatrapati Sambhajinagar.
97. V. Prabhakarachary, R. S. Erande, N. Sunil Naik, M. Phani Kumar, R. S. Kankara, "Development of Servo-Hydraulic Wave Maker for the Replication of Proto-type Sea Wave Conditions for the Simulation of Wave Spectrum" published in "International Conference on Recent Trends in Engineering and Technology (ICRTET-2024)" jointly organized by JNTUH University College of Engineering, Science & Technology, Hyderabad and Maulana Azad National Institute of Technology, Bhopal from 21st to 23rd December, 2024 at JNTUH, Hyderabad thorough Hybrid Mode.
98. M. Z. Qamar, M. K. Verma, A. P. Meshram, "Length Optimization of Desilting Basin- A Case Study" published in "International Journal of Advanced Research in Water Resources and Hydraulic Engineering"
99. P. P. Gadge, R. G. Patil, "Performance evaluation of high head orifice spillway using numerical modeling - A case study" published in "Journal of Applied Water Engineering and Research (JAWAR)" by IAHR publication.
100. A. Basu, A. A. Purohit, K. A. Chavan, M. M. Vaidya, "Application of Numerical Model for Estimation of Local Scour at Sea-link Bridge Pier under Extremely Severe Cyclonic Condition" published in "International Perspectives in Water and Environment (IPWE) Conference" jointly organized by ASCE-EWRI and Madhya Pradesh State Water Resources Department (MPWRD) from 08th to 10th January 2025 at Bhopal.
101. Raghavendra S., Sreedhara B. M., A Manoj, K. M. Praveen, "Numerical Analysis to Compare the Performance of an Oscillating Water Column Device with Different Air Chamber Geometry" published in "Journal of Waterway, Port, Coastal and Ocean Engineering" by ASCE.
102. Prakash Palei, Vijay Ghodake, S. Santhosh Kumar, Rajendra Gurjar, Chaman Singh, Mahendra Meena, Rizwan Ali, R. S. Kankara, "Effective implementation of controlled blasting methodology during excavation of hard rock in the close proximity of earthen dam and tunnel" published in Journal "Defense Technology (Elsevier)"
103. Prajakta Gadge, R. G. Patil, "Hydraulic design of spillway aerators for high-head and long chute orifice spillway using physical and numerical modeling- A case study" published in Journal of "Dam Engineering" by International Waterpower and Dam Construction

PARTICIPATION IN SEMINARS/ SYMPOSIA/ CONFERENCES/ WORKSHOPS

Sl. No.	Title/Event	Place and Date of Event	No. of Participants / Officer
1.	"Sedimentation Management in Reservoirs for Sustainable Development" organized by the Indian National Committee on Large Dams (INCOLD) in association with Central Board of Irrigation & Power (CBIP) and Bhakra Beas Management Board (BBMB).	Institute of Engineers (India), Chandigarh 02 nd & 03 rd May, 2024	2
2.	One day workshop on "Landslide Disaster Risk: Need for Coordination, Cooperation, Skill Enhancement and Implementation Strategy in Maharashtra" organized by State Unit: Maharashtra, Geological Survey of India (GSI), Pune.	GSI Pune Office 11 th June, 2024	1
3.	One day workshop on "Seismic Hazard Assessment for Dams" organized by ICED, Roorkee.	IIT Roorkee 15 th June, 2024	2
4.	International Conference on "Dam Safety 2024" organized by Dam Safety Society, New Delhi in collaboration with SSNNL, WRD, Govt. of Gujarat.	Kevadiya, Gujarat. 18 th & 19 th July 2024	6
5.	"International Conference on Ships and Offshore Structures" organized by Dept. of Ocean Engg., IIT Madras, Chennai.	IIT Madras Campus, Chennai 08-12 September, 2024	1
6.	"8 th India Water Week 2024" organized by Ministry of Jal Shakti.	Pragati Maidan, New Delhi 17-21 September, 2024	23
7.	92 nd INCOLD Annual Meeting & International Symposium on "Dams for People, Water, Environment and Development" being organized by International Commission of Large Dams (ICOLD) and hosted by Indian National Committee on Large Dams (INCOLD)	New Delhi 29 th September to 03 rd October, 2024	5
8.	National Workshop on "Integrated Flood Risk Management" organized by DoWR, RD & GR along with CWC	New Delhi 26 th November, 2024	1
9.	Seminar on "Research Data Management" organized by INFLIBET, Gandhi Nagar in collaboration with IGIDR, Mumbai	IGIDR, Mumbai 30 th November, 2024	1
10.	29 th International Conference on "Hydraulics, Water Resources, River and Coastal Engineering (HYDRO-2024)" organized by Central Water & Power Research Station, Pune under the aegis of Indian Society for Hydraulics (ISH), Pune.	CWPRS, Pune 18-20 December, 2024	78
11.	"Indian Geotechnical Conference (IGC)- 2024" jointly organized by Indian Geotechnical Society (IGS) Aurangabad Chapter and Maharashtra Institute of	MIT Campus, Chhatrapati Sambhajinagar. 19-21 December, 2024	1

