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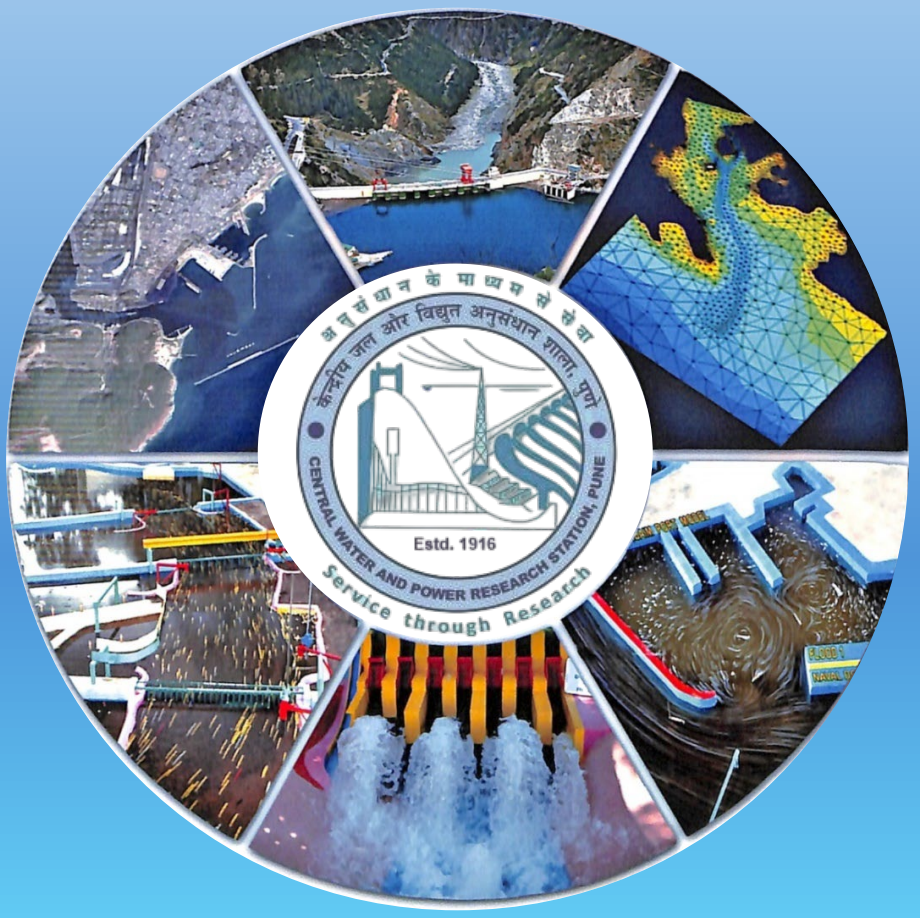
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION

ANNUAL REPORT
2023-24



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
(http://jalshakti-dowr.gov.in)

ANNUAL REPORT 2023-24

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

CONTENTS

FROM THE DIRECTOR'S DESK

It is with heartfelt gratification that I present the Annual Report of the Central Water & Power Research Station (CWPRS), Pune, for the year 2023-24

Central Water & Power Research Station is an apex R&D organization in the field of hydraulic and allied research in the water and power sector. CWPRS provides specialized services in areas like River training and flood control, hydraulic structures, ports and harbours, coastal protection, foundation engineering, construction materials, pumps and turbines, ship hydrodynamics, hydraulic design of bridges, environmental studies, earth sciences, cooling water intakes for thermal/nuclear power plants, etc.

During this financial year 2023-2024, CWPRS executed / carried out 136 Nos. of research studies in the area of Water Resources, Coastal Engineering and Earth Sciences including some important projects like flood protection measures in River Godavari, Swan, Vashishti in the states of Andhra Pradesh, Punjab, Maharshtra, designs of spillways and energy dissipators of Pakal Dul HE Project, Punatsangchhu 1 HE Project, Hirakud Project in the state of J&K, Bhutan & Odisha, development of old Manglore Port, Karnataka, Kakinada gateway Port, AP, Saheed Dweep (Neil Island), Andaman and Nicobar, Muthalapozhy Fisheries Harbour, Kerala etc. CWPRS has been part of Government of India's flagship projects viz. National Hydrology Project (NHP) and Coastal Management Information System (CMIS). As a significant mandate of CWPRS, dissemination of knowledge and research findings through research publications, participating in technical events, imparting training programs and delivering invited lectures were accomplished. Training programs were conducted for the benefits of Employees and Students. CWPRS is equipped to play a greater role in facing challenges.

CWPRS, upkeeping the mantle of fulfilling the research and development necessities for the nation and allied countries, spanning across the century, has remained on the pinnacle of hydraulic research through adopting and contributing towards the rapidly advancing technologies and further incorporating them to their advantage. In unison with the current technological trends and assessing the future advancements, CWPRS is now gradually expanding their expertise in the horizon of integrated structural health monitoring, data analysis and interpretation, automation and use of machine learning algorithms and artificial intelligence for predictive analysis.

I am grateful to the Department of Water Resources, River Development and Ganga Rejuvenation, MoJS for their constant support and providing enough support throughout the journey of CWPRS. I would like to extend my thanks to all the Clientele in India and abroad for showing belief and being with CWPRS for all these years. I take this opportunity to appreciate all the scientists of CWPRS and their supporting teams who made us stand out to deliver technically sound and sustainable solutions. Finally, I take this opportunity to express my gratitude to my predecessors for successfully steering CWPRS to this stage with their unique identity.

With a well-defined roadmap for the coming years and a clear vision oriented towards transforming CWPRS into centre of excellence, we have an exciting journey ahead. I am delighted to be part of and lead this journey.

Dr. R. S. KANKARA

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, Assistant Research Officer (ARO) and Research Assistant (RA) has a sanctioned strength of 316 personnel. The other supporting staff to the tune of 758 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 2023-2024 are flood protection measures in River Godavari, Swan, Vashishti in the states of Andhra Pradesh, Punjab, Maharshtra, designs of spillways and energy dissipators of Pakal Dul HE Project, Punatsangchhu 1 HE Project, Hirakud Project in the state of J&K, Bhutan & Odisha, development of old Manglore Port, Karnataka, Kakinada gateway Port, AP, Saheed Dweep (Neil Island), Andaman and Nicobar , Muthalapozhy Fisheries Harbour, Kerala, the design of Kapasa Dyke in Gujarat, Site specific seismic studies for kathkal Irrigation project, Assam, Ghatti Basavanna project, Karnataka, Ekdare project, Maharashtra, Geotechnical stability studies for Navabandar fisheries harbour, Gujarat and MTC pump house , Andhra Pradesh.

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. Various laboratories are being established 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, Data logger and Telemetry and INGRESS PROTECTION (IP XX) Test Lab. Twelve national trainings in physical mode for support to IAs and 5 webinars/in-house trainings were conducted in 2023-24 under NHP. By the end of financial year 2023-24, the total cumulative expenditure of the project is Rs. 27.22 Crore.

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 NaniDanti- MotiDanti in Gujarat (Southern region). During the year 2023-24, a comprehensive Beach survey and beach sediment analysis was carried out seven times for a reach of about 1.5 km each to assess shoreline changes at these sites. A bathymetry survey was carried out for pre-monsoon in May 2023 and post-monsoon in January 2024. Similarly, Riverine data was collected in the pre-monsoon, monsoon and post-monsoon period of 2023-24.

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 136 Nos. of Technical Reports, 91 nos. of research papers in different National & International Journals/Conferences/Seminars, conducting 27 nos. of training programs for various stakeholders, delivering 48 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 2023-2024, 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.

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 (KHLC), 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

A Hindi Section under the control of Central Secretariat Official Language Service, Department of Official Language, M/o Home Affairs is functioning at CWC Headquarter which is working tirelessly to ensure the proper compliance of Officials Language Act, 1963 and other rules and regulation related thereto. Continuous measures are being taken for increasing progressive use of Hindi for official purpose. Various measures including 'Hindi day', Publication of Hindi magazine 'Jalvani', Technical/Administrative Hindi Workshop, Hindi Seminar etc. were taken to progressive use of Hindi were undertaken during the year 2023-24.

IMPORATNT VISITORS/EVENTS

Mrs. Debashree Mukherjee, Special Secretary, Ministry of Jal Shakti, Air Marshal Ajit Bhonsale, Ex. Member UPSC, Delhi, Shri Harsh Gupta, IAS, Project Director, NDMA, New Delhi, Prof. V. S. Raju, Ex-Director, IITD and Design Consultant to Water Resources Department, Govt. of Andhra Pradesh , Shri K. S. Hosalikar, Scientist 'G' (Climate Research & Services) , IMD, Shri Ranbir Singh, IAS(R), Chairman, Bramhaputra Board, Mr. Mark Britton, Vice President of DHI, Mrs. Prerana, Dy Director, MIS etc. visited CWPRS during year 2023-2024.

Various events under Swachhata Pakhwada 2024, Sexual Harassment at Workplace Prevention Week, The Vigilance Awareness Week, Health Awareness' session, 107th foundation day of CWPRS, World Environment Day, International Day of Yoga, Hindi Diwas, Women's Day' celebration, World Water Day conducted at CWPRS during year 2023-2024.

AWARDS & ACCOLADES

Jawaharlal Nehru Port Authority (JNPA) commended the outstanding performance of CWPRS and felicitated with special recognition award for providing prompt technical support for port development projects at JN Port at the hands of Hon. Shri. Sarbananda Sonowal, Union Minister for Ministry of Ports, Shipping and Waterways, Govt. of India on 25.05.2023 at Mumbai.

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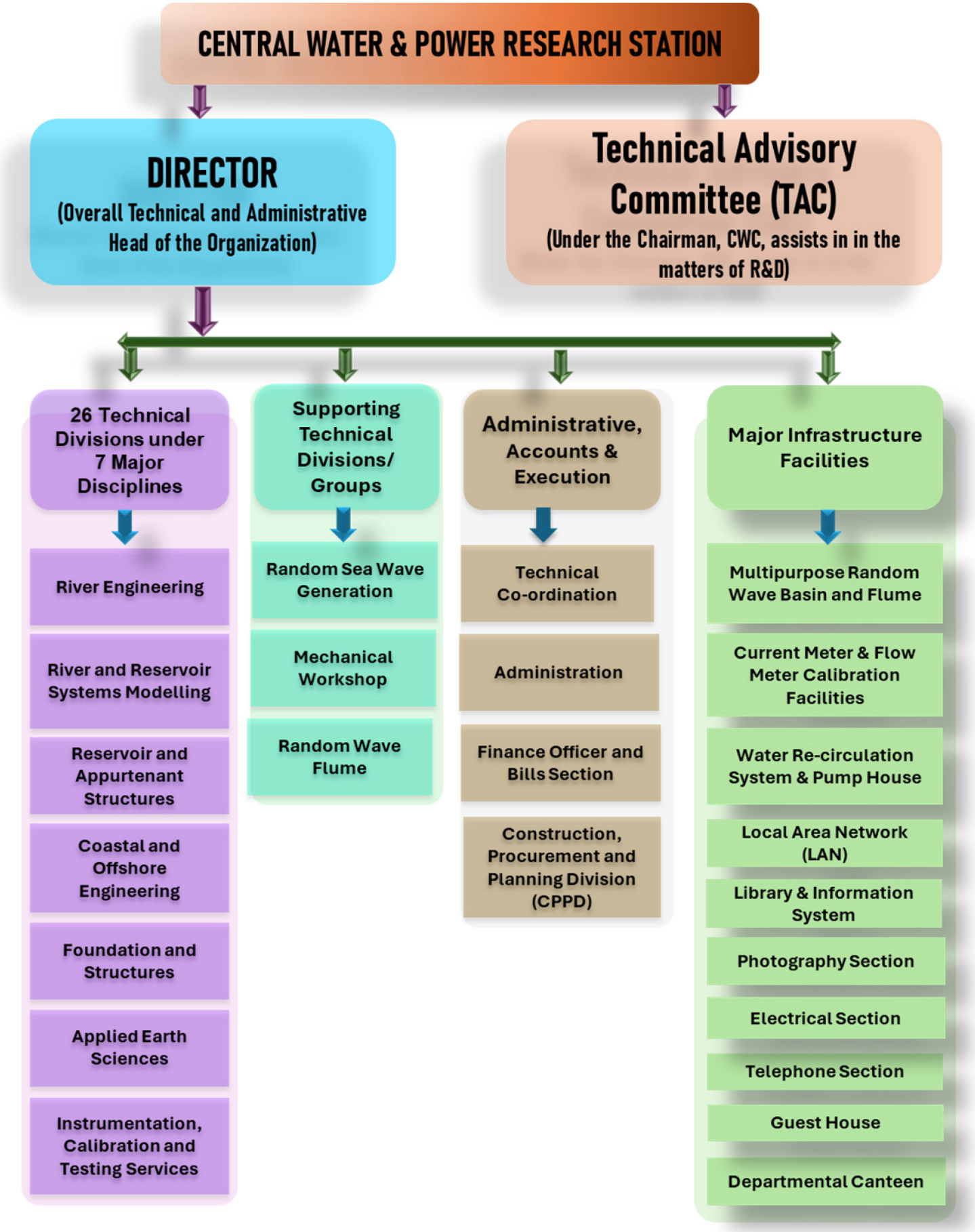
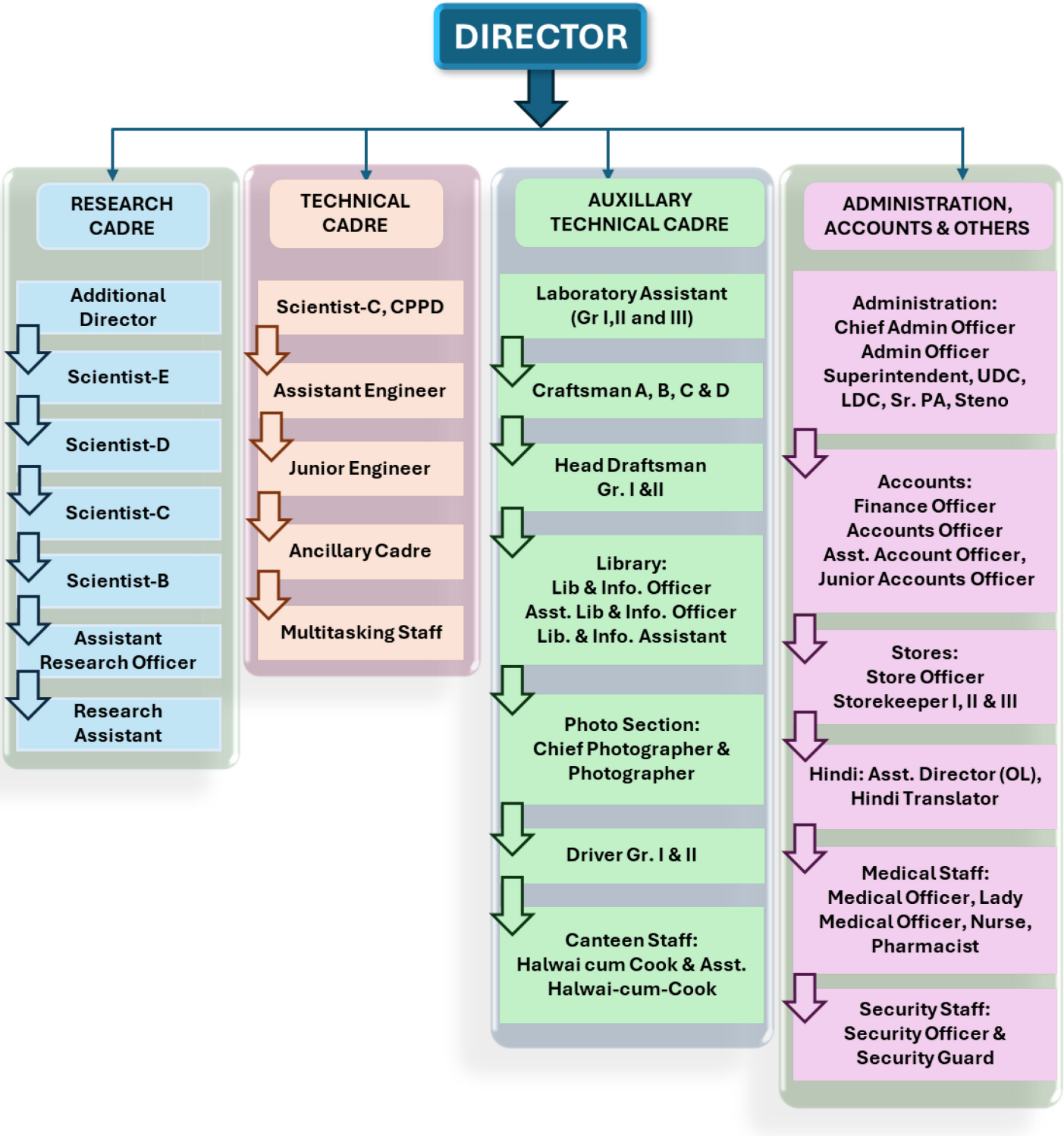
PART-I

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 2023-24.

Name of the scheme	Final Estimate 2023-24
R&D Programme in Water Sector under MoJS, Dept. of WR, RD&GR– CWPRS component	11.9050 Crore

During 2023-24 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 Softwares etc.

Activities: During 2023-24, with a budget outlay of Rs 11.9050 Cr., major activities undertaken included:

(i) **Infrastructure**: (Rs.5.41 Cr)

- (Rs.3.67 Cr) Construction of Concrete Technology Laboratory
- (Rs.0.25 Cr) Construction of 2-D flume model for centralized experimental facilities of River engineering studies in REG hangar
- (Rs. 0.15 Cr) Construction of Cross Bridge (CHS-III)
- (Rs. 0.21 Cr) Renovation of different office buildings, hangars and laboratories
- (Rs. 0.25 Cr) Construction of Office cabins, Sheds, RCC Jacketing in re-circulating system
- (Rs. 0.40 Cr) Renovation and upgradation of residential quarters
- (Rs. 0.32Cr) Maintenance of Garden area attached to Office complex and Guest House area
- (Rs. 0.16 Cr) Re-carpeting of existing road and AMC of CWPRS Website

(ii) **Machinery & Equipment** (Rs. 4.91 Cr)

- (Rs. 0.34 Cr) River Acoustic Doppler Current Profiler (ADCP) HMC
- (Rs. 0.16 Cr) GP Radar System
- (Rs. 0.09 Cr) MATLAB Software
- (Rs. 1.04 Cr) CFD Software for HM Lab
- (Rs. 0.85 Cr) RSWG System of 120 mtr. Wave Flume
- (Rs. 0.77 Cr) Thermal Conductivity Meter
- (Rs. 0.92 Cr) Static Triaxial Soil Test System
- (Rs. 0.61 Cr) Static Gauges & Calibrators
- (Rs.0.13 Cr) Different Software viz. Grapher, Surfer and Computers, Survey meter, Current meters, etc.