	Technology (MIT), Chhatrapati Sambhajinagar (Aurangabad).		
12.	"International Conference on Recent Trends in Engineering and Technology (ICRTET-2024)" jointly organized by JNTUH University College of Engineering, Science & Technology, Hyderabad and Maulana Azad National Institute of Technology, Bhopal	Online Mode 21-23 December, 2024	1
13.	"International Perspectives in Water and Environment (IPWE) Conference" jointly organized by ASCE-EWRI and Madhya Pradesh State Water Resources Department (MPWRD)	Bhopal 08-10 January, 2025	2
14.	Workshop on "Best Practices and Achievements under NHP" organized by NPMU NHP, New Delhi.	Kaushal Bhavan, New Delhi 11-12 February 2025	7
15.	"NHP Tech Vision 2025" conference organized by NHP, DoWR, RD & GR, Ministry of Jal Shakti	Bengaluru, Karnataka 10-11 March 2025	4
16.	Workshop on "BRAHMA model" in NEHARI, Gujarat	NEHARI, Gujarat 24-26 March 2025	2

INVITED LECTURES DELIVERED

Sl. No.	Title/Topic	Event	Place and Date	Name of Officer
1.	"Collection and Processing of Hydrological Data"	Training program on "Hydrological Modelling" organized by IRICEN, Pune from 06 th to 13 th May, 2024 at IRICEN, Pune	IRICEN, Pune. 09 th May, 2024	Shri N. Vivekanandan, Scientist 'C'
2.	"Estimation of Design Flood by Synthetic Unit Hydrograph Approach"			Mrs. Snehal Tayade, Scientist 'B'
3.	"Hydrological Modelling of Ungauged Catchments"			Dr. RamyaPriya Ramesh, Scientist 'B'
4.	"Frequency Analysis of Rainfall and Stream Flow Data"			Shri N. Vivekanandan, Scientist 'C'
5.	"CCS (Conduct) Rules, Leave Rules"	Orientation Training Program (OTP) for lower division clerks of subroutine cadre of CWC being organized by NWA, Pune from 20 th to 24 th May, 2024 at NWA	National Water Academy (NWA), Khadakwasla, Pune 20 th May 2024	Shri Vishal Dond, CAO
6.	"Vigilance Matters"			Shri Vishal Dond, CAO
7.	"Noting & Drafting, Office Procedure, ACP/MACP, Guidelines-1"		National Water Academy (NWA), Khadakwasla, Pune 21 st May 2024	Shri Vishal Dond, CAO
8.	"Model studies for pumped storage hydroelectric project"	Training Program on "Pumped Storage Hydroelectric Projects" organized by NWA, Pune	NWA, Pune 10-19 June, 2024	Shri P. M. Abdul Rahiman, Sci. 'E'
9.	"SCADA design and configuration for water resources management system"	Training Program on "Impact of Climate Change on Water Resources, Efficient Water Management with Modern Measurement Technology and Capacity Building" organized by WALMI, Dharwad.	Dharwad, Karnataka 25-29 June, 2024.	Dr. M. Selva Balan, Sci. 'E'
10.	Coastal Data Requirement, its availability and Method of Data Collection	Training Program on "Coastal Erosion Protection & Coastal	NWA, Pune 1 st July, 2024	Shri M. M. Vaidya, Sc D

11.	Coastal Processes (Wave & Tide Hydrodynamics)	Zone Management” organized by NWA from 01 st to 05 th July 2024	NWA, Pune 2 nd July, 2024	Dr. Phani Kumar, Sc D
12.	Coastal Structures – Design and Construction		NWA, Pune 2 nd July, 2024	Shri B. R. Tayade, Sc D
13.	Hydraulic Modelling Techniques for Coastal Protection		NWA, Pune 3 rd July, 2024	
14.	Hydrodynamics & Sedimentation		NWA, Pune 5 th July, 2024	Dr J. Sinha, Sc E
15.	A) CCS (Conduct) Rules, Leave Rules B) Noting & Drafting, Office Procedure	Three week “Induction Training Program (ITP) for newly recruited Junior Engineers of Bramhaputra Board” organized by NWA, Pune from 15 th July- 02 nd August 2024	NWA, Pune 15 th July, 2024	Shri Vishal Dilip Dond, CAO
16.	A) Vigilance Matters B) Right to Information Act		NWA, Pune 16 th July, 2024	
17.	Techniques in designing an efficient SCADA system for canal and barrage automation- Case study from India	Workshop on “Instrumentation of Dams including Seismic Instrumentation” organized by Dam Safety Society, New Delhi in collaboration with SSNNL, WRD, Govt. of Gujarat during 16 th & 17 th July, 2024	Kevadia, Gujarat. 16 th and 17 th July 2024	Dr. M. Selva Balan, Sci. ‘E’
18.	Uses of River Modelling Software like HEC-RAS, HEC-HMS etc	Three week “Induction Training Program (ITP)” for newly recruited Junior Engineers of Bramhaputra Board and Junior Engineers of CWPRS organized by NWA, Pune from 15 th July to 02 nd August, 2024	NWA, Pune 29 th July 2024.	Smt. Jotsana G. Ambekar, Sci. ‘B’
19.	Hands on Sessions on HEC-RAS			