(iii) **Operating Cost** (Rs.0.71 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 2023-24 are given below:

Item/ Head	Amount (Crore)	
	Final Estimate	**Actual Expenditure**
Salary	80.32	80.11
Non-Salary	7.68	7.40
Total (Gross)	88.00	87.51
Recovery	15.00	15.26
Net	73.00	72.25

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MONITORING OF RESERVATION STATUS

1. Minority Welfare

The recruitment of personnel from minority community 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 2023 to March 2024.

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 25 people with disabilities are working in the Research Station with 03, 07 and 15 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 31st March 2024
	PH
A	03
B	07
C	15
Total	25

3. Monitoring of Reservations for SC/ST/OBC

Monitoring of the recruitment of candidates form 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 31stMarch 2024			
	SC	ST	OBC	UR
A	24	12	35	84
B	25	07	37	105
C	51	26	101	197
Total	100	45	173	386

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. Dr. (Mrs.) Neena Issac, Scientist 'E' is the Chairperson of the committee. Meetings of the committee are held regularly. No complaints were received during 2023-2024.

VIGILANCE AND DISCIPLINARY CASES

Break up of vigilance and disciplinary cases in respect of different categories of staff of CWPRS during 2023-24 is mentioned below in Tables I & 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	01	00
2	No. of cases added during the year	00	00
3	No. of cases disposed off during the year	01	00
4	No. of cases pending at the end of theyear	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	00	01
2	No. of cases added during the year	NA	00	00
3	No. of cases disposed off during the year	NA	00	00
4	No. of cases pending at the end of the year	NA	00	01

As part of a vigilance awareness programme, Vigilance Awareness Week was observed at Central Water and Power Research Station (CWPRS), Pune, from 30th October to 5th November 2023.

Essay and Elocution competitions held during Vigilance Awareness Week

Prize distribution by Dr. R. S. Kankara, Director CWPRS during valedictory function

RTI ACT, GRIEVANCES 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. Prabhat Chandra Additional Director, CWPRS, Khadakwasla, Pune 411024 Tel.: 020-24103521 e-mail: prabhat.chandra@gov.in
Public Information Officer	Shri A.A. Purohit Scientist-E, CWPRS, Khadakwasla, Pune 411024 Tel.:020-24103508 e-mail: purohit_aa@cwprs.gov.in
Transparency Officer	Dr. (Smt.) Neena Isaac Additional Director, CWPRS, Khadakwasla.Pune 411024 Tel.:020-24103455 e-mail: neena.isaac@.gov.in
Nodal Officer	Shri A.A. Purohit Scientist-E, CWPRS, Khadakwasla, Pune 411024 Tel.:020-24103508 e-mail: purohit_aa@cwprs.gov.in
Asst. Public Information Officer	Shri Amol Borkar, Scientist-"C", CWPRS, Khadakwasla, Pune 411024 Tel: 020- 24103501 E-mail: amol.borkar@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 2023-24 is summarized below.

	Opening balance as on 1/04/2023	Received during 2023-24 (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	01	142	6	0	134
First Appeals	0	22	0	0	22
Amount of Charges Collected (Rs) 130/-					
Registration fee amount		Additional fee & any other charges		Penalties amount	
130/-		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 pertaining to cases handled during 2023-24 is given below:

Grievance cases pending as on 31st March 2023	01
Cases received during 1st April 2023 to 31st March 2024	09
Cases disposed off during 1st April 2023 to 31st March 2024	10
Cases pending as on 31st March 2024	00

The Centralised 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. Cititzen'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. Prerana, Dy Director, MIS explored the training facilities developed under NHP at CWPRS from 26th to 28th April 2023

Mrs. Debashree Mukherjee, Special Secretary, Ministry of Jal Shakti visited various physical models and exhibition Hall at CWPRS on 22nd May 2023

Air Marshal Ajit Bhonsale, Ex. Member UPSC, Delhi visited CWPRS on 27th June 2023

Dr. Amar Singh, Scientist 'F', Electronics Test and Development Centre (ETDC), Pune and his team visited Testing and Calibration Laboratories on 26th July 2023

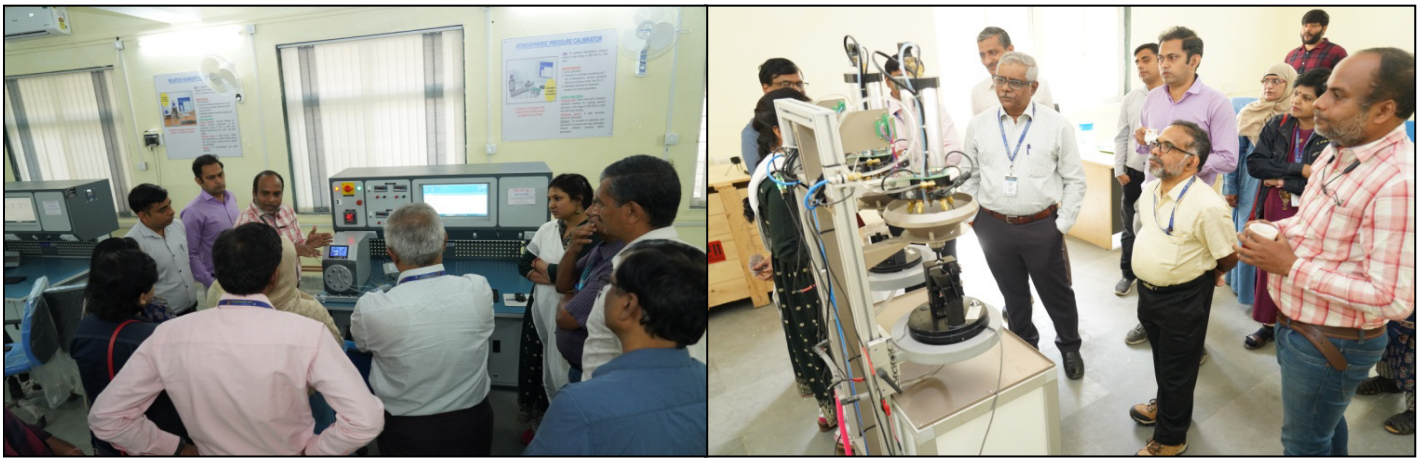
Shri RMA Khan, GM (Design), Shri Saket Kumar, DGM (Civil), Shri Prakash Singh, Manager (Civil) of NHPC visited various models at CWPRS on 10th August 2023

Shri Harsh Gupta, IAS, Project Director, NDMA, New Delhi visited the Hathnikund barrage model at CWPRS on 23rd August 2023

Prof. V. S. Raju, Ex-Director, IITD and Design Consultant to Water Resources Department, Govt. of Andhra Pradesh interacted with CWPRS officials on 10th October 2023

An interactive session with Mr. Mark Britton, Vice President of DHI and team on the updates and new developments in MIKE software at CWPRS on 10th October 2023

Mr. Abdi Samulsaa from Tanzania Port visited CWPRS on 15th December 2023



Shri K. S. Hosalikar, Scientist 'G' (Climate Research & Services), IMD visited CWPRS on 09th February 2024

Shri Ranbir Singh, Chairman, Bramhaputra Board visited CWPRS during 14th and 15th March 2024

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IMPORTANT EVENTS

Multiple Workshops on "Realaxation and Rejuvenation through meditation" under the initiative "हर दिल ध्यान, हर दिन ध्यान" held from 6th to 21st April 2023

Lecture on "Coastal data collection and nearshore measurements" by Dr. B.K. Jena, Scientist 'G', NIOT, Chennai on 12th April 2023

Lecture on "APAR submission and its Importance" by CAO, CWPRS for Group A, B & C officials on 18th April 2023

Dr. R. S. Kankara, Director CWPRS and Shri A. A. Purohit, Scientist 'E' felicitated with outstanding performance award by Hon. Shri Sarbananda Sonowal, Union Minister, Ministry of Ports, Shipping and Waterways, Govt. of India on 25th May 2023 during 34th foundation day of JN Port, Mumbai

Campaign "Beat Plastic Pollution" held by CWPRS on 05th June 2023 on "World Environment Day"

Lecture on "Health: Best Care- Best Services "delivered by Dr. Shruti Mahajan, Global Hospital Pune at CWPRS on 09th June 2023

A lecture entitled "Recent Advances in Ocean Science and Technology" delivered by Shri G. A. Ramadass, Director, NIOT, Chennai on 107th foundation day of CWPRS on 14th June 2023

CWPRS celebrated its 107th foundation day on 14th June 2023 and, organized Open house to showcase its history and present role in water resource management in India.

"International Day of Yoga" celebrated at CWPRS on 21st June 2023

संघ की राजभाषा नीति के कार्यान्वयन हेतु केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में दिनांक 18-29 सितम्बर के दौरान 'हिंदी पखवाड़ा-2023' के अंतर्गत प्रतियोगिताए

Swachhta Pledge taken by CWPRS ofiicials and Staff under "Swachhata Hi Seva Pakhwada" on 26th September 2023


Shramadan by CWPRS officials and Staff under "Ek Tareek, Ek Ghanta" on 01st October 2023

"Swachhata Pledge" by CWPRS officials and Staff followed by "Tree Plantation" under "Swachhata Diwas" on 02nd October 2023

"Health Awareness" session and "Free Eye Checkup camp" organized by CWPRS on 17th October 2023

"The Vigilance Awareness Week" observed at CWPRS during 30th October 2023 – 05th November 2023

दिनांक १९-२५ नवम्बर २०२३ को "सम्प्रदायिक सद्भावना सप्ताह" के अंतर्गत "वर्त्तमान समय में सम्प्रदायिक सद्भावना का महत्व" विषय पर विभिन्न प्रतियोगियो का आयोजन

"Sexual Harassment at Workplace Prevention Week" observed during 11-15 December 2023

दिनांक 10 जनवरी 2024 को "हिंदी हास्य/ व्यंग कवि सम्मेलन-2024" का आयोजन

CWPRS celebrated International Women's Day 2023 in its true spirits on 8th March 2023 and various activities also organized

“Swachhata Pledge”as part of the "Swachhata Pakhwada 2024" Special campaign from 16th to 31st March 2024

Shramdan Activities near Khadakwasla Dam, Pune under “Swachhata Pakhwada 2024”

Community outreach for the Participation of Local school(s) in the "Swachhata" and "Water for Peace" thematic campaigns

A lecture on "Water for Peace" by Shri Vijay Paranjpye delivered on "World Water Day"

Encouraging the curbing of "Single Use Plastic (SUP)" through a campaign and Plantation of Saplings at CWPRS Staff Colony to promote a green environment

An awareness programme on the "Benefits of Hygiene and Sanitation" organized by Health Unit, CWPRS on 30th January 2024

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राजभाषा हिंदी के प्रगामी प्रयोग से संबंधित प्रमुख गतिविधियाँ
(वर्ष: 2023-24)

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 2023 और 15 सितंबर 2023 को पुणे में आयोजित तीसरे 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 श्रीमती उमा गंगाधरन, वरिष्ठ अनुवाद अधिकारी 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, हिन्दी में वार्तालाप, हिन्दी प्रश्नमंच, तकनीकी शब्दों का अनुवाद, हिन्दी कविता पठन, हिन्दी शुद्धलेखन, तकनीकी संगोष्ठी प्रतियोगिता, हिन्दी टंकण, हिन्दी 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 थी । इन प्रतियोगिताओं में योग्यता प्राप्त अधिकारियों एवं कर्मचारियों को मुख्य अतिथि के करकमलों द्वारा नकद पुरस्कार एवं प्रमाणपत्र देकर सम्मानित किया गया ।इस अवसर डॉ. ओमकार नाथ शुक्ल, वरिष्ठ हिंदी अधिकारी, आई आई टी एम, पुणे, मुख्य अतिथि के रूप में उपस्थित थे ।

मुख्य अतिथि डॉ. ओमकार नाथ शुक्ल, वरिष्ठ हिंदी अधिकारी, आई आई टी एम, पुणे को दिनाँक २९ सितंबर, २०२४ के दिन केन्द्रीय जल एवं विद्युत अनुसंधान संस्थान के निदेशक द्वारा स्मृति चिह्न प्रस्तुत करके हिन्दी पखवाड़ा २०२३ 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 तीसवें अंक का विमोचन किया गया। अनुसंधान शाला के अधिकारियों एवं कर्मचारियों ने उक्त पत्रिका में विभिन्न विषयों पर लेख, कविता, यात्रा संस्मरण आदि लिखकर अपना बहुमूल्य योगदान दिया है।

तकनीकी/ प्रशासनिक हिंदी कार्यशाला का आयोजन

गृह मंत्रालय द्वारा जारी वार्षिक कार्यक्रम में दिए गए निर्देशों के अनुसार अनुसंधान शालामें दिनांक 5 जुलाई 2023, 25 अगस्त 2023, 20 दिसंबर, 2023 एवं 05 अप्रैल 2024 को प्रशासनिक/तकनीकी हिन्दी 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.	डॉ. (श्रीमती) प्राजक्ता गाडगे, वैज्ञानिक 'सी'	उत्प्लव मार्ग और उर्जा क्षयकारक के लिए भौतिक और संख्यात्मक प्रतिमान अध्ययन
2.	श्री उदय पाटील, वैज्ञानिक 'सी'	तटीय हाइड्रालिक संरचनाओं का डिजाइन
3.	श्री जितेश व्यास, वैज्ञानिक 'सी'	जल गुणवत्ता प्राचलों का महत्व
4.	श्री अमोल चुनडे, सहायक अनुसंधान अधिकारी	जल संरक्षण और प्रबंधन के लिए बांध सुरक्षा का महत्व
5.	श्रीमती स्वाति चड्ढा, सहायक निदेशक (राजभाषा), राष्ट्रीय रासायनिक प्रयोगशाला, पुणे	विश्व में हिंदी का बढ़ता महत्व तथा कार्यालयीन पत्राचार में हिंदी का प्रयोग
6.	श्री महेंद्र कुमार मिश्र, हिंदी प्रभारी, वैकुण्ठ मेहता राष्ट्रीय सहकारी प्रबंध संसथान, पुणे	राजभाषा नीति एवं उसका अनुपालन
7.	श्री मोहम्मद जियाउल कमर, वैज्ञानिक 'सी'	जलविद्युत परियोजनाएं : जलाशय तलछट प्रबंधन और बाईपास टनल के लिए प्रतिमान अध्ययन
8.	श्रीमती शिवानी साहु, वैज्ञानिक 'सी'	तटीय क्षेत्रों पर जलवायु परिवर्तन का प्रभाव एवं संख्यात्मक मॉडलिंग द्वारा उपयुक्त सुझाव

तकनीकी /प्रशासनिक हिंदी कार्यशालाओं में उपस्थित अधिकारी व कर्मचारी

हिन्दी संगोष्ठी का आयोजन

राजभाषा नीति केप्रचार-प्रसार को ध्यान में रखते हुए केंद्रीय जल और विद्युत अनुसंधान शाला, पुणे में दिनांक 20 अप्रैल 2023 को "जल संसाधन के विकास से संबंधित पर्यावरणीय समस्याएँ" विषय पर हिंदी संगोष्ठी का आयोजन किया गया था। जल संसाधन, नदी विकास और गंगा संरक्षण विभाग के अधीनस्थ सभी कार्यालयों तथा पुणे में स्थित विभिन्न सरकारी कार्यालयों से कुल 10 शोध-पत्र प्रस्तुत किए गए। भारतवर्ष के दीर्घकालिक विकास के संदर्भ में जल संसाधन के विकास से संबंधित पर्यावरणीय समस्याओं से जुड़े विषय पर गहन विचार-विमर्श करने तथा इनसे जुड़े विभिन्न पहलुओं पर व्यापकपरिचर्चा करना इस संगोष्ठी का मुख्य उद्देश्य था। संगोष्ठी के शुभ अवसर पर मुख्य अतिथि द्वारा संगोष्ठी पुस्तिका का विमोचन भी किया गया।

हिंदी हास्य/व्यंग्य कवि सम्मेलन का आयोजन

केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 10 जनवरी 2024 को "विश्व हिन्दी दिवस" के शुभ अवसर पर " हिन्दी हास्य-व्यंग्य कवि सम्मेलन" का आयोजन किया गया। अनुसंधान शाला से 05 कवियों ने तथा पुना तथा अन्य राज्यों से आमंत्रित 08 कवियों ने अपनी कविताएं प्रस्तुत की। जल संरक्षण , बेटी बचाओ, सीमा पर तैनात सैनिक, कोरोना आदि महत्त्वपूर्ण विषयों को कविताओं में शामिल किया गया था। सभी ने धाराप्रवाह शैली में अपनी –अपनी कविताएं प्रस्तुत की और सभागार में उपस्थित श्रोताओं को उत्तम काव्य सुनने का अवसर प्रदान किया।

संगणकों में हिंदी साफ्टवेयर

अनुसंधान शाला के सभी संगणकों में हिंदी सॉफ्टवेयर डलवाए गए हैं जैसे iLeap, ISM Office, ISM Publisher और iTranslatorइत्यादि। यूनीकोड आधारित सॉफ्टवेयर ISM V6 नेट वर्ज़न का प्रयोग किया जा रहा है। साथ ही गुगल आधारित यूनीकोड सॉफ्टवेयर का प्रयोग भी किया जा रहा है। हिन्दी 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 समय-समय पर अद्यतन किया जाता है।

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

प्रतिदिन काम आनेवाले नेमी क़िस्म 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 इन्ट्रानेट पर हिंदी में उपलब्ध कराए गए हैं। हिन्दी नियम पुस्तिका, गृह मंत्रालय के राजभाषा विभाग द्वारा प्रतिवर्ष जारी वार्षिक कार्यक्रम तथा अनुसंधान शाला के सभी प्रयोगशालाओं की तकनीकी शब्दावली को भी इन्ट्रानेट पर उपलब्ध कराया गया हैं।

हिन्दी भाषा तथा टंकण प्रशिक्षण

हिन्दी शिक्षण योजना, पुणे के प्रवीण एवं पारंगत पाठ्यक्रम हेतु अनुसंधान शाला से कुल 41 अधिकारियों/ कर्मचारियों को नामित किया गया। नवंबर 2023 में संपन्न परीक्षामें पारंगत परीक्षा के लिए नामित प्रशिक्षणार्थियों ने अच्छे अंक हासिल किए । प्रवीण परीक्षा के लिए नामित प्रशिक्षणार्थियों ने अच्छे अंक हासिल किए ।

विभागीय निरीक्षण

हिन्दी 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, तकनीकी समन्वय प्रभाग तथा निर्माण एवं क्रय कक्ष के साथ-साथ अन्य प्रभागों का निरीक्षण किया गया। निरीक्षण के दौरान यह पाया गया कि लगभग सभी प्रभागों में तकनीकी सारांश एवं उसका अग्रेषण पत्र, छुट्टी के आवेदन, कार्यभार प्रस्थान तथा कार्यभार ग्रहण रिपोर्ट आदि कार्य नियमित रूप से हिन्दी में किए जा रहे हैं। निरीक्षण के दौरान अन्य विषयों से संबंधित पत्राचार को भी हिन्दी में करने के लिए मार्गदर्शन किया गया। अनुसंधान शाला में हिन्दी 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 जाएं।

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 मदें अंग्रेजी के साथ हिंदी में भी भेजी जा रही है।

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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 eOffice, 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 eOffice 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 eoffice have been created. eOffice 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 pre-requisite for eOffice. As a part of the implementation of eOffice, CWPRS had accomplished the formation of eOffice Helpdesk comprising three experts in eOffice from NIC. This team was providing support to the officials of CWPRS for using eOffice 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 eFile. 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), eSign, 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 250 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 eGovernance 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.

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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 was made available from a variety of sources, such as databases, compact discs, microforms and through online searches from international databases.

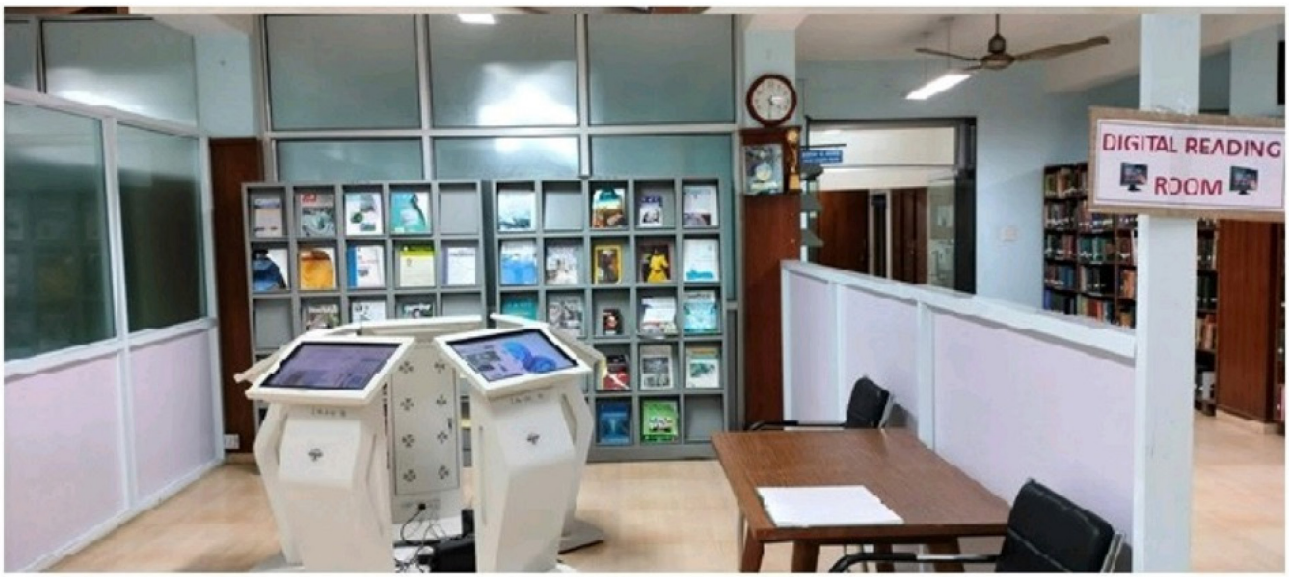
In 2019, the library underwent a significant transformation by migrating its data from LIBSYS 4.0 LMS System to the Cloud based e-Granthalaya Library Management Software. This migration marked a significant step forward in streamlining operations and enhancing user experience with unlimited storage capacity 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-incheck-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 2023-2024, 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.



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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
- Hydraulic Analysis and Prototype Testing
- Bridge Engineering

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

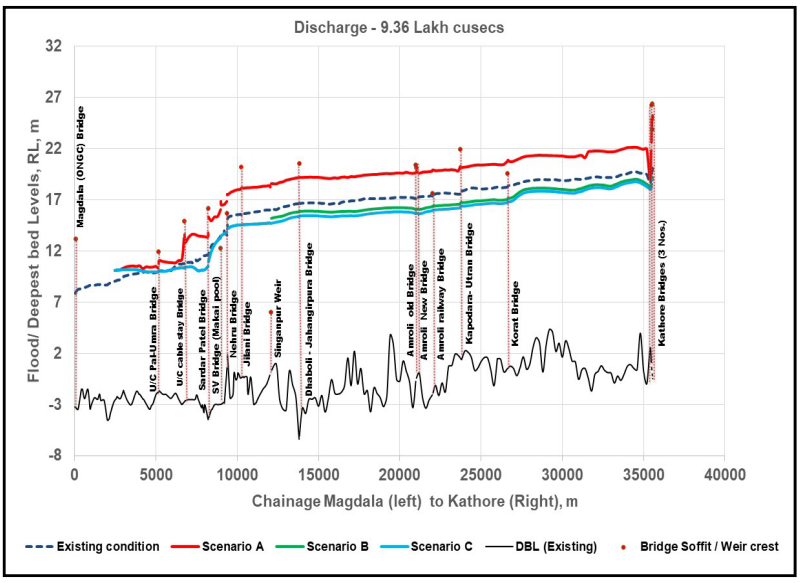
- State Government Authorities
- National Highway Authority of India (NHAI)
- Farakka Barrage Project
- National thermal Power Corporation (NTPC)
- Delhi Metro Rail corporation
- Damodar Valley Corporation
- Indian Railways
- Inland Water Ways Authority of India (IWWAI)
- WAPCOS Limited
- District Municipal Corporations
- Water Resources Department Bihar (Kosi River)
- Farakka Barrage Project (Ganga River)

Mathematical Model Studies to Assess the Flow Conditions in River Tapi due to Proposed River Front Development and River Rejuvenation, Surat, Gujarat

The Surat Municipal Corporation (SMC) is planning River Front Development (RFD) along River Tapi at Surat, Gujarat. In this regard, RFD alignments and their design work were entrusted to M/s HCP Design Planning & Management Private Limited (HCPDPM), Ahmedabad. To assess the flow conditions due to the proposed RFD works, SMC had entrusted the model studies to CWPRS, Pune. CWPRS has carried out 1-D mathematical model studies using HEC-RAS for the reach from the Kathore bridge to the Magdalla (ONGC) bridge with the proposed RFD alignments. After a detailed delebration with project authorities on flooding assessment and accounting of the flood in analysis, design discharge of 26505 m^3/s (9.36 Lac Cusecs) for RFD works is adopted. The studies were conducted for various scenarios related to the discharge. The various combinations comprising of the barrage at RD 2476 m for three scenarios i.e. scenario A (P2-2023 RFD proposal), scenario B (P2-2023 RFD proposal plus bed corrections), and scenario C (P2-2023 RFD proposal plus bed corrections and removal of Singanpur weir), were analyzed.

For the RFD design discharge of 26505 m^3/s (9.36 lakh cusecs) scenarios B and C resulted in lower flood levels at majority of the reaches than the existing condition and scenario A and hence, provisions in scenario's B or C were recommended. Certain bridges were found to get submerged particularly, SV bridge (Makal pool in case of scenario B or C). The modifications to the submerged bridges were necessitated and it was suggested to modify the bridges based on the design discharge considered. The proposed barrage at RD 2476 m will act as a salinity arresting barrier and the pond formed in the upstream reach will be able to store fresh water for various necessities and hence recommended.

Location Map of the Tapi River Front



Flood levels computed for scenarios A, B, C

Mathematical Model Studies for Flood Protection Measures along River Swan from Downstream of Santokhgarh Bridge to Shri Anandpur Sahib in Punjab Region

The Swan River originates from Joh-Marwari village near Daulatpur Chowk in AmbTehsil and flows through the inter-mountainous valley of Una district in Himachal Pradesh and Roopnagar district in Punjab. The Total length of Swan River is 85 km, out of which 65 km is in Himachal Pradesh and 20 km in Punjab. The flow in the River Swan increases abruptly and experiences flash floods. As a part of an integrated development plan for Swan River, the construction of embankments from Daulatpur bridge to Santokhgarh bridge at a length of 65 km in Himachal Pradesh has been completed and about 7500 Hactre land has been reclaimed besides other benefits. In view of the encouraging results, the flood management and integrated land development project starting from D/S of Santokhgarh Bridge to Sri Anandpur Sahib, Punjab has been prepared byIrrigation & Water Management Investigation (I&WMI) Division Punjab. The plan covers the aspects like construction of embankments on both sides of River Swan at a length of 18.288 km left side and 15.488 km right side with an overall waterway of 775 m. The recommendations from the studies are:

- The top level of the embankments of River Swan may be finalized by using the obtained maximum water levels by adding sufficient freeboard.
- The distance between both the embankments (River width) as proposed by project authorities at each cross-section of River Swan is sufficient.
- The top width of the embankment may be kept as 3.0 to 6.0 m in Swan River depending on the necessity of use of the embankment top.
- It is recommended to provide slope pitching in the form of stones in crates of size 1.0 m x 1.0 m x 0.6 m up to about at least 1.5 m above the expected HFL for River Swan.
- It is recommended to provide a 16 m wide launching apron for River Swan. The launching apron would consist of stones in crate of size 1.0 m x 1.0 m x 1.0 m laid over a geofabric filter.
- At the end of each sloping portion toe wall of size 1.0 m x 1.0 m x 1.0 m is suggested to support the structure on sloping portion.

Google image of River Swan from Santokhgarh bridge to Shri Anandpur Sahib

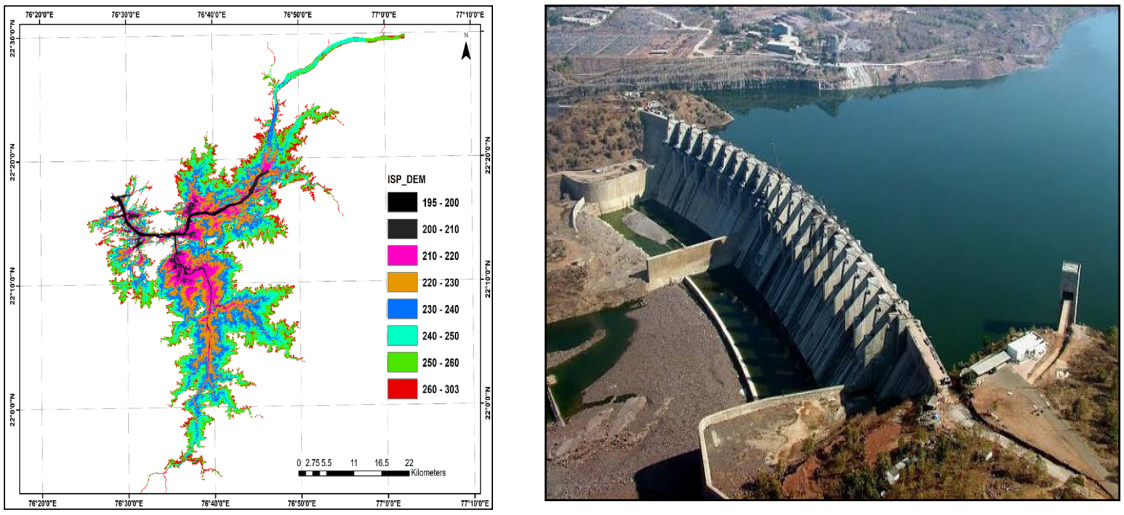
Confluence points of River Swan with River Sutlej

Assessment of Reservoir Capacity and Sedimentation Studies using Multi Beam Based Survey along with Single Beam System for Indira Sagar Reservoir

Indira Sagar is a multipurpose project located on River Narmada in Khandwa district of Madhya Pradesh. The project has a power generation capacity of 1000 MW and a 249 Km long canal to provide an irrigation potential of 1.23 lakh hectares in the districts of Khandwa and Khargone. The project consists of a 653 m long and 92 m high concrete dam with an ogee spillway. It consists of 12 main spillway blocks. The pre-impoundment water spread area and capacity of the reservoir at FRL EL. 262.13 m are about 909.90 km^2 and 12211.55 Mm^3 respectively.

The bathymetry survey work was conducted by CWPRS from February 2019 to January 2020 using Single Beam Echo-Sounder technique for assessment of reservoir capacity and sedimentation of Indira Sagar project. The survey lines were run at 200 m interval on main Narmada River as well as on Tawa River. Multi beam survey was also conducted near the power intake and along the deep channel over the entire reservoir. The lowest reservoir bed level recorded within the survey area was 194.67 m w.r.t. MSL (651636.91m E, 2464918.54m N). The highest reservoir bed level recorded within the survey area was 261.68 m w.r.t. MSL (681973.7m E, 2462166.07m N).

The bathymetric point data was used to create a vector point shapefile (Esri Shape file format) in GIS software. The boundary of the reservoir was then digitized around the point shapefile. Two types of boundaries were constructed. First boundary is outside the reservoir and the second type of boundary consists of the boundary around islands in the reservoir. This point shapefile was then utilized for creation of DEM. The satellite images from Landsat 8 and Sentinel 2 were used for the analysis for obtaining the contours of water spreads of higher elevations. This water spread areas were then used for the calculation of reservoir capacity using a trapezoidal formula. It was observed from the analysis that the present water spread area is about 824.92 km^2 and corresponding capacity of the reservoir is about 11632.01 Mm3 as against the original values of 909.90 km^2 and 12211.55 Mm^3 respectively. Thus, from the analysis it can be concluded that there is about 9.34% loss in the reservoir area and 4.74% loss in the corresponding reservoir capacity. The observed rate of siltation in the Indira Sagar reservoir during the 15 years is about 1034.20 tonnes/year/km^2 which is higher as against the value of 906 tonnes/year/km^2 for River Narmada reported by Garde and Kothyari.



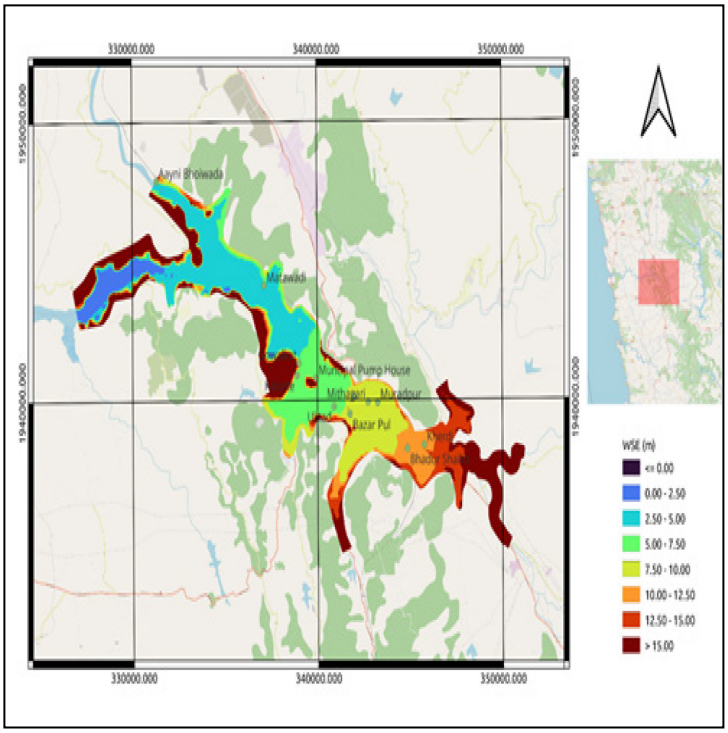
Vector point shapefile of bathymetric point data of surveyed area and a panoramic view of Indirasagar dam

Mathematical Model Studies for Evolving Flood Protection Measures for River Vashishti near Chiplun Town, Maharashtra

Maharashtra State experienced a series of floods in July 2021. Chiplun in Ratnagiri district and Mahad in Raigad bore the maximum brunt of the disaster. Chiplun town experienced very heavy precipitation on the 21st and 22nd of July 2021 and very high inundation levels for a prolonged time. According to the decision taken in the cabinet meeting of the Maharashtra Government held on 03rd August 2021, WRD, Ratnagiri approached CWPRS to conduct the model studies for suggesting flood protection measures for River Vashishti near Chiplun town. Accordingly, hydro-metrological analysis, hydrological model of the Vashishti basin and hydrodynamic model of the rivers were carried out at CWPRS. Hydro-metrological analysis of rainfall data was carried out to develop the IDF curve for various rain gauge stations in the study area. It was observed from the analysis that 24-hour rainfall intensity for a 25-year return period is 361.77 mm and 24-hour rainfall intensity for a 100-year return period is 441.70 mm.

It was observed that the flood of July 2021 was very widespread inundating almost all Chiplun town. The width of River Vashishti near Chiplun town is in the range of about 150 to 250 m and the banks are very shallow as the river is very near to the tidal zone. The bankful discharge of River Vashishtinear Muradpur is about 400 m^3/s. The magnitude of the July 2021 flood was about ten times the bankful discharge and hence, there was a wide spread of flood. This flood cannot be confined in a channelized River with restricted width and hence no flood embankments are proposed. The Riverbank prone to erosion must be protected using suitable bank protection measures designed for the prevailing velocities and as per the BIS code provisions. It is recommended to develop a flood forecasting system with a lead time of about 72 hours. It is also recommended to construct only flood-proof structures in the floodplain zone of River Vashishti, which will not block passage of flood and help in reducing the flood levels.

Flood in Chiplun for July 2021



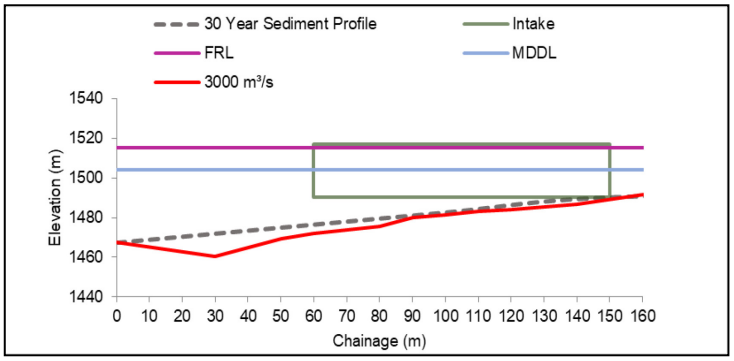
Flood Inundation Map for July 2021 flood

Hydraulic Model Studies for Reservoir Sedimentation of Kiru H.E. Project, Kishtwar, J&K

Kiru hydroelectric project is a run-of-River scheme across the River Chenab with a proposed installed capacity of 624 MW. The Kiru hydroelectric project is located near the villages Kiru &Patharakki in the Kishtwar district of Jammu and Kashmir and is at about 17 km upstream of the Dul dam. The proposed Kiru HEP envisages the utilization of 127 m gross head of Chenab River by constructing a 123.0 m high concrete dam near Kiru village. Studies were carried out at Central water and Power Research Station (CWPRS), Pune with the help of physical modelling techniques to estimate the quantity of suspended sediment entering the power intake, and it's removal by sluicing and the flow conditions with respect to the water and sediment inflow.