20.	Case study and experience sharing on water distribution network design	Lecture for 3 rd year civil engineering students of SIT, Pune	Pune 2 nd August 2024	Smt. Sushma Vyas, Sci. 'C'
21.	Remodeling/Retrofitting of dam spillway	Training program on "Assessment of Structural Safety of Existing Dam" organized by NWA, Pune	NWA, Pune 26 th August, 2024	Shri Hanumanthappa M.S., Sci. 'D'
22.	Wave Energy for Sustainable Development	Lecture in a AICTE sponsored ATAL Faculty Development Program (FDP) on "Advancing Sustainable Engineering: Innovations, Practices and Pedagogies for Faculty Excellence" organized by KSRM College of Engineering, Kadapa, Andhra Pradesh in their campus from 25 th to 30 th August, 2024.	Kadapa, Andhra Pradesh 27 th August 2024	Dr. Kumaran Viswanathan, Sci. 'B'
23.	Introduction of earthen dams	Training Program on "Construction of Earthen Dam" being organized by NERIWALM in association with PWD (Water Resources), Govt. of Tripura from 28 th to 30 th August, 2024 at Agartala	Agartala 28 th August 2024	Dr. Tanusree Samanta, Sci. 'C'
24.	Causes of failures of earthen dams			
25.	Safety measures in earthen dams		Agartala 29 th August 2024	
26.	Understanding Tides & Modelling Techniques in Port Development	Faculty Development Programme (FDP) on "Coastal Engineering: Comprehensive Insights for Onsite Solutions" organized by Dr. D. Y. Patil	Online mode 02-06 September 2024	Shri Anil A. Purohit, Sci. 'E'
27.	Basics of Ocean Waves			Dr. M. Phani Kumar, Sci. 'D'
28.	Coastal data Collection & Analyses			Shri M. M. Vaidya, Sci. 'D'

29.	Geotechnical Safety Aspects of Coastal Structures	Institute of Technology (DIT), Pune in association with CWPRS from		Smt. J. S. Edlabadkar, Sci. 'D'
30.	Outcome Quiz of Learned Topics			Dr. Satheesh Kumar, Sci. 'B'
31.	Analysis and Interpretation of Data, Elements of Finite and Distinct Element Technologies including Measurement of Pore Water Pressures	Training Program on "Instrumentation in Dams" organized by NWA from 17th to 21st September 2024 at NWA	NWA, Pune 20 th September 2024	Shri M. S. Hanumanthappa, Sci. 'D'
32.	Design of SCADA for Dam Instrumentation & Early Warning		NWA, Pune 21 st September, 2024	Dr. M. Selva Balan, Sci. 'E'
33.	Sedimentation Management in Reservoirs for Sustainable Development	Workshop organized by International Commission of Large Dams (ICOLD) and hosted by Indian National Committee on Large Dams (INCOLD) from 29 th September to 03 rd October, 2024.	New Delhi 03 rd October, 2024	Shri M. K. Verma, Sci. 'D'
34.	CCS (CCA) Rules & Conduct Rules, Leave Rules	5 days "Induction Training Program (ITP) for newly recruited Junior Engineers of Farakka Barrage Project" organized by NWA, Pune.	NWA, Pune 10 th October, 2024	Shri Vishal Dilip Dond, CAO
35.	Noting, Drafting & Office Procedure			
36.	Role of AI in SCADA in Water resources modernisation	Training Program on "Impact of Climate Change on Water Resources and agriculture, Conservation of water, Efficient Water Management in irrigation and Capacity Building" being organized by WALMI, in their	Dharwad 19 th October, 2024	Dr. M. Selva Balan, Sci. 'E'

		campus from 15-19 October, 2024		
37.	Role of Central Water & Power Research Station in Water Resources Development and Management	“34 th Induction Training Program (ITP) for Central Water Engineering Services (CWES) Group A probationary officers “organized by NWA, Pune from 21 st October, 2024	NWA, Pune 24 th October, 2024	Shri S. G. Manjunatha, Sci. 'E'
38.	Hyphenated Techniques for Trace Pollutant Analysis in Environmental Matrices	National seminar entitled “Advances in Applied and Chemical Science (AACS)” organized by department of Chemistry, St. Paul’s College, Kalamassery.	Online mode 24 th October, 2024	Dr. Akhil P. S., Sci. 'B'
39.	Design, need and planning of instrumentation for dam safety	2 days training program on "Instrumentation and Monitoring for Assessment of Dams and Associated Structures" being organized by CSMRS during 24 th & 25 th October 2024	New Delhi 25 th October, 2024	Shri M. S. Hanumanthappa, Sci. D'
40.	CCS Conduct Rules, Vigilance/Disciplinary	“34 th Induction Training Program (ITP) for Central Water Engineering Services (CWES) Group ‘A’ Probationary Officers” organized by NWA, Pune on 05 th November 2024 at NWA	NWA, Pune 05 th November ,2024	Shri Vishal Dilip Dond, CAO
41.	Microplastics: Emerging Contaminants in Aquatic Environment	A lecture for B. Tech students of Guru Nanak Institutions	Hyderabad, Telangana	Dr. Srinivas Billakanti, Sci. 'B'