A 3-D comprehensive model was constructed to simulate reservoir sluicing on a 1:100 geometrically similar scale physical model. The dam, intake structures and the river topography of about 2600 m upstream and 500 m downstream of the dam axis was reproduced in the model. The simulations were carried at different discharges of 700, 1300, 1875 and 3000 m^3/s and for various gate operating conditions viz. all gates open, gates G1 and G2 open and gates G2 and G3 open. The sediment deposition in the reservoirs after 30 years of operation was simulated using sand/silt of equivalent grain size. The spillway gates were also operated to maintain the reservoir water level at MDDL. The influence of sluicing is limited to about 70 to 95 m from the spillway axis. The scour cone is formed in front of the intake and spillway during higher discharges. Overall lowering of the bed is observed during all gates open condition, whereas lowering in the channel portion in front of the gates and deposition near the bank is observed during two gate open condition. Hence it will be favourable to operate the reservoir with all gates open during the monsoon months when the discharge is in the range of 1200 to 1300 m^3/s. The sediment concentration of 2000, 3000 and 4000 ppm during various discharges were simulated. The maximum sediment concentration entering the intake was about 202 ppm for the discharge of 3000 m^3/s and the incoming sediment concentration of 4000 ppm.

The sediment deposition profiles achieved equilibrium state in about 30 years. However, this is critical condition in terms of reservoir functioning since sedimentation level in the reservoir is above the invert of intake and sediment would be passing through the intake and water conductor system. This condition is not recommended for smooth functioning of the project and hence efforts should be taken to avoid the occurrence of the condition in the project by regular sluicing and maintaining the pivot point in the area upstream of the intake. Measures such as dredging should also be employed to avoid the occurrence of sediment deposition.



Formation of distinctive scouring cone for gate 2 & 3 open condition and Q = 3000 m^3/s

Mathematical Model Studies for Suggesting Flood Protection Measures at the Confluence of Rivers Manjra and Terna, Latur, Maharashtra

Latur district has two main Rivers, River Manjara and River Terna flowing through it. Manjara dam is built on River Manjara in the year 1980. Terna dam was constructed on the River Terna. These two dams are major sources of water for Irrigation and drinking water supply in the command area of these two dams. The confluence of the River Manjara and River Terna is close to the village Tagarkheda. Due to climate change and irregular rainfall patterns in the catchment areas of these two Rivers, there is an increase in the frequency of floods along with the increase in flood discharge. High precipitation was experienced during the 29th of September- 1st of October 2021 in the catchment areas of River Manjara and Terna. This resulted in major releases in the river from upstream barrages and dams. This situation created huge inundation near the confluence causing the loss of agricultural land. To suggest long-term measures to reduce the damages from frequent floods Water Resources Department (WRD), Latur, Government of Maharashtra approached the CWPRS to conduct numerical model studies. To assess probable causes of the flood an inspection was carried out at the site. The River Manjara when flowing at full capacity does not accommodate discharge from River Terna. This leads to stagnation of discharge in River Terna and there is a high level of inundation in the area around the confluence for prolonged duration. It was also observed that the natural stream flowing on the right bank of River Terna downstream of Tagarkheda barrage was blocked, thereby increasing the flood and water levels in River Terna. To reduce the flood conditions at the site it was suggested to reactivate the natural stream and to dredge a channel of about 50 m wide and 3m to 4 m deep. It was also suggested to provide a smooth transition near the confluence and widen the river reaches of both Rivers Manjara and Terna by about 5-10 m on both banks. Accordingly, a 2D model was developed in HEC-RAS covering a reach of about 2.6 km of Manjara River upstream of the confluence and 3 km downstream of the confluence. The reach of about 4.2 km of River Terna up to the confluence was also reproduced in the model. The Tagarkheda barrage was also incorporated into the model. The simulations were carried out for existing conditions and with modified conditions incorporating the flood protection measures.

From the simulations, it was observed that the water level was reduced by about 0.55 m upstream of River Manjara and by about 0.45 m downstream of the River Manjara for a high flood combination near the confluence. The velocity was also reduced by about 1.07 m/s upstream of River Manjara and by about 0.97 m/s in the River Terna near the confluence for a high flood combination. The additional dredged channel was carrying the discharge of 990 m^3/s for the 100 % discharge combinations and 432 m^3/s for 50% discharge combinations. Numerical model studies show that flood protection measures suggested are effective in reducing both water levels and velocities near the confluence. Therefore, it is recommended to implement the suggested remedial measures.

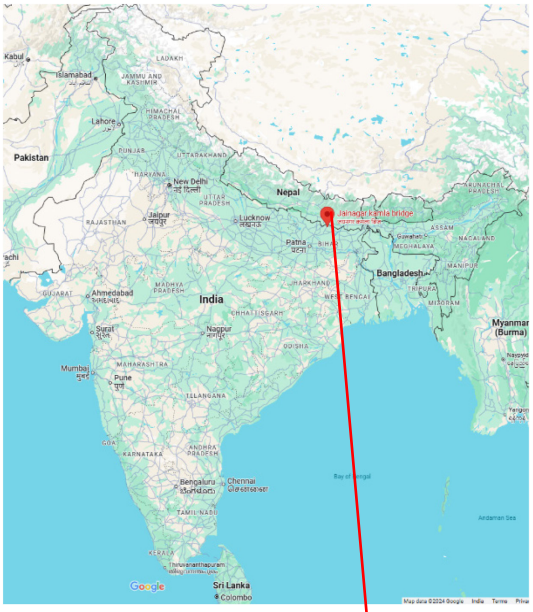
Tagerkheda Barrage

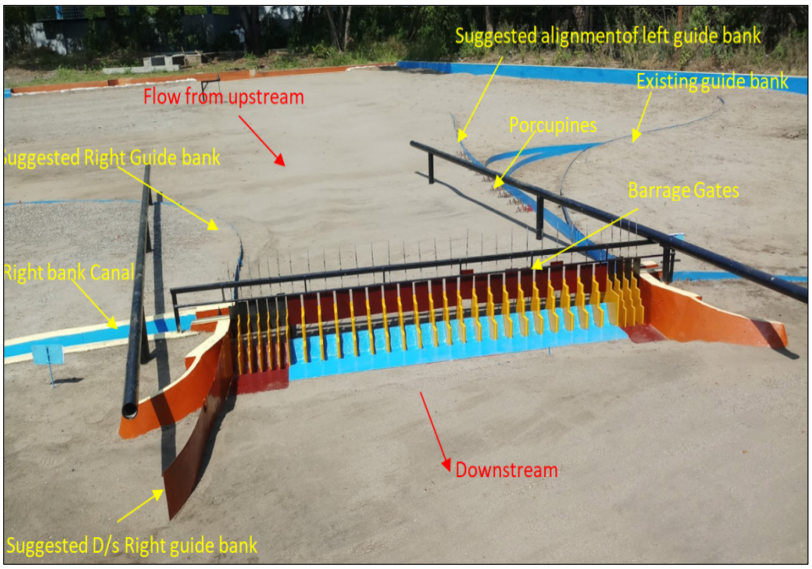
Confluence of Manjra and Terna rivers

Hydraulic Model Studies for the Proposed Barrage across River Kamla, Jaynagar, Dist. Madhubani, Bihar

Water Resources Department, Government of Bihar has proposed to construct a 550 m wide barrage across River Kamla to replace the existing 292.45 m wide weir in order to utilize water more effectively and to have better flood management/regulation of the flow. In this connection hydraulic model studies of River Kamla at Jaynagar were carried out to study the sufficiency of waterway, barrage orientation and flow conditions. This report describes the study for finalizing the level, length, and alignment of guide bunds/divide walls and designing suitable bank protection measures.

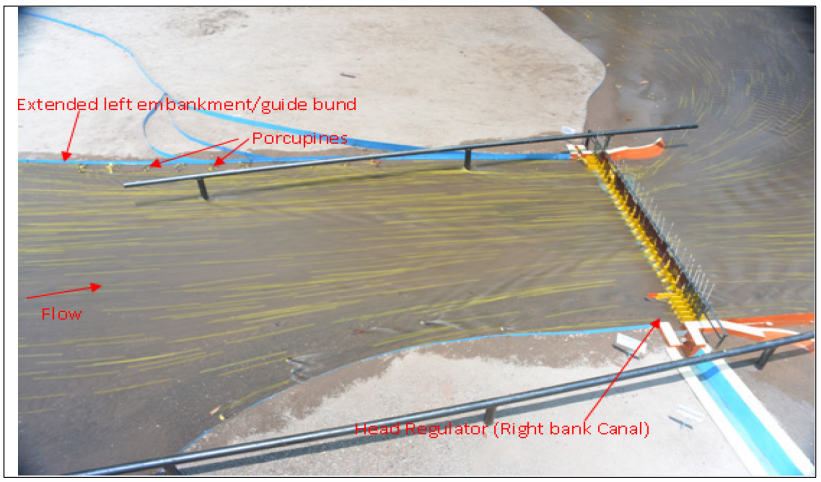
A physical model was constructed to a horizontal scale of 1:200 and vertical scale of 1:40 to reproduce the river reach of 5 km upstream to 3 km downstream of the proposed barrage location. Model studies were conducted to observe flow conditions, velocities, water levels etc. in the study area. Based on analysis of model findings, observation during site visit by CWPRS officers and discussions with project officials, length and alignment of guide bunds for the proposed barrage were suggested along with required bank protection measures in the upstream and downstream of the proposed barrage. The length of divide wall was also optimised to facilitate the flushing of deposited sediment, in front of the right-side head regulator, during the receding flood.





Kamla barrage with its suggested alignments of guide banks, waterway and orientation of axis

Location map pf Jaynagar Barrage, Madhubani, Bihar



Kamla barrage model showing flow conditions with final alignments of guide banks and barrage axis

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Mathematical model studies to assess the flow conditions in River Tapi due to proposed Riverfront development and River rejuvenation, Surat, Gujarat	RH	6194
2.	Revised desk studies for flood protection works on left bank of River Godavari at Purushothapatnam, East Godavari Dist., Andhra Pradesh	RH	6207
3.	Mathematical model studies for improvement of Pravara River reach from Kalas bridge to Ozar pickup weir, Tal. Akole-Sangamner, Dist. Ahmednagar, Maharashtra	RH	6212
4.	Mathematical model studies for flood protection measures along River Swan from downstream of Santokhgarh bridge to Shri Anandpur Sahib in Punjab region	RH	6242
5.	Studies for location and hydraulic design of cooling water intake in Mahi Bajaj Sagar reservoir for proposed Mahi Banswara Rajasthan Atomic Power Project (MBRAPP) of NPCIL Banswara, Rajasthan	BE	6136
6.	Hydraulic model studies for the proposed barrage on River Kamla, Jayanagar, Dist. Madhubani, Bihar	BE	6223
7.	Hydrographic survey of Omkareshwar reservoir, Madhya Pradesh to evaluate reservoir capacity	HAPT	6183
8.	Assessment of reservoir capacity and sedimentation studies using multi-beam-based survey along with single beam system for Indira Sagar reservoir	HAPT	6184
9.	Mathematical model studies for evolving flood protection measures for River Vashishti near Chiplun town, Maharashtra	HAPT	6185
10.	Hydraulic model studies for reservoir sedimentation of Kiru H. E. project, Kishtwar, J&K	HAPT	6186
11.	Mathematical model studies for suggesting flood protection measures at the confluence of Rivers Manjra and Terna, Latur, Maharashtra	HAPT	6243
12.	Nalla diversion studies in connection with the construction of 3rd & 4th railway lines near Badlapur Railway Station for Mumbai Rail Vikas Corporation	HAPT	6244
13.	Mathematical model studies for siltation of Bhadbhut barrage project, Gujarat	HAPT	6254
14.	Mathematical Model Studies for Bhadbhut barrage project, Gujarat	HAPT	6255

RESERVOIR AND APPURTENANT STRUCTURES

Divisions

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

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

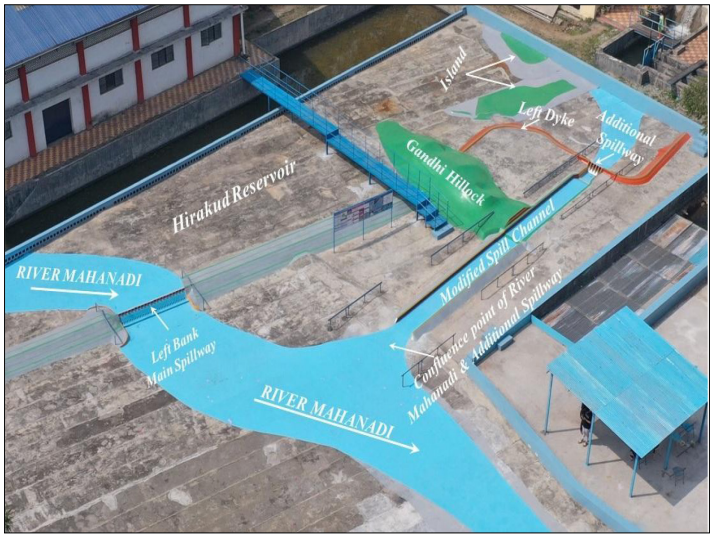
List of Clients

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

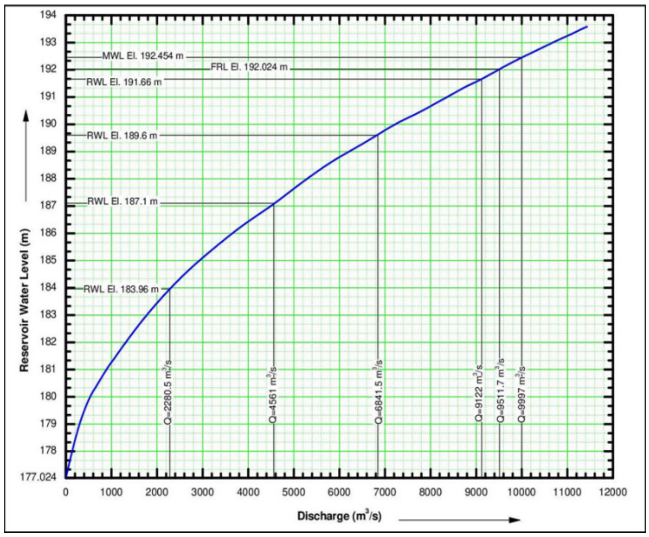
Hydraulic Model Studies for the Modified Spill Channel and Upstream Guide Walls of Additional Spillway of Hirakud Dam, Odisha; 1:100 Scale, 3-D Comprehensive Model

Hirakud Dam Project is built across River Mahanadi about 15 km upstream of Sambalpur, town in the state of Odisha. It is a Multipurpose Project and is the longest Earthen Dam in Asia having a total length of Dam & Dyke 25.80 km. There are two spillways in the main dam comprising of left spillway with 40 nos. of sluice gates and 21 nos. of crest gates and the right spillway with 24 nos. of sluice gates and 13 nos. of crest gates. The total discharging capacity of both the spillways is 42,450 m^3/s. The project was commissioned in the year 1957. The Central Water Commission (CWC) reassessed the Inflow Design Flood with up-to-date data and revised the design flood to 69,632 m^3/s. In order to safely pass the additional flood of 27,182 m^3/s inflow revised design flood, it is proposed to provide two additional spillways, the first spillway was provided/ proposed at the left bank 1st gap dyke of Hirakud Dam near 2nd saddle of Gandhi hillock with 5 nos. of spillway gates of size 15 m x 15 m each to discharge 9,122 m^3/s and the second additional spillway at Right dyke with 10 nos. of spillway gates to discharge 13,571 m^3/s flood water.

Hydraulic model studies were conducted on 1:100 scale 3D comprehensive model for assessing the various operating scenarios of the combined operation of the existing left bank spillway and additional spillway to decide the orientation of spill channel outfall joining the left limb of Mahanadi. Studies revealed that the length of the stilling basin was satisfactory as hydraulic jump was forming in the stilling basin. It was observed that the approach flow conditions near the left and right training walls of additional spillway in front of 1st and 5th span were abrupt for higher discharges, therefore, it is suggested that the height of the upstream curved guide walls may be raised to improve the approach flow conditions. The flow along the entire length of the modified spill channel was contained within the training walls without overtopping indicating the adequacy of size of the modified spill channel. Therefore, the heights of both the training walls are found to be adequate to contain the flow. It is recommended to provide curved guide bunds at the confluence of additional and left bank spillways oriented towards the downstream side so that the discharges from the additional and left bank spillways merge at the confluence tangentially without much disruption. It was observed that the velocities for ungated and gated operation of spillway are high in the modified spill channel as well as at the confluence of River Mahanadi and Additional Spillway. Therefore, it is recommended that proper bed and bank protection may be provided to prevent the scouring of the bed and the sides of the channel.



Top view of the model showing existing left spillway of main dam, additional spillway and modified spill channel



Discharging Capacity Curve for Proposed Additional Spillway

Hydraulic Model Studies for Modified Design of Spillway with Stilling Basin as Energy Dissipator of Punatsangchhu-I H.E. Project, Bhutan, 1:70 G.S. 3-D comprehensive model

Punatsangchhu-I H.E. Project is located on Punatsangchhu River in Wangdue Phodrang Dzongkhag in Western Bhutan. The project envisages the construction of a 136 m high concrete gravity diversion dam to generate 1200 MW of power utilizing a net head of 343 m at an underground powerhouse. The orifice spillway consists of the MWL / FRL at El.1202 m and the MDDL is at El. 1195 m. In the original design, the performance of the ski jump bucket was studied on 3-D comprehensive model. Now, in the modified design, stilling basin option as an energy dissipation arrangement with 5 sluices of dimensions 9.6 m (W) x 17.4 m (H) to pass a probable maximum flood of 11,500 m^3/s and Glacial Lake Outburst Flood (GLOF) of 4,300 m^3/s has been explored.

Hydraulic model studies were conducted on a 1:70 scale comprehensive model for a modified design of spillway with stilling basin as an energy dissipator. The studies indicated that discharges of 15,800 m^3/s (PMF+GLOF), 15,365 m^3/s and 11,500 m^3/s could be passed through all five spans at RWL El. 1203.3 m, FRL El. 1202 m and RWL El. 1192.8 m respectively. Considering the free board above FRL, discharging capacity of the spillway was found to be adequate. The performance of the spillway with stilling basin was studied for the entire range of discharges up to the design maximum discharge of 15,800 m3 /s for the gated and ungated operation of the spillway with a raised top elevation of the training wall from El. 1161 m to El. 1163 m maintaining tail water levels for the respective discharges. For the discharges of 2,000-2,875 m^3/s and 2,875-6,900 m^3/s, a submerged hydraulic jump formed near the toe of the spillway with no spilling of water over the training wall top El. 1163 m. The performance of the stilling basin was found to be satisfactory for the discharges ranging from 2,000-6,900 m^3/s as hydraulic jump forms near the toe of the spillway and is contained within the stilling basin. However, the performance of the stilling basin were found to be unsatisfactory for higher discharges (above 6,900 m^3/s and up to 15,800 m^3/s, including 8,625 m^3/s and PMF discharge of 11,500 m^3/s) as the jump is hitting the right bend of the River and causing the secondary flows, return flows with random large turbulence in the stilling basin. Severe high velocity return flows from downstream into stilling basin, especially at the right bank of the river for higher discharges were observed. Studies conducted without divide walls in the stilling basin indicated that the intensity of turbulence and volatile flow conditions in the stilling basin is slightly reduced as compared to those with the divide walls in the stilling basin. Considering the discharges up to 6,900 m^3/s, the top elevation of the training wall (El. 1163 m) was found to be adequate. The maximum observed discharge was 2,600 m^3/s during cyclone Aila at dam site of Punatsangchhu-I H.E. Project, Bhutan during Cyclone Aila in the year 2009. Taking view of this, the performance of stilling basin for discharges up to 6,900 m^3/s may be considered as satisfactory. It is to be noted that a higher tailwater depth with a submerged hydraulic jump would have lesser energy dissipation than a free hydraulic jump.

Location Map of Punatsangchuu-I HE projects, Bhutan

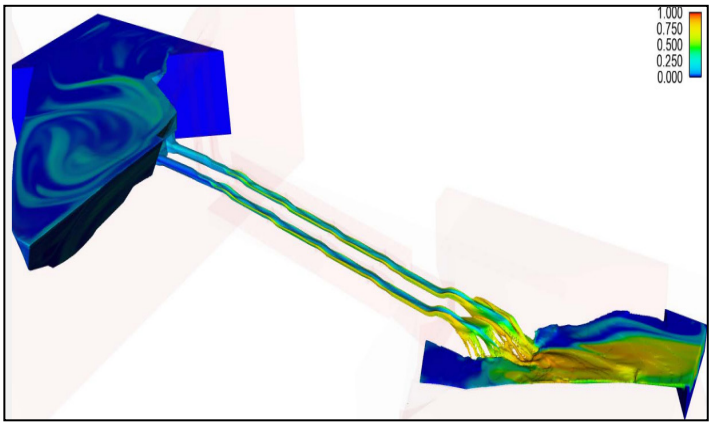
Flow conditions downstream of the spillway

Physical and Numerical Model Studies for Single Tunnel Spillway of Pakal Dul H. E. Project, J&K,1:25 Scale 3D Comprehensive Model

Pakal Dul (Drangdhuran) H.E. Project located on River Marusudar, a tributary of River Chenab envisages construction of 167 m high Concrete Faced Rock-fill Dam. It is proposed to provide a surface spillway and two low-level horseshoe-shaped tunnel spillways with a discharging capacity of 4000 m^3/s and 3530 m^3/s respectively at maximum water level (MWL) El. 1703 m. A Tunnel Spillway of length 456 m in plan comprising of two low-level horseshoe-shaped tunnels of 10.5 m dia each are provided downstream of the gates for passing flood as well as to flush the sediment from the reservoir with their inlet invert levels at El.1580 m. The tunnels are provided with radial gates of size 6.2 m (W)x 7.0 m (H) that separate the inlet portion and the downstream horse-shoe tunnels. The discharging capacity considered for the tunnel spillways are 3530 m^3/s and 3400 m^3/s at maximum water level (MWL) El. 1703 m and full reservoir level (FRL) El. 1700 m, respectively. Numerical model studies were conducted for the original design of the Tunnel Spillway and all three alternative designs with an aerators system. All the numerical simulations were conducted for the ungated operation of the Tunnel Spillway at full reservoir level (FRL) El. 1700 m. Based on numerical studies for the original and three alternative designs of tunnel spillway aerator system, it was suggested that the alternative – III design of the aerator system would be a better choice and the design would be finalized after validation with physical model studies on 1:25 scale single tunnel model.

Physical and Numerical studies were conducted for the modified design of alternative – III for the ungated operation of the tunnel spillway with the reservoir water level at MDDL El. 1620 m for the validation of the numerical model. The numerical model and the physical model show a good match in the pressures at different points. The trend and the magnitude of the pressures are similar in both models for most of the locations. This indicates that the CFD simulation can capture the hydrodynamic behavior of the flow accurately. The physical model showed significant variations in the pressure values in the cavity region only, where the backflow of the aerator jet partially filled the cavity beneath the jet. It was observed that the flow conditions in the physical model are violent in the transition downstream of the gate shaft and near the first aerator due to a short span of transition length and high-velocity flow of the order of 25 m/s. Also, the physical model showed a backflow in the cavity, which partially blocked the bottom openings of the aerator shafts with water for all four aerators. Based on the results of these validation studies and discussion with the NHPC officers during their visit to CWPRS, it was suggested that the transition zone after the gate shaft should be longer and the aerator design should be modified in terms of ramp height and step height to enhance the flow conditions, especially near the first aerator. It was also suggested to modify the position and size of the aerator shaft to enhance its performance and avoid the partial obstruction of the lower opening of the aerator shaft.

View of Physical Model



View of Numerical Model

Hydraulic Model Studies for an Extended Length of Syphon Structure on KopardeApproach Canal, Tarali Irrigation Project, Patan Taluka, Satara District, Maharashtra, 1:20 scale 3D Comprehensive Model

The Tarali irrigation project envisages the utilization of pondages created by a masonry dam constructed across the River Tarali which is a right bank tributary of the Krishna River. The masonry dam is located near Dangistewadi, Patan Taluka, Satara district, Maharashtra. The height of the masonry dam is about 75 m from the foundation and is provided with gated spillways. The Tarali irrigation project would provide irrigation benefits for 14726 hectares of land in Patan, Karad, Khatav and Man talukas of Satara district. Tarali Irrigation Project falls under the Accelerated Irrigation Benefit Programme (AIBP) funded by the Central Government. The Koparde approach canal is an important component of the Koparde Lift Irrigation Scheme (LIS) which is part of the Tarali Irrigation Project. The Koparde approach canal draws water from Tarali dam and supplies water to the existing Arphal canal.

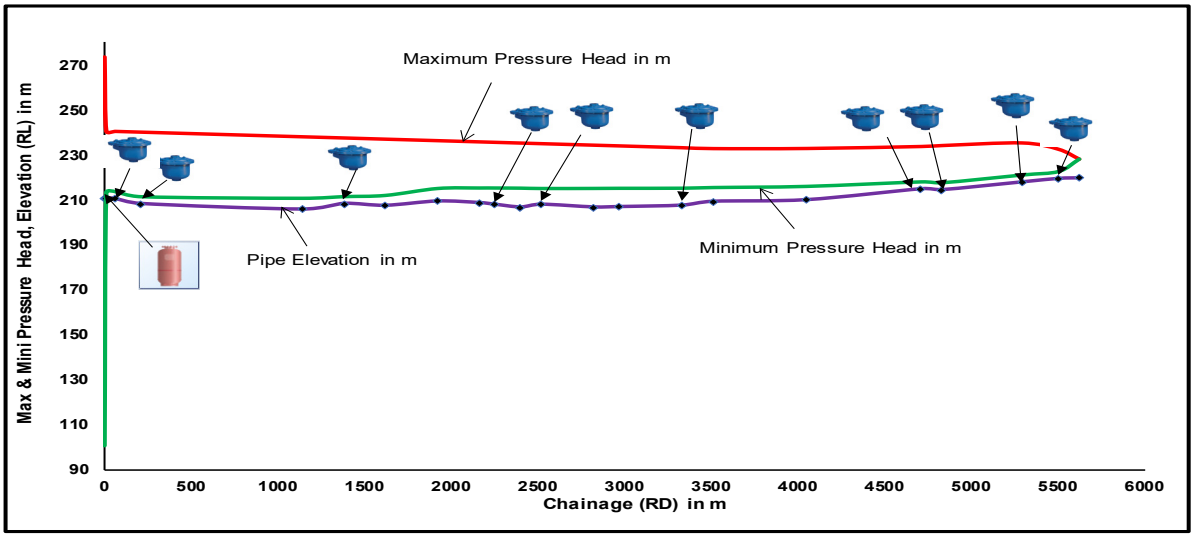
Hydraulic Model Studies were conducted in CWPRS on a geometrically similar physical model to a scale of 1:20 to study the hydraulic behaviour of the entire syphon pipeline provided between the Entry chamber (Ch. 18390 m) to the Arphal canal (Ch. 27365.65 m) for a design discharge of 6.44 m^3 /s. The entry, exit, and bend losses are like prototype losses, as the pipeline alignments vertically and horizontally are reproduced exactly similar to the prototype alignment. The model studies were conducted by slowly filling the system to understand the flow conditions in the pipelines, while maintaining the FSL level of Rl. 640.9 m at the entry chamber. It is observed that discharge flowing through the pipeline from the entry chamber to the Arphal canal varies from 4.734 m^3/s to 4.749 m^3/s (average 4.744 m^3/s). It is also found that the system experiences gross head loss of 16.36 m for a design discharge of 6.45 m^3/s. The gross head loss includes all the head losses in the system. It is also observed that the downstream part of the pipeline from the exit chamber to the Arphal canal exhibits open channel flow conditions when the water level in the entry chamber is maintained at FSL 640.869 m. It has been observed that the air bubbles or air pockets formed in the syphon pipeline are not able to vent out through the air-release/vent pipe specified by the proj
ect designer. To prevent this, additional number of air valves are suggested. It is also observed that sediment deposition is taking place in certain portions of the pipeline. To mitigate the effects of sediment collection, sediment traps with reduced velocity are recommended. The debris flowing along the flow may clog the syphon pipeline. To prevent this, it is recommended to provide trash rack.

Top view of the model

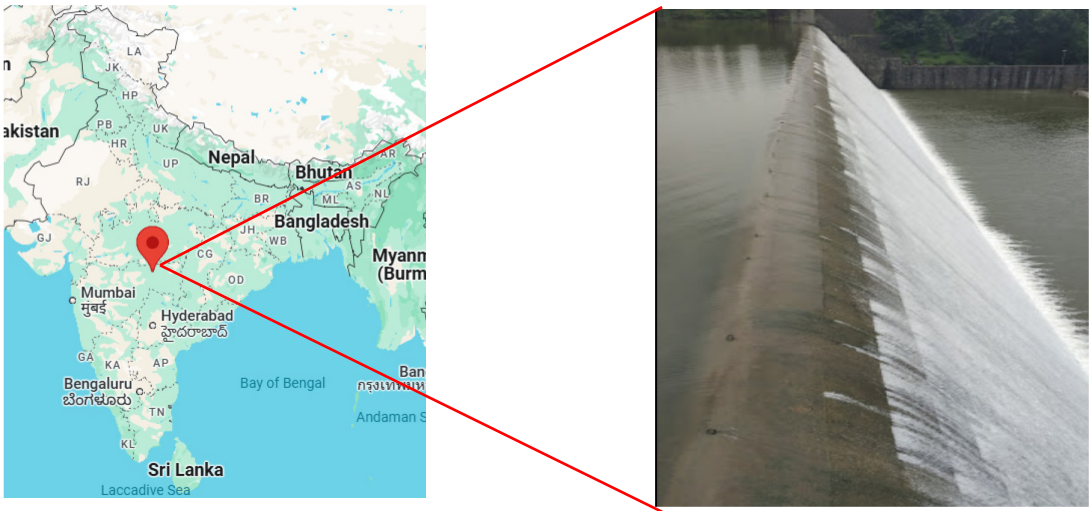
Mathematical Model Studies for Surge Analysis for Dongargaon –Thanegaon Lift Irrigation Scheme, Tah. Armori, Dist. Gadchiroli, Maharashtra

The Dongargaon –Thanegaon lift irrigation scheme is located on River Wainganga near village Dongargaon in taluka Armori of Gadchiroli district in Maharashtra State. This scheme envisages lifting water from River Wainganga using pumping for irrigation of 2093 hectares of land. The first distribution point is approximately 5620 m away from the lift point. An intake structure is in the river wherein three vertical pumps are installed to pump water through a system of manifolds and single rising main of 0.94 m diameter and 5620 m long. The total discharge of three pumps is 1.41 m^3/s and total static lift from the pump sump to the delivery chamber is 22.08 m whereas the total head of the pump is 40.54 m. At the other end, the pipe delivers water into a delivery chamber where the flow changes over from a closed conduit to open channel. Water, thereafter, flows by gravity through a network of pipes to the command area.

CWPRS conducted mathematical model studies for surge analysis of rising main. The large positive and negative pressures indicated need for providing anti-surge devices. Later, the studies were carried out with ten air valves in the rising main and it was found that the provision of an additional anti-surge device in the form of air vessel is necessary to avoid unacceptable pressure conditions in the rising main Finally, an air vessel of 75.0 m^3 capacity along with ten air valves was recommended for the rising main to bring acceptable pressure conditions in rising main.



Flow conditions downstream of spillway



Location Map of Dongergaon-Thanegaon Lift irrigation Scheme

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Hydraulic model studies for modified design of spillway with stilling basin as energy dissipater of Punatsangchhu-I H.E. project, Bhutan, 1:70, G.S. 3-D comprehensive model	SED	6129
2.	Field visit report for inspection and deciding the scope of studies for downstream bucket, extension of downstream apron and extension of downstream training wall regarding restriction of the further erosion of the rockmass of Jawahar Sagar Dam, Rawatbhata, Kota, Rajasthan	SED	6155
3.	Hydraulic model studies for scour downstream of Indira Sagar dam spillway, Madhya Pradesh, 1:130 scale, 3-D comprehensive model	SED	6174
4.	Physical and numerical model studies for single tunnel spillway of Pakal Dul H. E. project, J & K, 1:25 scale, 3-D comprehensive model	SED	6175
5.	Hydraulic model studies for extended length of syphon structure on Koparde approach canal, Tarali Irrigation Project, Patan Taluka, Satara District, Maharashtra, 1:20 scale 3D comprehensive model	SED	6221
6.	Hydraulic model studies for the additional spillway of Hirakud dam, Odisha; 1:100 scale 3D comprehensive model	SED	6228
7.	Hydraulic model studies for spillway of Ratle H.E. Project, 1:45 scale 2-D sectional model	SED	6258
8.	Mathematical model studies for surge analysis for Rising Main of Awarde Lift Irrigation Scheme Stage-II, Taluka. Patan Dist. Satara, Maharashtra	Pump House	6152
9.	Mathematical model studies for surge analysis for surge analysis for Rising Main of Dhumakwadi Lift Irrigation Scheme Stage-II, Taluka. Patan Dist. Satara, Maharashtra	Pump House	6153
10.	Mathematical model studies for surge analysis for surge analysis of Konjewade Lift Irrigation Scheme Stage-II, Taluka. Patan Dist. Satara, Maharashtra	Pump House	6154
11.	Mathematical model studies for surge analysis for modifiedAwarde Lift Irrigation Scheme Stage I, Tal. Patan, Dist. Satara, Maharashtra	Pump House	6168
12.	Mathematical model studies for surge analysis for modified Turali Lift Irrigation Scheme Stage II, Tal. Patan, Dist. Satara, Maharashtra	Pump House	6169
13.	Mathematical model studies for surge analysis for Donargaon- Thanegaon Lift Irrigation Scheme, Tah. Armori, Dist. Gadchiroli, Maharashtra	Pump House	6181

RIVER AND RESERVOIR SYSTEMS MODELLING

Divisions

- Hydrometeorology
- Surface Water Hydraulics / Disaster Management and Planning
- Water Quality Analysis and Modeling / River Rejuvenation

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

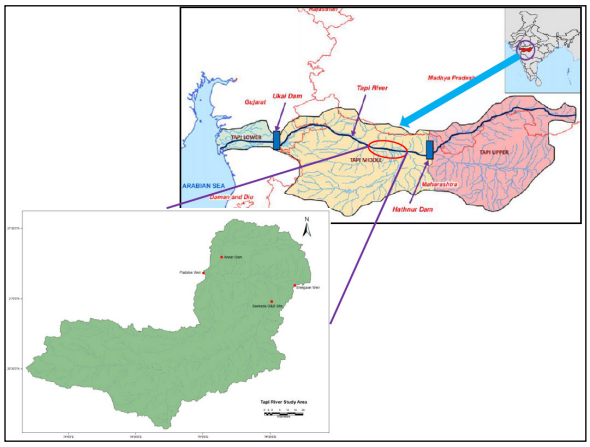
- CIDCO, Mumbai
- NPCIL
- WRD, Maharashtra
- Reliance Industries Limited
- Tarapur Atomic Power Station, Maharashtra
- NTPC
- State Irrigation Departments
- Satluj Jal Vidhyut Nigham Ltd. (SJVNL)

Backwater Studies and Preparation of Inundation Maps for Padalse Weir on River Tapi, Maharashtra

The Water Resources Department, Jalgaon Irrigation Circle, Government of Maharashtra approached Central Water and Power Research Station (CWPRS), Pune to study the effect of backwater of the Padalse weir at different ponding levels for assessing the flood inundation in fringe areas of River Tapi and its tributaries for ensuring the rehabilitation of the people and safety of their property. Accordingly, CWPRS carried out the backwater studies that included the preparation of inundation maps for 25-year (yr), 50-yr and 100-yr return periods at different water (i.e., pond) levels viz., HFL (RL +157.7 m), FRL (RL +156.0 m) and FRL at Stage-I (RL +152.38 m) of Padalse weir. Regarding this, the project authorities provided the surveyed cross-section data and digital Survey of India (SoI) toposheets of the study area of River Tapi and its tributaries. In addition, the salient features of Padalse and Shelgaon weirs, Aner and Gul dams, and stream flow (gauge-discharge) data of the Rivers Tapi at Bhusawal and Girna at Savkheda sites were collected from the project authorities and used. Apart from this, CWPRS procured the rainfall data of Amalner, Chalisgaon, Chopda, Dharamgaon, Dhule, Gidhade, Jalgaon and Jamner from IMD (India Meteorological Department), collected the toposheets of the influence catchments of the study area from SoI and downloaded the 30 m grid NRSC-CartoDEM data from Bhuvan Portal. By using rainfall data, the 1-day maximum rainfall for different return periods at eight IMD rain gauge stations were estimated by applying Extreme Value Type-I (EVI) distribution. Further, the weights of each rain-gauge station were derived by adopting the Theissen polygon method and used to estimate the weighted 1-day maximum rainfall for different return periods for River Tapi and its tributary catchments.