		Technical Campus (GNITC), Hyderabad.	07 th November ,2024	
42.	Testing and Calibration Facility at CWPRS- An Overview	Training program on “Real Time Data Acquisition System (RTDAS)” organized by NWA, Pune for NHP-IA’s, Central/State Govt., PSUs and other stake holders etc. from 11 th to 13 th November 2024 at NWA under NHP.	NWA, Pune 11-13 November 2024	Dr. N. D. Atkekar, Sci ‘E’
43.	AWS & ARG- Installation and Maintenance; AWS & ARG- Testing and Calibration; Demo/Hands-on: Calibration of AWS Sensor & ARG (Rain Gauge) Sensor at CWPRS Testing Lab			Dr. Annapurna Patra, Sci ‘C’
44.	Surface Water Level Sensors- Measurement & Maintenance and visit to Reference Surface Water Level Station			Shri V. N. Katte, Sci ‘C’
45.	Automatic Water Level Recorder (AWLR)- Testing and Calibration Procedure of Sensors; Demo/Hands-on: Calibration of AWLR (Radar Water Level) Sensor at CWPRS Testing Lab			Mrs. H. R. Khandagale, Sci ‘C’
46.	Comprehensive Ingress Protection (IP XX) Test Facility at CWPRS for Large Sized Hydro-meteorological Instruments along with Demo/Hands-on at CWPRS IP Testing Lab			Dr. Faizal Rahiman, Sci ‘B’
47.	AWS Station visit at CWPRS Campus			Shri Azhar Golandaj, Sci ‘B’
48.	Visit to TCCF- Data Logger and Telemetry			Mrs. R. S. Erande, Sci ‘C’ Shri P. K. Dorle, Sci ‘C’
49.	Hydrographic Surveys & Recent Advancements	Training program on “Reservoir	NWA, Pune 19 th November 2024	Shri M. S. Bist, Sci. ‘D’

50.	Bathymetry Data Analysis	Sedimentation Assessment and Management” organized by NWA, Pune for NHP-IAs, Central/State Govt., PSUs, Private organizations, individuals, NGOs etc from 18-23November, 2024		
51.	Introduction to IoT: Concepts, Architecture and Technologies	AICTE-ATAL Faculty Development Program (FDP) organized by Manipal Institute of Technology, Bengaluru from 9-14December, 2024	Online mode 09 th December 2024	Dr. Raghuchandra Garimella, Sci.'B'
52.	Introduction to coastal processes	“34th Induction Training Program for Central Water Engineering Services (CWES) Group A Probationary Officers” organized by NWA from 21st October 2024 at NWA	NWA, Pune 11 th December 2024	Dr. M. Phani Kumar, Sci.'D'
53.	Coastal erosion and littoral process			Shri Sanjay Nath Jha, Sci.'B'
54.	CMIS- coastal site selection and data requirements			Shri S. G. Manjunatha, Sci.'E'
55.	Beach surveys and data analysis			
56.	Field data collection of waves, currents, tides, river discharge, sediment and water samples and analysis		NWA, Pune 16 th December 2024	Shri G. V. Ramana Rao, Sci.'E'
57.	Data collection of bathymetry surveys, automatic weather station		NWA, Pune 16 th December 2024	Shri S. R. Swami, Sci.'D'
58.	River morphology, basic concepts of processes and terminology, brief introduction to physical modelling aspect of a reverse course example Kosi River model		NWA, Pune 16 th December 2024	Shri Arun Kumar, Sci.'D'

59.	River behavior management and river training structures/ works for flood management		NWA, Pune 16 th December 2024	
60.	Design of breakwaters and coastal protection works		NWA, Pune 17 th December 2024	Shri A.V. Mahalingaiah, Sci.'E'
61.	Establishment Matters	Induction training program for newly recruited Multi-Tasking Staff of Central Water Commission conducted by National Water Academy during 30 th December 2024-10 th January 2025 organized by NWA, Pune.	NWA, Pune 02 nd January 2025	Shri Vishal Dond, CAO
62.	Conduct Rules, Do's and Don'ts to Government Servant			
63.	Establishment Matters; Service book, Increment, Reservation Roaster, DPC, Deputation Seniority, Promotion, Pay parity, ACP/ CGHS/ AMA rules/ Quarters/ HRA/LF etc	Induction training program for newly recruited Junior Engineer of Central Water Commission during 06 -24 January 2025 organized by NWA, Pune.	NWA, Pune 07 th January 2025	Shri Vishal Dond, CAO
64.	Introduction to Hydrological and Hydraulic Modelling		NWA, Pune 23 rd January 2025	Shri P. S. Kunjeer, Sci.'D'
65.	Demo/ Hands-on session using HEC software			Smt S. B. Tayade, Sci. 'B'
66.	Establishment Matters; Service book, Increment, Reservation Roaster, DPC, Deputation Seniority, Promotion, Pay parity, ACP/ CGHS/ AMA rules/ Quarters/ HRA	Induction training program for newly recruited Junior Engineer of Central Water Commission during 27 January-14 February 2025 organized by NWA, Pune.	NWA, Pune 28 th January 2025	Shri Vishal Dond, CAO
67.	TA/TTA/LTC claims, joining time; Establishment Matters; Service book, Increment,	Induction training program for newly recruited Junior Engineer of Central Water Commission	NWA, Pune 12 th February 2025	Shri Vishal Dond, CAO