By using the weighted rainfall and physiographic characteristics of the delineated catchments derived from ArcGIS tool, the 25-yr, 50-yr and 100-yr return period Peak Flood Discharge (PFD) was computed by applying synthetic unit hydrograph approach as detailed in CWC (Central Water Commission) flood estimation report for subzone-3(b) and rational formula. Also, by using gauge-discharge data, the 25-yr, 50-yr and 100-yr return period PFDs for the Rivers Tapi at Bhusawal and Girna at Savkheda were estimated from EVI through flood frequency analysis. The 25-yr, 50-yr and 100-yr return period PFDs for River Tapi at Padalse weir were computed as 36490.5m^3/s, 41815.6 m^3/s and 47107.4 m^3/s respectively.

Based on the requirement of the project, a 1-D MIKE Hydro River model with steady-state conditions was adopted to study the backwater effect. The model simulations were carried out at pond levels viz., HFL (RL +157.7 m), FRL (RL +156.0 m) and FRL at Stage-I (RL +152.38 m) of Padalse weir by using the estimated PFD. The model simulation results were used for the preparation of flood inundation maps for each pond level comprising of 25-yr, 50-yr and 100-yr return period floods. The estimated PFD and flood inundation maps would help to carry out the rehabilitation work and safety of the property in fringe areas of River Tapi and its catchment tributaries.



Index map of the study area

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Backwater studies and preparation of inundation maps for padalse weir on River Tapi Maharashtra	HMET	6141
2.	Desk studies for hydrological re-assessment for new railway line section between Araria and Galgalia for NEFR, Bihar	HMET	6251
3.	Dam break studies and emergency action planning for Venkatadri reservoir, Telangana.	DMP	6213

COASTAL AND OFFSHORE ENGINEERING

Divisions

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

Areas of Specialization/ Expertise

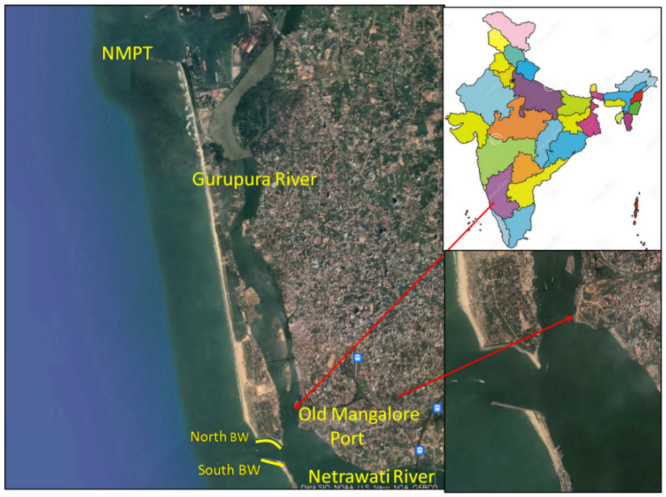
- **Physical and Mathematical Model Studies for**
  - Port layouts
  - Shoreline Changes
  - Dredging & Disposal
  - Coastal Protection
  - Breakwaters
  - Safe Grade Elevation
  - Ship Navigation
  - Cooling Water Intake & Outfall
  - Tidal Inlets
  - Coastal Ecology
- **Desk and wave flume studies for**
  - Design of coastal hydraulic structures
  - Design of Coastal Protection Measures
- **Field investigation for**
  - Coastal parameters for Hydraulic model studies

List of Clients

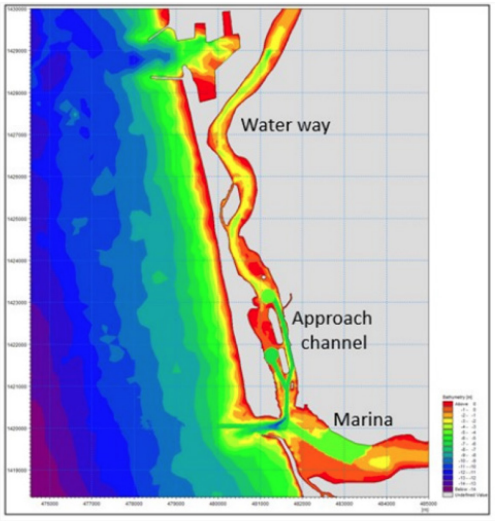
- Major Port Trusts
- WAPCOS
- Indian Navy
- Andaman and Lakshadweep Harbour Works (ALHW)
- ONGC
- State Maritime Boards
- State Fisheries Departments
- CIDCO
- Vizhinjam International Sea Port Limited
- NPCIL

Mathematical Model Studies for Hydrodynamics and Sedimentation for Development of Waterway in Gurupura and Netravati Rivers for Port & Inland Water Transport Department, Karwar, Karnataka

The Ports & Inland Water Transport Department, Karwar, Govt. of Karnataka has proposals for the development of a 10 km long waterway in the vicinity of Old Mangalore Port as a part of DPR -2, 3 and 4 under Sagarmala scheme. The 60 m wide and 6.5 km long proposed waterwayfrom the turning circle to Kuloor would be dredged to -3 m below CD and a Marina of 0.47 Haarea to -4.5 m below CD at the confluence of Gurupura and Netravati Rivers. In the part of the channel common to the waterway and dedicated jetty, the depths are already being maintained at -4.0 m. The old Mangalore port is located at the left bank of the Gurupura River which runs parallel to the coast and joins the River Netravati at the mouth of the Estuary. The mathematical model studies were conducted to assess the impact and feasibility of the proposed developments of the Marina facility and Waterway from a hydrodynamic andsedimentation point of view. From a hydrodynamic point of view, the site is mainly influenced by River discharges from two Rivers. The mouth of the river is exposed to waves which in turn cause wave-induced currents. In the Proposed Marina area, maximum currents during nonmonsoon period would be of the order of 0.2 m/s while during monsoon periods, these would be about 0.6 m/s. The capital dredging in this stretch (Waterway Kuloor Bridge to turningcircle) would be about 0.19 Mm^3 while the annual maintenance dredging in this area wouldbe about 35000 m^3. In the marina and its approach channel, the capital dredging would beabout 2.05 Mm^3 while the annual maintenance dredging would be about 41450 m^3.



Location map

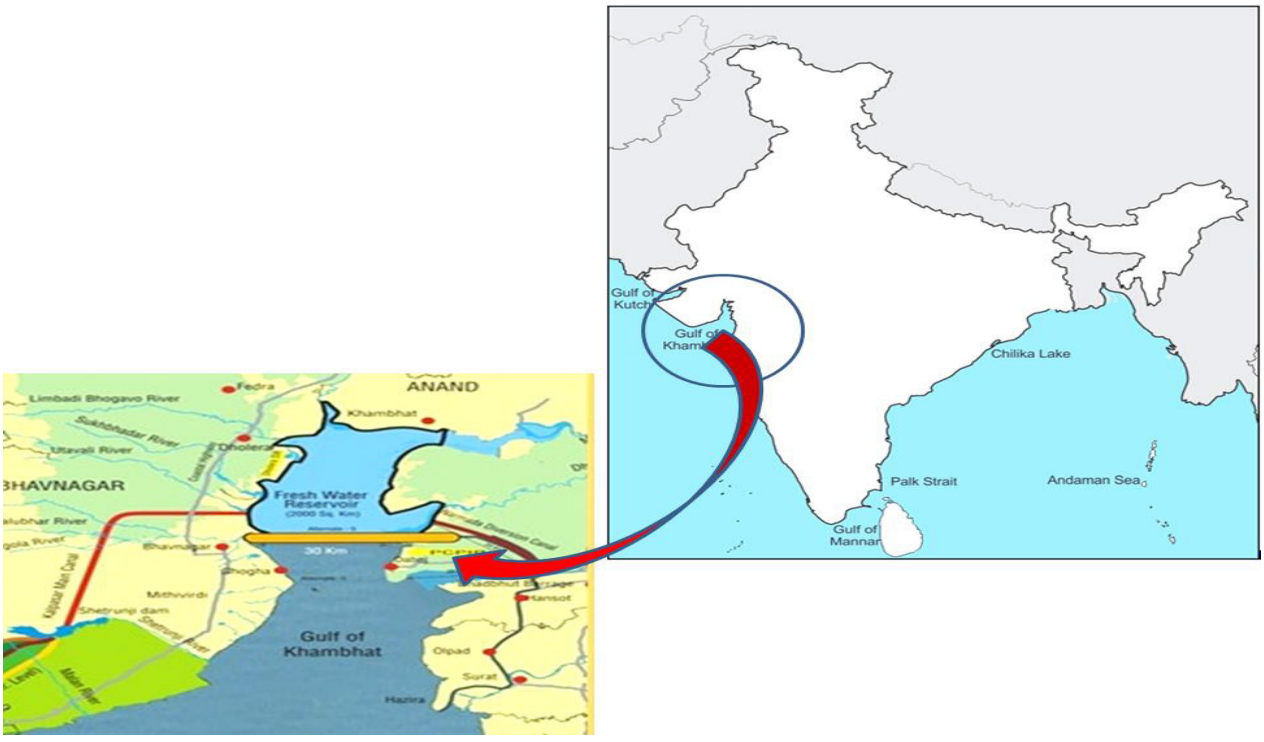


Bathymetry of Waterway under proposed condition

Aerial view of Old Mangalore Port in the vicinity of which waterway is proposed

Mathematical Model Studies for Assessment of Wave Climate near Spillway Area for Proposed Kalpasar Dyke in Gujarat

To full fill the requirement for water in Saurashtra region of Gujarat, a huge multipurpose freshwater reservoir project is proposed by Gujarat Government by building a 30 km long Dyke across the Gulf of Khambhat connecting Bhavnagar and Bharuch districts. A road link will also be set up over the Dyke, greatly reducing the distance between Saurashtra and South Gujarat. For the design of spillway gates and assessment of discharging capacity, the wave is a very important parameter to be assessed. Generally, the waves in the Gulf of Khambhat vary in the range of 1 to 3m throughout the year under normal conditions. The mathematical model studies were conducted at CWPRS, Pune to assess the wave conditions near the spillway of dyke under the extreme climate. The design significant wave height of 7.32 m as provided by the Project authorities, was adopted for the studies. Mathematical model studies for the transformation of wave height and wave direction from deep water (at the distance of about 8.0 km from the approach channel) to the mouth of the approach channel at a depth of (-)15m using spectral wave model MIKE 21-SW indicated that the predominant directions are from 218^0 N to 225^0 N. The significant wave height at the approach channel mouth located at about 4kmfrom Dyke axiswas estimated to be about 4.0m. Wave propagation studies carried out with MIKE21-BW model to assess the wave tranquility for the proposed approach channel dredged to (-)12m depth w.r.t MSL indicated that the significant wave heights near the spillway would be upto 0.70m. The incident wave heights are attenuated while reaching the spillway gates mainly due to dissipation along slopes of the dredged channel and around the turn provided in the approach channel. However, in the absence of the correct location of the generation of design significant wave height of 7.32m, the most critical incident wave direction from 270 degrees at the mouth of the channel with incident wave height of 4.0m at the channel mouthwas also considered and studied. The BW simulation results indicated that a significant wave height of 2.5m can reach upto the spillway under this condition. This may be considered as the Design wave height for the spillway gates and the assessment of discharging capacity.



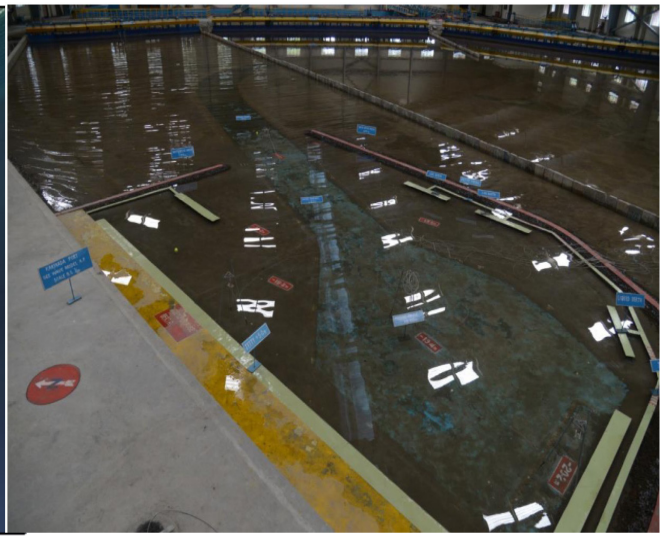
Location map of proposed Kalpsar Project, Gujarat

Physical Wave Model Studies for Development of Kakinada Gateway Port, East Godavari District, Andhra Pradesh

The Kakinada Gateway Port Ltd. is developing an all-weather deep water multi-purpose port facility under Special Economic Zone at KakinadainEast Godavari District, Andhra Pradesh. The location at Kakinada Port is fully exposed to incident waves from the Bay of Bengal with maximum significant waves of up to 3.5m Hs from the quadrant North-East to South-East. The proposed layout consists of a north breakwater (Leeward breakwater) of length 570m and a south or main breakwater (Seaward breakwater) of length 2670m. The studies using a geometric similar physical wave model with a rigid bed of scale G.S. 1:150 were conducted at CWPRS for assessment of wave conditions inside the proposed berths in the port area and at the port entrance to optimize or modification if any in the proposed breakwater/s layout. In this physical wave model, all features like South/main and North breakwaters, all berths/jetties along with the dredged basin, and 4 km long approach channel dredged to -20.2m (C.D.) were reproduced. The three most predominant incident wave directions viz., ENE (Hs 1.5 m), East (Hs 2.0 m), and SE (Hs 3.5 m) using random wave spectrum were also reproduced. The 3D physical wave model can simulate non-linear or complex wave phenomena such as refraction, shoaling, reflection, diffraction, etc.

The wave tranquillity studies indicated that no further extension/modification in the proposed breakwater/s layout is required since significant wave heights at all berths and inside the harbor basin would be within permissible wave tranquillity limits. The wave tranquillity studies envisaged that overall wave tranquillity would be achieved throughout the year at all berths/jetties for the suggested layout by project authorities. The diaphragm wall (vertical face) beneath the deck slab of the multipurpose berth (1.3 km long) would not contribute significantly in wave height increase and the overall wave tranquillity conditions would be maintained in the port area.

Location plan of proposed Kakinada Gateway Port



Wave Propagation for ENE direction as observed in the physical model of Kakinada port

Mathematical Model Studies for Hydrodynamics, Sedimentation and Identification of New Dumping Ground Location for Sogal Channel Dredged Material Disposal for Deendayal Port, Kandla, Gujarat

The Deendayal Port is one of the major ports on the west coast of India located in Kutch District of Gujarat state in the Gulf of Kutch. The length of Kandla creek is about 13.0 km from the outfall in Gulf of Kutch to the Phang and Sara Creek junction in the north and has an average width of about 1.0 km. Though regular navigation is taking place along the creek through the Sogal channel of length of about 10 km, continuous dredging is required in the curvature portion of Sogal channel of about 4.2 km of length.

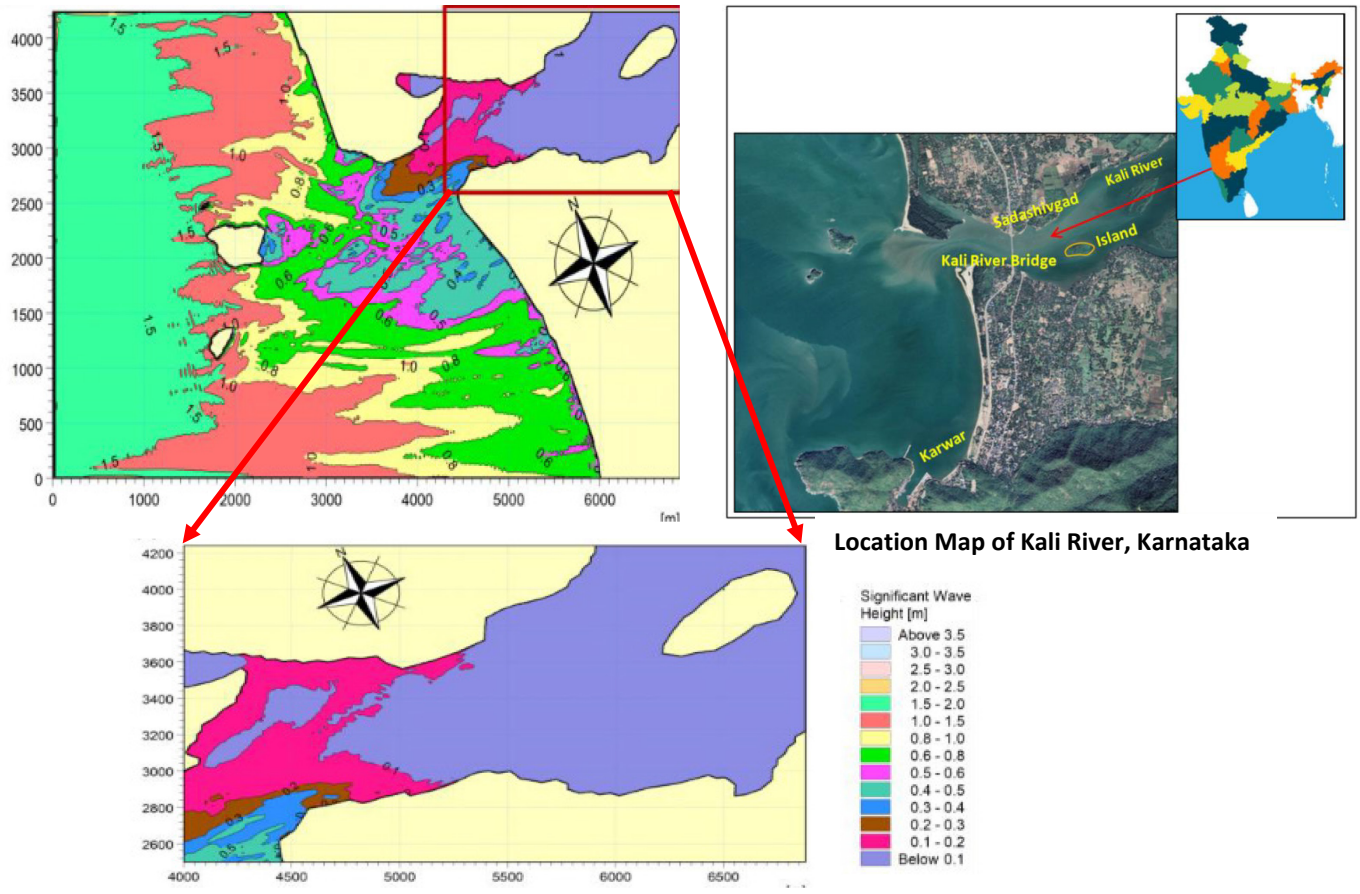
The annual sedimentation in the Sogal channel and inside the creek as on date is about 9.0 Mm^3 as per the estimate provided by DPA (As per IITM report). The dredged material has been dumped for about more than 10 years in a periphery of 2 km around the location 619523.448 E and 2527469.583 N. The depths in this dumping region have reduced from -10 m to about -7.0 m during this period. Major changes in morphology were observed during the years 2022 to 2023 where depth of deposition was about 2.5 m. It was proposed to identify new disposal ground for dumping of estimated annual quantity of 9.0 Mm^3. The mathematical model studies were carried out at CWPRS by using MIKE-21 HD/MT for the identification of a new disposal ground for dumping of estimated annual quantity. Optimized new disposal ground was identified at location D1 (70.187E, 22.8376N) which is about 2.5 km from the existing dumping ground and prevailing depths are of the order of -11 m. The haulage distance of the existing and proposed dumping ground is almost same. The studies indicate that the sediment plume attains ambient conditions within the port limit, and it does not intercept existing channel or port area. Hence, dredged disposal ground location D1 (70.187E, 22.8376N) is optimum site for disposal of dredged material (annually about 9.0 million cum) and the same is recommended.

Location map of Existing Damping Location for Sogal Channel Dredged Material Disposal for Deendayal Port

Mathematical Model Studies for Wave Tranquility, Hydrodynamics and Sedimentation for Development of Waterway from Sadashivgad to Kalika Mata Island in Kali River for Karnataka Maritime Board, Karwar, Karnataka

The Kali River originates in the dense Western Ghats near Diggi village in the Uttara Kannada district and takes a westward course, traversing the heart of the Karnataka State. An island that houses of the ancient Kalika Mata temple is situated 2 km upstream of Kali River. Many devotees across the state visit this Holy place. Presently, in view of the shallow depths there are problems for navigating the passenger ferries to the temple and as such there is no demarcated channel and jetty facility near the temple. The Karnataka Maritime Board (KMB) plans to develop ferry services from Sadashivgad pontoon to Kalika Mata Island as part of the Sagarmala scheme. The existing Sadashivgad Pontoon is located near Kali River Bridge. In this respect, KMB requested CWPRS to carry out necessary hydraulic model studies for the development of a ferry approach channel from Sadashivgad to Kalika Mata Temple Island and to develop a pontoon for embarkment and disembarkment of passengers for operation during the non-monsoon season only under Sagarmala scheme (DPR-8). The proposed approach channel would be 40 meters wide to be dredged to a depth of -2.0 meters with a side slope of 1:4, covering a total distance of approximately 1.2 kilometers.

The significant waves would be less than 0.30 m along the channel and near the jetties at Sadashivgad and at Kalika Mata temple during operational non-monsoon season. The maximum current in the proposed condition in a waterway stretch of 1.2 km varies from 0.3 m/s to 0.75 m/s during the non-monsoon period. During the monsoon period, the maximum current varies from 0.9 to 2.1 m/s which may pose problems for the navigation of ferry boats during this period. The capital dredging in the approach channel (Sadashivgad to Kali Mata Temple Island) would be about 38000 m3 while the annual maintenance dredging in this area would be about 9300 m^3.



Location Map of Kali River, Karnataka

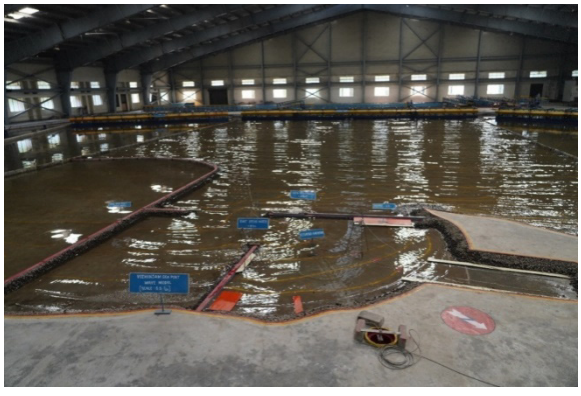
Wave Height Distribution Plot for Waves Incident from WNW (292.50 N) Direction (Incident Wave Height: 2.0 m)

Physical Model Studies for Wave Tranquility to Assess the Effect of Vizhinjam International Seaport Breakwater, Kerala on the Existing Fishing Harbour (Phase-II)

The Vizhinjam international deep-water seaport (VISL) is proposed in the Thiruvananthapuram district of Kerala state. The length of the proposed VISL breakwater is 3.1 km, extending into the sea, of which 2.4 km have already been constructed. On the west side of the proposed port, there already exists a fishing harbour with about 300m long southern breakwater and 520m long northern breakwater. The VISL has proposed the construction of a 140 m-long mole alongside the port breakwater. The VISL approached CWPRS to study the effects of the construction of a seaport breakwater and mole on the aspects of wave hydrodynamics of the existing fishing harbour and to assess the suitability of the new fishing harbor and 140m long mole considering the wave aspects. The physical wave model studies (Phase-I studies) were conducted for three predominant incident wave directions: South (Hs 1.5m), SSW (Hs 2.5m), and WSW (Hs 3.0 m). Six different scenarios, including two remedial measures, were analyzed in Phase-I studies. To increase the width at the entrance and to provide a more comfortable stopping distance remedial measure -2 evolved. An extension of the existing main breakwater of the fishing harbour by 270m at 45 degrees was suggested vide Phase-I studies to achieve suitable wave tranquility conditions at the modified entrance and inside the basin of the fishing harbour. The 140m mole as suggested by VISL was not found to be suitable from wave tranquility considerations. Subsequently, as per the demand of stakeholders, it was decided to conduct physical wave model studies for the other two predominant SW and West directions too, and the same was carried out at CWPRS under the second phase of studies.

The remedial measure with a full seaport breakwater and a 270-meter extension at 45 degrees of the main seaward breakwater of the fishing harbor would provide better wave protection at the fishing harbor entrance with more main entrance width and a shelter area. The model studies (Phase II) indicated that with this remedial measure, the wave heights at the entrance of the fishing harbor and inside would remain within permissible limits. Maximum wave heights of 0.50m were observed for both the SW and West directions and 0.30m near the fishing jetty. More width of about 180m would be available at the main entrance, and an additional shelter area for the maneuvering of fishing boats to get into the fishing harbor safely. Also, much better head-on wave conditions would be available in the approaches. The present studies (Phase-II) confirm the suitability of a 270m extension of the seaward breakwater of the fishing harbour at 45 degrees to improve wave tranquility conditions at the entrance as well as inside the existing fishing harbour for the other two predominant incident directions (SW and West) also. The phase-II studies also confirm the deletion of the proposed 140m mole, which is not contributing to improve wave conditions at the existing fishing harbour entrance; on the contrary, it is causing more wave reflections.

Vizhinjam international multipurpose deepwater seaport

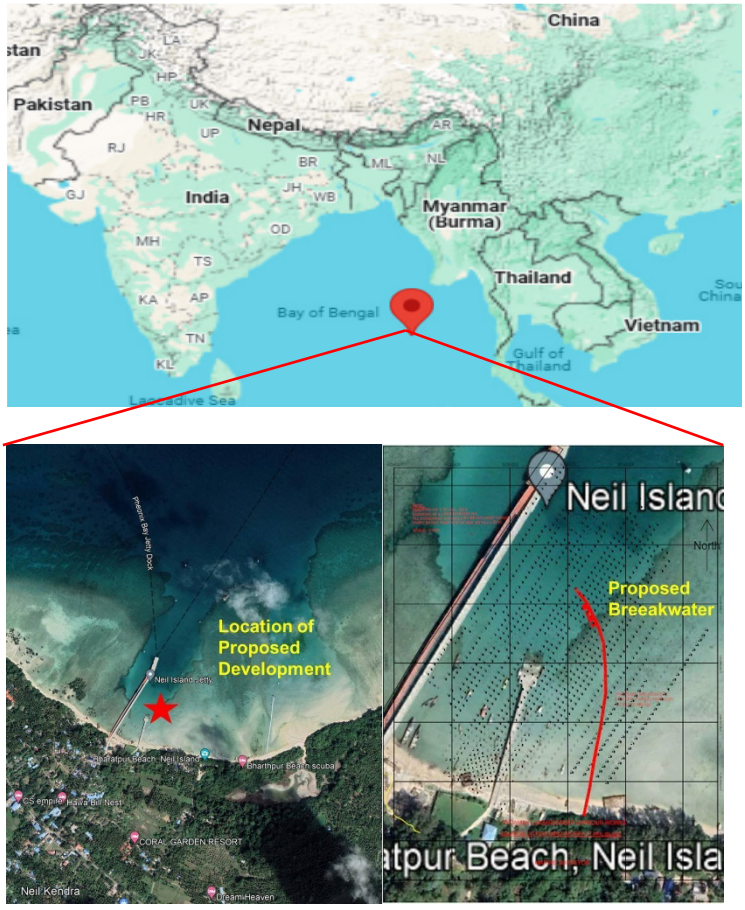


Wave tranquility studies for VISL (Phase-II) at MPWB Hangar

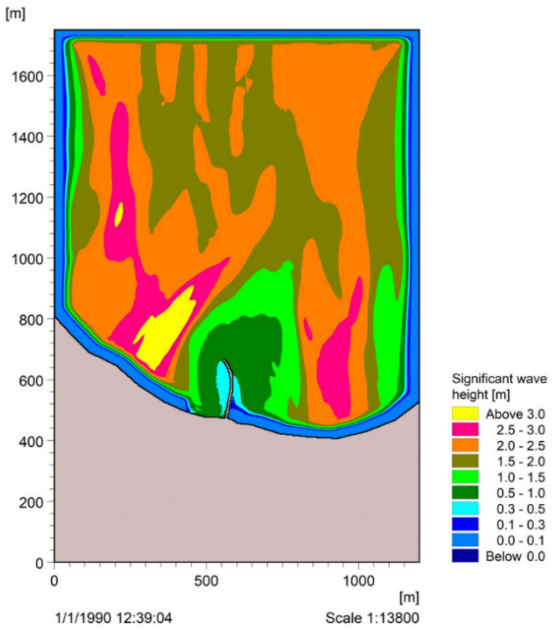
Mathematical Model Studies for Wave Tranquillity for the Proposed Development at Shaheed Dweep (Neil Island), A&N Islands

Andaman Lakshadweep Harbour Works, Port Blair has a proposal to develop landing center at ShaheedDweep (Neil Island), A&N Islands, Situated at Latitude 11°50'11.29" N and Longitude 93° 1' 57.79" E. At present, the fishermen are operating their fishing boats in open sea, and they are facing difficulty in navigating the vessels due to shallow depths and direct wave action. To facilitate the fishing activity, Chief engineer and Administrator, Andaman Lakshadweep Harbour Works requested CWPRS to conduct hydraulic model studies for the proposed fish landing center at ShaheedDweep (Neil Island), A&N Islands. Accordingly, mathematical model studies for the wave tranquility studies have been taken up at CWPRS. The proposed layout of the fish landing center is provided by the project authority. The layout consists of a 200-meter-long shore attached to breakwater.

The above study has been carried out in two stages. Initially, the wave transformation studies were carried out using MIKE 21 SW model. This wave transformation study has resulted in predominant wave directions and heights at the near-shore locations (10 m depth) i.e. NE (3.0 m), NNE (2.0 m), North (2.0 m), NNW (1.5 m) & NW (3.0 m). These wave heights and directions are used in MIKE 21 BW model to study wave tranquility. From these studies, it is observed that wave heights exceed the permissible limit of 0.3 m for Incident waves from North, NNW& NW with the percentage occurrence of 4.50%, 0.75% & 25.33% respectively. Further wave tranquility studies indicated that wave heights near the berthing face of the fish landing center exceed the permissible limit of 0.3 m for about 20 days in a year, enabling the fisherman to operate their boats safely for about 345 days in a year with the proposed layout. The proposed layout is safe and recommended from a wave tranquility point of view.



Location Map & Layout of the proposed development at Shaheed Dweep (Neil



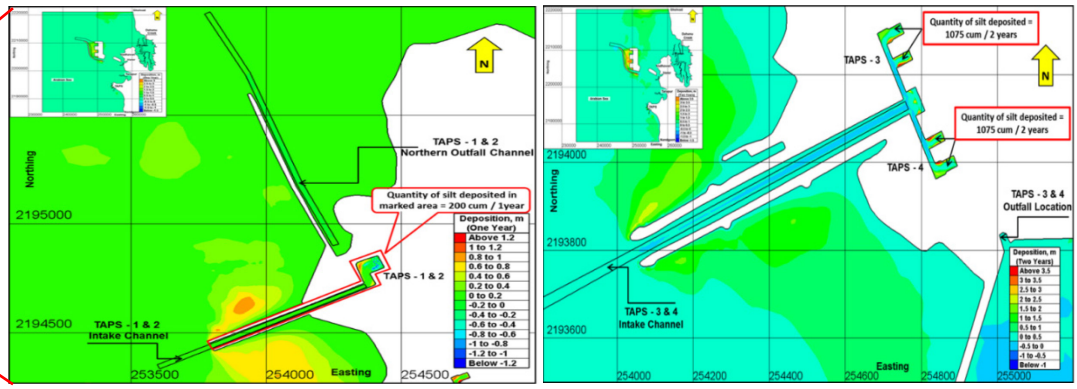
Significant Wave Height Distribution Plot for Wave Direction/Height-North/2.0 m

Mathematical Model Studies to Assess the Impact of Finalised Layout of Proposed Port at Vadhavan on Tarapur Atomic Power Station For JNPA

The Government of India (GOI) has a proposal to develop a major Greenfield, all-weather port at Vadhavan through a joint venture between Jawaharlal Nehru Port (JNP) working under the Ministry of Surface Transport, GOI and Maharashtra Maritime Board (MMB) of the Government of Maharashtra (GoM). The location of the proposed port is at Lat. 19° 55.8′ N, Long. 72° 39.6′ E in Dahanu Taluka, Palghar district of Maharashtra state and is about 110 km north of Mumbai. The Phase-I development of the port is the part portion of the master plan layout with offshore reclamation of 970 Ha. keeping other structures, the same as the master plan layout. The development of the proposed Phase-I & Master plan layouts requires depths in the approach channel and dredged area/berth pockets need to be dredged and maintained by carrying out capital and maintenance dredging. The material generated during dredging needs to be disposed off at a suitable location in the deeper part of the sea.

The mathematical model studies were carried out using a well-calibrated& validated model for existing and proposed Phase-I & Master plan layouts of the port to assess its impact on siltation at intake/outfall structures of TAPS 1&2 and 3& 4 as well as to assess the impact on siltation due to disposal of dumped material. The tidal hydrodynamic studies reveal that due to the development of a proposed port at Vadhavan, there will be a reduction in the current strength by about 9% and 10% in relatively deeper depths near TAPS and on the north side of the northern outfall channel of TAPS 1&2 respectively, while about 6% reduction is on the southern side of the outfall of TAPS 3&4. On the other hand, in the guided portion of intake channels, forebays as well as outfalls of TAPS 1&2 and 3&4 there will be insignificant impact on current strength (<2%), as well as on water depths (<1%). Thus, based on hydrodynamic consideration, it is revealed that the proposed port development will not hamper the daily operation of pumps at TAPS to supply an adequate quantity of water as being supplied presently for condenser cooling as a service water requirement. The estimation of siltation in intake channel/pump bays carried out by model (355 cum/yr for TAPS-1&2; 1106 cum/2yrs for TAPS-3&4) is in good agreement with the silt deposition rates reported by TAPS (362 cum/yr for TAPS-1&2; 1100 cum/2yrs for TAPS-3&4) at these locations. The siltation studies carried out with and without proposed port layouts reveal that there will not be an increase in the quantum of siltation due to Phase-I and Master plan development of the port at intake/outfall channels, forebays &pumpbays of TAPS-1&2 and TAPS-3&4.The model studies carried out to assess the impact on siltation at TAPS-1&2 and 3&4 due to dispersion of dredged material resulted by capital as well as maintenance dredging for Master plan & Phase-I layouts dumped at proposed dumping siteslocated inside (VDS-1) as well as outside (VDS-2) port limitreveal that, there will not be any adverse impact due to proposed port development at Vadhavan as well as dumping of dredged material (less than 5 cum) on siltation at intake/outfall channels, forebays as well as pump bays of TAPS-1&2 and TAPS-3&4.