	Reservation Roaster, DPC, Deputation Seniority, Promotion, Pay parity, MACP/ CGHS/ AMA rules/ Quarters/ HRAetc	during 10-28 February 2025 organized by NWA, Pune.		
68.	Introduction to Hydrological and Hydraulic Modelling	Induction training program for newly recruited Junior Engineer of Central Water Commission during 06 -24 January 2025 organized by NWA, Pune.	NWA, Pune 13 th February 2025	Shri P. S. Kunjeer, Sci.'D'
69.	FEM: Theory, Methodology, Assumptions, Limitations, Different types of elements & Applications, Static & Dynamic analysis	34 th induction training program for newly appointed CWES (Group A) probationary officers organized by NWA, Pune during 3rd March 2025 to 09th May 2025 at NWA	NWA, Pune 13 th March 2025	Shri HanumanthappaMSci. 'D'
70.	Issues in Gravity Dams- Diagnosis and Remedial Measures	Workshop on "Grouting Technology in Rehabilitation of Dams" organized by DSS, New Delhi on 19 th March 2025 at	Hotel Peterhof, Shimla, Himachal Pradesh 19 th March 2025	Shri Rizwan Ali, Sci. 'E'
71.	Cementitious grouting of Masonry Dams for arresting seepage- CWPRS Experiences			Shri S. J. Pillai, Sci. 'C'
72.	Flood Modelling for Retention Structures	Technical Workshop on "GLOF Hazard & Risk Assessment and Management" organized by SCA-Himalayas Project, SDC at the Hotel Royal Plazas, New Delhi from 18 th to 20 th March 2025.	Hotel Royal Plazas, New Delhi 20 th March 2025	Shri P. S. Kunjeer, Sci.'D'
73.	Hydraulic Structure and Significant Achievements by Modelling Techniques	Expert session for B. Tech students (Civil Engineering) of G H Raisoni College of Engineering and Management, Pune, Maharashtra in their campus on 21 st March 2025.	G H Raisoni College of Engineering and Management, Pune 21 st March 2025	Shri M. K. Verma, Sci.'D'

74.	In-situ Studies in Gravity Dam and Physical Model Studies for Structures on Braided River: Kosi River	Lecture for B. Tech students (Civil Engineering) of Bharati Vidyapeeth's College of Engineering, Lawale, Pune	Lawale, Pune 21 st March 2025	Shri S.A. Burele, Sci.'C'
75.	AI & ML in Integrated Water Resources Management	Translational Research Centre and Department of Information Technology of Government Engineering College, Trivandrum, Kerala organized International Colloquium on Translational Engineering & Research 2025 with the theme Translational AI-Engineering Solutions to Society	Trivandrum, Kerala 22 nd March 2025	Dr. M. Selva Balan, Sci.'E'

TECHNICAL COMMITTEE MEETINGS ATTENDED

S. No.	Name of Committee	Date and Venue	Participants
1.	Meeting on 'Hydrometry Sectional Committee, WRD 01, BIS'	Online mode 10 th April 2024	Shri B. Suresh Kumar, Sci 'D'
2.	32 nd Plenary Meeting of ISO/TC 113 Hydrometry" organized by Water Resources Department (WRD), Bureau of Indian Standards (BIS)	New Delhi 22 nd & 23 rd April 2024	Dr. R. S. Kankara, Director Shri B. Suresh Kumar, Sci 'D' Shri P. S. Kunjeer, Sci 'D' Shri G. A. Panvalkar, Sci 'C' Dr. Mandira Majumdar, Sci 'C'
3.	3 rd meeting of the committee for Joint Flood Management study of river Yamuna between Hathnikund and Okhla barrage	Online mode 25 th April 2024	Dr. R. S. Kankara, Director
4.	BIS panel meeting under WRD 14 for Water Conductor System Sectional Committee	Online mode 07 th May 2024	Shri M. K. Verma, Sci 'D'
5.	38 th meeting of National Committee on Seismic Design Parameters (NCSDP)	CWC, Delhi 10 th May 2024	Dr. R. S. Kankara, Director Shri Rizwan Ali, Sci 'E' Shri Sachin Khupat, Sci 'C' Dr. Chaman Singh, Sci 'C'
6.	Meeting regarding Ganga Padma River studies with CWC officials.	Online mode 16 th May 2024	Shri P. S. Kunjeer, Sci 'D' Smt H. P. Chaudhary, Sci 'C'
7.	Review meeting on the current status of comprehensive flood management work on the river Jhelum and tributaries- Phase II (Part A) under chairmanship of Secretary, Water Resources	New Delhi 17 th May 2024	Dr. R. S. Kankara, Director Dr. R. G. Patil, AD
8.	Meeting of Research Committee under chairmanship of Assistant Secretary (Ports & Shipping)	Online mode 20 th May 2024	Dr. R. S. Kankara, Director
9.	Meeting of BIS WRD 03 Sectionaql committee regarding groundwater and related investigations.	Online mode 20 th May 2024	Shri G. A. Panvalkar, Sci 'C'
10.	Meeting regarding Ganga Padma river project.	New Delhi 24 th May 2024	Shri Arun Kumar, Sci 'D' Smt K. V. Katte, ARO
11.	2 nd meeting of WG-2 under WRD 14 for Water Conductor System Sectional Committee.	Online mode 27 th May 2024	Shri M. K. Verma, Sci 'D' Smt Sushama Vyas, Sci 'C'
12.	Kosi high level committee meeting.	Birpur, Bihar 28-30 May 2024	Shri Arun Kumar, Sci 'D'
13.	2 nd meeting for monitoring status of studies by CWPRS related to comprehensive flood management works related to Jhelum and tributaries- Phase II (Part A) under chairmanship of Secretary, Water Resources	Online mode 29 th May 2024	Dr. R. S. Kankara, Director
14.	BIS WRD 16 meeting.	Online mode 07 th June 2024	Shri Rizwan Ali, Sci 'E' Shri Sachin Khupat, Sci 'C'

15.	25 th National meeting of Pumps Sectional Committee, MED 20 of BIS.	CWPRS, Pune 25 th June 2024	Dr. R. S. Kankara, Director Dr. Prabhat Chandra, AD Shri Abdul Rahiman, Sci 'E'
16.	Meeting for finalization of draft report of committee for joint flood management study of river Yamuna for its reach between Hathnikund and Okha barrage.	Online mode 1 st July 2024	Dr. R. S. Kankara, Director
17.	1 st meeting of National Steering Committee (NSC) for NAP under the chairmanship of Secretary (MoEF&CC)	New Delhi 11 th July 2024	Dr. R. S. Kankara, Director
18.	22 nd meeting of BIS WRDC.	Online mode 15 th July 2024	Dr. R. S. Kankara, Director
19.	Meeting regarding interim measures suggested by the committee of Kaleshwaram project, Telangana hosted by SMD, CWC.	Online mode 20 th July 2024	Shri Rizwan Ali, Sci. 'E' Dr. Sanjay A. Burele, Sci. 'C' Dr. (Mrs) Tanusree Samanta, Sci. 'C' Shri A. D. Khot, ARO
20.	BIS WRD 09 meeting.	Online mode 30 th July 2024	Shri.M. K. Verma, Sci. 'D' Dr.(Smt) Prajakta P. Gadge, Sci.'C' Smt. Sangeeta Patnaik, Sci. 'C'
21.	BIS WRD 30 sectional committee meeting.	Online mode 30 th July 2024	Shri Rizwan Ali, Sci. 'E' Smt J. S. Edlabadkar, Sci. 'D' Shri. R. Vigneswaran, Sci. 'C' Shri. Sunil J Pillai, Sci. 'C' Dr. Sarbjeet Singh, Sci. 'C' Shri Lalit Kumar, Sci. 'B'
22.	4 th committee meeting for 'Joint flood management study in Himachal Pradesh, Punjab and Uttarakhand' chaired by Chairman, CWC.	Online mode 22 th August 2024	Dr. R. S. Kankara, Director
23.	BIS WRD 16 meeting.	Online mode 30 th August 2024	Shri Rizwan Ali, Sci. 'E' Shri Sachin Khupat, Sci. 'C'
24.	6 th committee meeting for Ganga Padma River System chaired by Chairman, CWC.	Online mode 03 rd September 2024	Dr. R. S. Kankara, Director
25.	6 th meeting of Expert Project Review Committee (EPRC).	CWC, Sewa Bhavan, New Delhi 04 th September 2024	Smt. J. S. Edlabadkar, Sci.'D'
26.	Meeting with committee constituted by NDSA for finalizing SOP for carrying out 'Comprehensive Dam safety Evaluation' for specified dams.	Online mode 10 th September 2024	Shri Rizwan Ali, Sci.'E' Smt. J. S. Edlabadkar, Sci.'D'

27.	WRD 14 Sectional Committee meeting for Water Conductor Systems	Online mode 10 th September 2024	Shri M. K. Verma, Sci.'D' Shri M. Z. Qamar, Sci.'C' Smt Sushma Vyas, Sci. 'C'
28.	16 th meeting of Ports, Harbours& Offshore installation Sectional Committee (CED 47) of BIS.	Online mode 19 th September 2024	Shri A. A. Purohit, Sci. 'E'
29.	9 th STAC meeting of CSMRS	New Delhi 25 th October 2024	Dr. R. S. Kankara, Director
30.	10 th meeting regarding EPSITAHECRAS model of Jhelum basin	Online mode 21 st November 2024	Shri P. S. Kunjeer, Sci. 'D' Smt H. P. Chaudhary, Sci. 'C'
31.	56 th Gandak High Level Standing Committee (GHLSC)	Kushinagar, Uttar Pradesh 25-29 November	Shri B. Raghuram Singh, Sci 'D'
32.	11 th meeting regarding EPSITAHECRAS model of Jhelum basin	Online mode 27 th November 2024	Shri P. S. Kunjeer, Sci. 'D' Smt H. P. Chaudhary, Sci. 'C'
33.	11 th meeting to monitor status of studies regarding flood management works on river Jhelum.	Online mode 28 th November 2024	Dr. R. S. Kankara, Director
34.	26 th WRD 03 BIS sectional committee meeting of groundwater and related investigations	Online mode 29 th November 2024	Shri G. A. Panvalkar, Sci. 'C'
35.	Meeting regarding Ganga Padma river studies.	Online mode 06 th December 2024	Dr. R. S. Kankara, Director
36.	25 th meeting of WRD 10 Sectional Committee	Online mode 12 th December 2024	Dr. V. M. Prabhakar, Sci. 'C' Shri Nishchay Malhotra, Sci. 'B'
37.	18 th meeting of Ganga Flood Control Board (GFCB) chaired by Hon'ble Minister, MoJS.	Vidya Bhavan, Delhi 19 th December 2024	Dr. R. S. Kankara, Director
38.	BIS meeting of ports, harbour and offshore installations CES 47 sectional committee	Online mode 21 st December 2024	Shri A. A. Purohit, Sci. 'E'
39.	Webinar on "Procedures on the development of ISO Standards" for WRD 01 and WRD 03 members.	Online mode 06 th January 2025	Dr. R. S. Kankara, Director Shri B. Suresh Kumar, Sci. 'D' Shri G. A. Panvalkar, Sci. 'C'
40.	Meeting chaired by Secretary DoWR with CWC and CWPRS officials regarding Ratle, Dul Hasti-II, Kirthai-II and Lakhwar hydroelectric projects	Online Mode 03 rd January 2025	Dr. R. S. Kankara, Director
41.	TAC meeting of Farakka Barrage Project	West Bengal 7-8 February 2025	Dr. R. S. Kankara, Director

42.	2 nd meeting of the Executive committee of ICED, IIT Roorkee	Online mode 10 th March 2025	Dr. Prajakta Gadge, Sci.'C'
43.	6 th Sectional committee meeting of BIS WRD 28- "Coastal Zone Water Management Sectional Committee"	Online mode 27 th March 2025	Shri A. A. Purohit, Sci. 'E'

TRAINING PROGRAMS ATTENDED

S. No.	Title	Event, Place and Date	No. of Participants
1.	Training program on “Public Procurement (Basic) ” for government officers	Arun Jaitley National Institute of Financial Management (AJNIFM), Faridabad 01-06 April, 2024	1
2.	हिन्दी कार्यशाला	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे 05 अप्रैल 2024	17
3.	Workshop on “Sedimentation Management in Reservoirs for Sustainable Development”	Indian National Committee on Large Dams (INCOLD) in association with Central Board of Irrigation & Power (CBIP) and Bhakra Beas Management Board (BBMB) at Institute of Engineers (India), Chandigarh. 02nd & 03rd May, 2024	2
4.	Training Program on “Geophysical Borehole Logging Tools, Processing and Interpretation”	Regional Training Division, Geological Survey of India at Regional Training Division, Central Region, Nagpur. 27th to 30th May, 2024	2
5.	Training program on “Pumped Storage Hydroelectric Projects”	NWA, Pune 10-19 June 2024 at NWA.	2
6.	Workshop on “Landslide Disaster Risk: Need for Coordination, Cooperation, Skill Enhancement and Implementation Strategy in Maharashtra”	State Unit: Maharashtra, Geological Survey of India (GSI), Pune at GSI Pune Office 11 th June, 2024	1
7.	Workshop on “Seismic Hazard Assessment for Dams”	ICED, Roorkee on 15th June, 2024 at IIT Roorkee	3
8.	Training program on “Numerical Modelling for Geotechnical Applications through Plaxis 2D/3D”	Indian Geotechnical Society Chandigarh Chapter in collaboration with Punjab Engineering College (PEC), Chandigarh, IIT Ropar and M/s Innovative Systel, Mohali from 18 th to 22 nd June, 2024 at PEC, Chandigarh.	2
9.	Training Course on “Know Your TC & Library”	26 th June 2024 at CWPRS, Pune.	30
10.	Training program on “Coastal Erosion Protection & Coastal Zone Management”	NWA, Pune 01-05 July 2024	5

11.	Induction training on “About CWPRS activities” for newly recruited staff	CWPRS. 08-12 July, 2024	22
12.	Induction training program for newly recruited Junior Engineers of Brahmaputra Board	NWA, Pune at NWA 15 th July to 02 nd August, 2024	5
13.	Online training Programme on “Physical and Numerical Modelling for Hydraulic design of Reservoir and appurtenant Structures”	CWPRS, Pune. 17 – 19 July, 2024	4
14.	हिन्दीकार्यशाला	केन्द्रीयजलऔरविद्युतअनुसंधानशाला, खडकवासला, पुणे 22 जुलाई2024	20
15.	Training Program on “Basic of GIS and its Application”	Regional Training Division, Geological Survey of India at Regional Training Division, Central Region, Nagpur. 22-27 July, 2024	2
16.	“Faculty Development Program (for Capacity Building and Professional Development of Trainers)”	National Water Academy, CWC, Pune. 22-26 July 2024	5
17.	Training course on “Selection and sizing of Pump motor and Uninterruptible power supply(UPS)”	25-26 July, 2024	19
18.	Workshop on “Deployment of Honeypot Sensors to prevent cyber-attacks through generation of reliable and actionable threat intelligence”	CERT-In , New Delhi in their office. 01 st August, 2024.	1
19.	Internal training for Craftsman for promotion from Craftsman Gr. I to Master Craftsman at CWPRS	1-31 August,2024	5
20.	In-house hands on training course on “Abaqus Software- Basic training”	CWPRS. 02 nd August, 2024	16
21.	Training program on “Introduction to Google Earth Engine & Its Applications in Water Resources Management”	National Water Academy (NWA), Pune under National Hydrology Project (NHP)at NWA, Pune 05-16 August, 2024	3
22.	Training course on “AI/ML for Geodata Analysis”	Indian Institute of Remote Sensing, Dehradun. 19-23 August, 2024	14

23.	Induction training for newly recruited officers of CWPRS	CWPRS. 19-23 August, 2024	10
24.	Training course on “e-Governance activities at CWPRS”	CWPRS. 20 August, 2024	94
25.	Hands on training on TUFLOW hydraulic modeling software	CWPRS. 27-28 August, 2024	22
26.	Training course on “Introduction to Python Programming & Applications in Water Resources Sector”	NWA, Pune 26 th August to 06 th September, 2024.	1
27.	Training program on “Reservation in Services for Sc/ST/OBC/EWS/ExSM/PWDs”	ISTM, New Delhi in their office. 16-19 September 2024	1
28.	Training program on “Instrumentation in Dams”	NWA, Pune at NWA 17-21 September 2024	1
29.	Training program on “Public Procurement Principles” for Government officers	Administrative Staff College of India (ASCI), Hyderabad in their campus 23-27 September, 2024.	2
30.	Online workshop on “Conduct of Inquiry on Complaints relating to Sexual Harassment of Women at Workplace (WCICRSHW-04)”	ISTM, New Delhi on 23 rd September, 2024	2
31.	Training program on “Laboratory System and Internal Audit as per ISO/ICE-17025:2017 (NABL Accreditation)”	Quality Council of India at Pune 23-25 September, 2024	5
32.	Training program on “Hydrological Modelling using Free Tools”	National Water Academy (NWA), Pune at their campus under National Hydrology Project (NHP). 30 th September to 05 th October, 2024	3
33.	Training course on “Storing for the season- Water Quality equipment storage tips”	17 th October, 2024 through online mode	2
34.	Workshop on “Climate Hazards and Climate Resilient Coastal Structures”	ABCD Centre; IIT Madras, Chennai and CWPRS, Pune collaborating with IAHR- IIT Madras Institute Chapter and IAHR SI YPN and ISH 17-18 October 2024	15
35.	Training program on “TUFLOW Water Quality Modelling”	TUFLOW, Australia on 24 th October, 2024 through online mode	6

36.	Training program on “Government e-Marketplace”	Institute of Secretariat, Training & Management (ISTM) in their campus from 13-14 November, 2024	1
37.	National Workshop on “Integrated Flood Risk Management”	DoWR, RD & GR along with CWC at New Delhi 26 th November, 2024.	1
38.	A Technical Workshop on “Water Resource Management and Conservation” for Women in STEM	CWPRS, Pune 26 th November 2024,	27
39.	Workshop on “Dam break Analysis using MIKE software”	CWPRS, Pune 26 th November, 2024	19
40.	Seminar on “Research Data Management”	INFLIBET, Gandhi Nagar in collaboration with IGIDR, Mumbai on 30 th November, 2024 at IGIDR, Mumbai	1
41.	Workshop on “Seismic risk and resilience advanced tools and methodologies”	IIT, Bombay at Powai campus, Mumbai 09 th December 2024	2
42.	In-house training programme on “Hands on AUTOCAD”	CWPRS 10 th -11 th December, 2024	21
43.	Training programme on “Government e-Marketplace”	Institute of Secretariat, Training & Management (ISTM) in their campus. 26-27 December 2024	1
44.	In house training course on “Hands on MIKE 21”		19
45.	Workshop on “Best Practices and Achievements under NHP”	NPMU NHP, New Delhi. 11-12 February 2025	7
46.	Workshop on “BRAHMA model”	NEHARI, Gujarat 24-26 March 2025	2

TRAINING/ CONFERENCE/ SEMINAR ORGANIZED

Sr.No.	Title
1	दिनांक 05 अप्रैल 2024 को हिंदी कार्यशाला का आयोजन किया गया
2	Training Course on “Know Your TC & Library” on 26 th June 2024 at CWPRS, Pune.
3	Induction training on “About CWPRS activities” for newly recruited staff of CWPRS during 08-12 July, 2024 at CWPRS, Pune.
4	Online training programme on “Physical and numerical modelling for hydraulic design of reservoir and appurtenant structures” during 17 – 19 July, 2024.
5	दिनांक 22 जुलाई 2024 को हिंदी कार्यशाला का आयोजन किया गया
6	05 days training workshop on “Hydraulic model study for engineering works” at NEHARI, Guwahati, Assam during 23-27 July, 2024.
7	Training course on “Selection and sizing of Pump motor and Uninterruptible power supply(UPS)” during 25-26 July, 2024.
8	Four Weeks internal training for Craftsman for promotion from Craftsman Gr. I to Master Craftsman CWPRS during 1-31 August, 2024 at CWPRS, Pune
9	In-house hands-on training course on “Abaqus Software- Basic training” at CWPRS on 02 nd August, 2024
10	Online training course on “Application of GIS and numerical modeling in Flood Management” during 6-7 August, 2024.
11	Induction training for newly recruited officers of CWPRS during 19-23 August, 2024
12	Training course on “e-Governance activities at CWPRS” on 20 August, 2024
13	Two days Hands on training on “TUFLOW hydraulic modeling software” during 27-28 August, 2024
14	Transfer workshop on “Climate Hazards and Climate Resilient Coastal Structures” organized by ABCD Centre; IIT Madras, Chennai and CWPRS, Pune collaborating with IAHR-IIT Madras Institute Chapter and IAHR SI YPN and ISH during 17-18 October 2024.
15	A Technical Workshop on “Water Resource Management and Conservation” for Women in STEM organized at CWPRS on 26 th November 2024
16	Workshop on “Dam break Analysis using MIKE software” organized at CWPRS on 26 th November, 2024
17	In-house training programme on “Hands on AUTOCAD” organized in CWPRS 10-11 December, 2024
18	In house training course on “Hands on MIKE 21” organized in CWPRS 16-21 January, 2025
19	Online training course on “ Climate resilient coastal hydraulic structures ” organized by CWPRS 13-14 February, 2025



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