Location Map of Tarapore Atomic Power Station

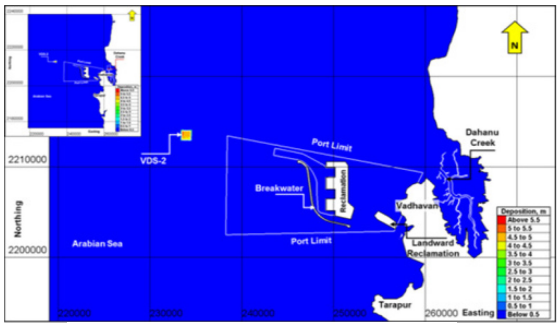


Siltationat TAPS-1&2 and TAPS-3&4 due to Master Plan layout development of port

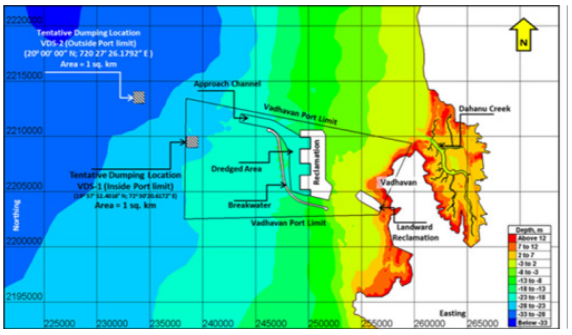
Mathematical Model Studies for Identification of Location of Dumping Site for the Disposal of the Dredged Material Resulted from Capital & Maintenance Dredging at Vadhavan Port

The Government of India (GOI) has a proposal to develop a major Greenfield, all-weather port at Vadhavan through a joint venture between Jawaharlal Nehru Port (JNP) working under the Ministry of Surface Transport, GOI and Maharashtra Maritime Board (MMB) of the Government of Maharashtra (GoM). The location of the proposed port is at Lat. 19° 55.8′ N, Long. 72° 39.6′ E in Dahanu Taluka, Palghar district of Maharashtra state and is at about 110 km north of Mumbai. The area of proposed port is about 175 Sq. km. JN Port has a proposal to develop this port on the seaward side of the headland at Vadhavanin in two phases viz. Phase-I & Master plan in the intertidal zone. The finalized master plan layout of the port includes 10.3 km long breakwater, offshore reclamation of about 1262 Ha. at about 6.5 km from headland at Vadhavan, and shore connected reclamation of about 222 Ha. on tidal flats near Vadhavanheadland. The Phase-I development of the port is the part portion of the master plan layout with offshore reclamation of 970 Ha. keeping other structures same as master plan layout. The depths in the approach channel and dredged area are proposed to be maintained to -22 m & -19.5 m CD of Dahanu respectively for Master Plan layout while those for Phase-I to be maintained to -20 m & -17.5 m CD respectively and those in berth pocket will be -19.5 m CD.The required depths in the approach channel and dredged area need to be achieved & maintained by carrying out dredging and the dredged material needs to be disposed-off at a suitable offshore location.The 3-D mathematical model studies are carried out by selecting the two dumping sites viz. 1) Inside Port Limit (VDS-1) having coordinates of 19° 57’ 52.4016” N; 72° 30’ 20.6172” E and 2) Outside Port Limit (VDS-2) having coordinates of 20° 00’ 00” N; 72° 27’ 26.1792” E with dumping over an area of 1 sq. km.The information on quantum of capital (about 7.0 M cum & 21.5 Mcum) & maintenance dredging (about 6.45 Mcum& 8.45 Mcum) for Phase-I & Master Plan layouts, capacity of dredgers (Two dredgers each of 11,000 cum) and schedule (10 trips/ day) of dredgers provided by JN port was utilised for the studies.

The studies reveal that both dumping sites viz. VDS-1 & VDS-2 are suitable for the dumping of dredged material resulted from capital & maintenance dredging for Phase-I and Master plan layouts. However, the quantum of siltation in the dredged area of port due to dispersion of dumped material is higher due to dumping at VDS-1 than that observed due to dumping at VDS-2.



Location of dumping sites



Deposition at the end of dumping cycle

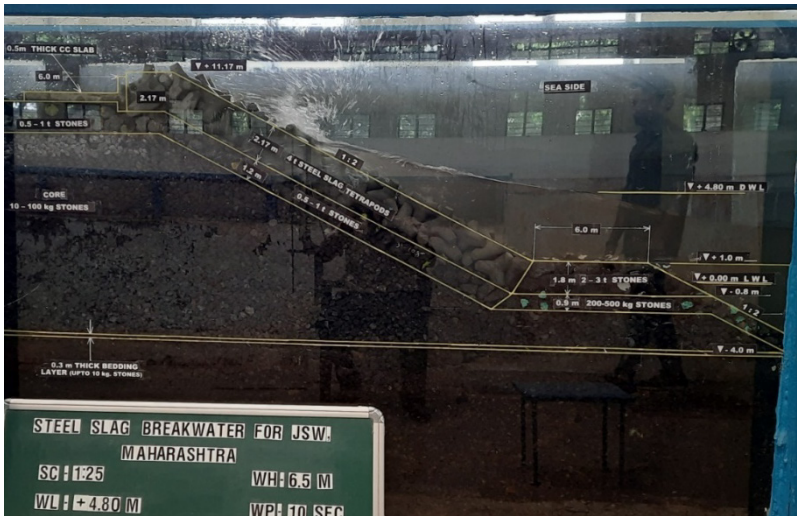
Location Map of Vadhavan Port, Odisha

Desk and Wave Flume Studies for the Design of Coastal Hydraulic Structures with Utilization of Steel Slag for M/S JSW Steel Limited, Dolvi Maharashtra

The 'Electric Arc Furnace' (EAF) steel slag produced as residue material during steel making process has superior properties after necessary processing compared to the naturally available stone aggregates. In this connection, M/s JSW Steel Limited, Dolvi, Maharashtra sought technical advice of Central Water and Power Research Station (CWPRS), Pune on the innovative product of steel slag material for using in coastal hydraulic structures for confirmation of its hydraulic stability through wave flume studies.

Accordingly, the conceptual design cross-sections of different coastal hydraulic structures (i.e. Seawall, Groyne, Offshore reef and breakwater) with the utilization of EAF steel slag for the coastal environment have been evolved. The hydraulic stability of the breakwater section with steel slag stone &tetrapods and the Offshore reef section with steel slag stone have been confirmed through wave flume studies. The density of steel slag is about 3.50 t/cum compared 2.60 t /cum for stones and 2.40 t/cum for concrete materials. As such, the unit weight of EAF steel slag stone/tetrapods required is less compared to the unit weight of rubble stone/ concrete tetrapods for the same wave height.

Index and location map of M/s JSW steel limited, Dolvi, District Raigad, Maharashtra



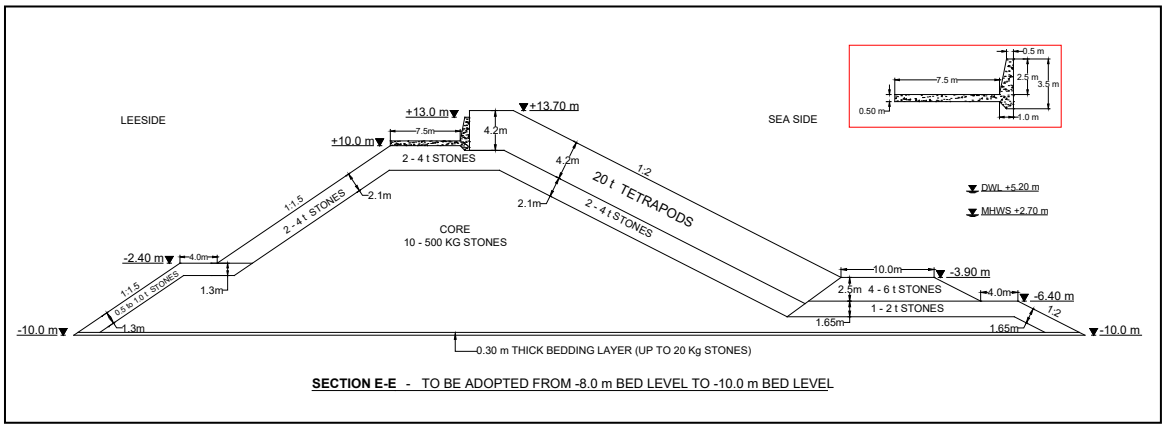
Wave Flume Studies for the Confirmation of Hydraulic Stability of the Structures by using Steel Slag

Desk and Wave Flume Studies for the Design of Breakwater for Development of Port Facilities at Porbandar, Gujarat

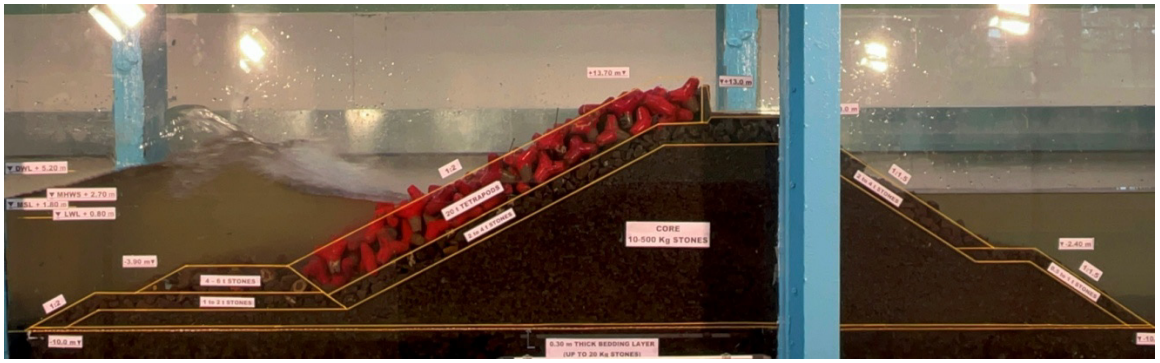
Porbandar Port is situated on the West coast of India in the state of Gujarat. The Porbandar Port was developed as an All-Weather Port by the Government of Gujarat in late 1970 under the advice of a Technical Advisory Committee. A 2650 m long western breakwater has been constructed in 1978. In order to enhance the capacity of the existing berthing facility at the Port, the Gujarat Maritime Board (GMB) has a proposal to construct a breakwater on the Eastern side of the existing breakwater. In view of this, Executive Engineer (C), Gujarat Maritime Board, Government of Gujarat has referred hydraulic model studies to CWPRS for the proposed development at Porbandar Port.

Based on the Mathematical Model Studies carried out at CWPRS for hydrodynamics & siltation (TR No. 5827 June 2020) and wave tranquility (TR No. 5896 February 2021), it was suggested to construct a 2040 m long breakwater on the Eastern side of the existing breakwater for the proposed development. Accordingly, desk & wave flume studies are conducted to evolve the cross-section of the breakwater based on the actual site survey data and other hydraulic parameters.

The trunk portion of the breakwater cross-section consists of 2 t, 4 t, 12 t & 20 t and a roundhead portion of the breakwater section consists of 25 t tetrapods units in the armor. The top level of the parapet varies from +8.50 m to + 13.0 m for +1.0 m to -11.0 m bed level. The hydraulic stability tests were conducted in the wave flume by reproducing the section to a Geometrically Similar (GS) model scale of 1:43. The section was found hydraulically stable by conducting experiments with random waves of different wave heights at various water levels. The maximum significant wave height of 6.60 m(HS) at Design Water Level of 5.20 m is considered for the design of breakwater sections.



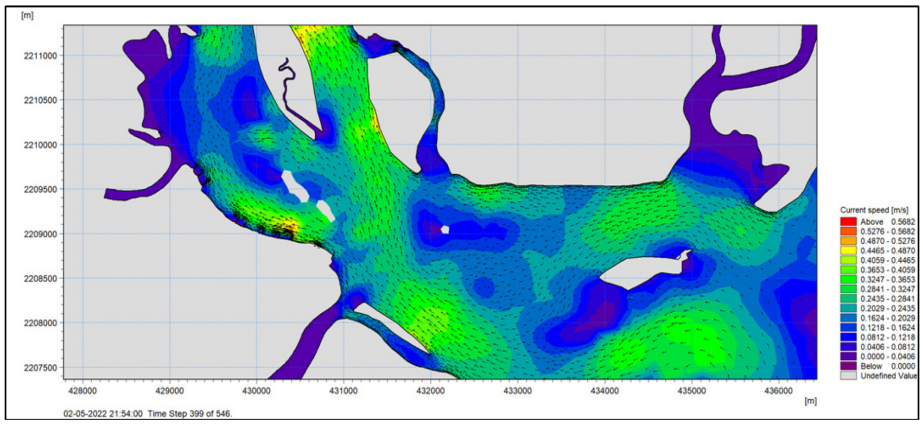
Recommended cross-section of breakwater



Wave flume test for breakwater

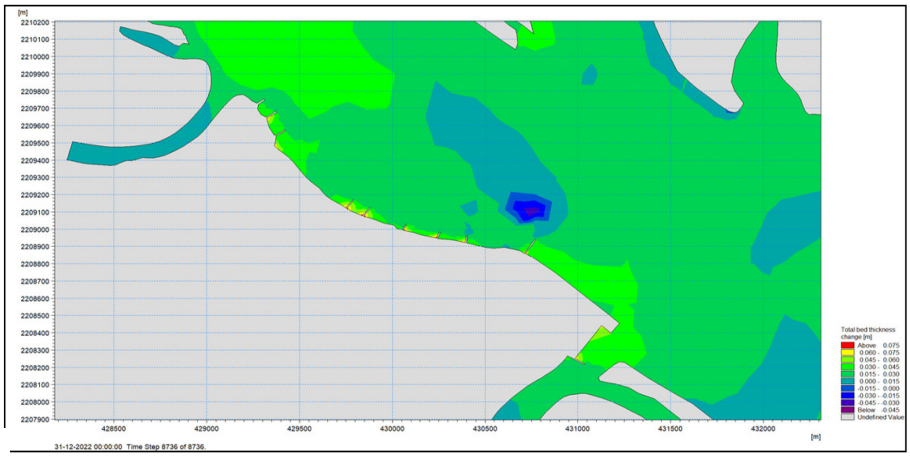
Field Data Collection and Mathematical Model Studies for Tidal Hydrodynamics and Sedimentation for Proposed Fishing Harbor at Astaranga, Odisha

Fishery Engineering Division, Bhubaneswar, Odisha (Project Authority) has proposed to develop a fishing harbour under Stage-II at Astaranga (Nuagarh)situated at about 4 km upstream of the river inlet mouth on the right bank of the River Devi. The construction of 200m long fishery jetty was completed during the year 1993-94 under Stage-I development. It is reported that fishermen used to face difficulty in berthing their fishing vehicles in the existing jetty region during high River discharge (about 7000 cumec) in the River Devi resulting into high current speed (about 1.2 m/s) during monsoon months particularly. Hence, mathematical model studies for hydrodynamics ((MIKE21 HD) and sediment transport (MIKE21 MT) were conducted to suggest a suitable training work in the form of a spur to achieve the desired calmness in the berthing area at the existing jetty along with the proposal of a fishing harbour (452 m long and 325 m wide) as an extension adjoining the existing jetty under Stage II development. Based on the simulation results it is concluded that the maximum current speed of the order of 1.2 m/s prevailing in the berthing area near the jetty under the existing condition during monsoon period gets reduced to about 0.2-0.5 m/s after implementation of the 100m long spur (Lat 19.97513^0 and Long 86.33746^0) and the proposed fishing harbour. Further, the water level was found to be rising up to 3.3m near the existing jetty during monsoon period with the high River discharge of about 7000 cumec. Siltation model studies indicated an accretion of the order of 0.03-0.08m in the jetty region and in the side creek region of the proposed harbour which may get stable with time. Based on the model studies for hydrodynamics and siltation, the layout of the proposal fishuing harbor for Astaranga site is found to be suitable.



Instataneous flow field in flooding & ebbing during non monsoon in existing condition

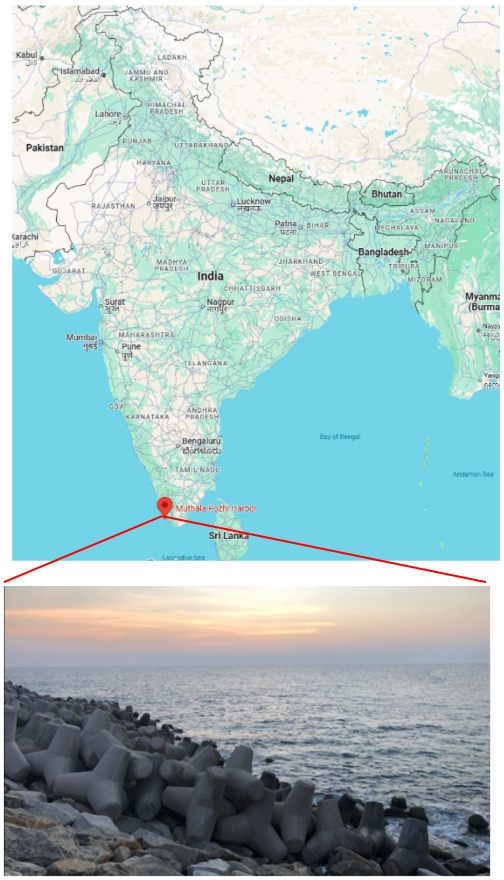
Location Map of Astaranga Port, Odisha



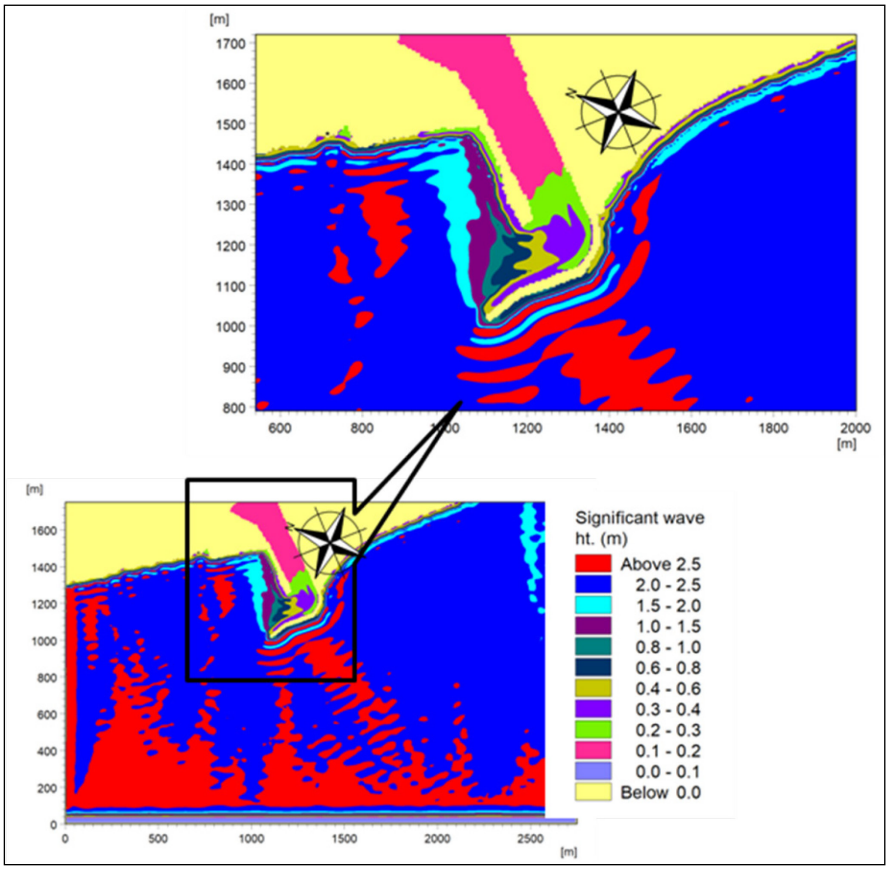
Total bed thickness change in a year with proposed condition

Mathematical Model Studies for Hydrodynamics, Siltation, Wave Propagation and Shoreline Changes for the Proposed Development of Muthalapozhy Fisheries Harbour, Kerala

Muthalapozhy fishing harbor is located inside a coastal inlet on the West Coast of India between Vizhinjam and Thangassery in Kerala. The Vamanpuram River falls into Arabian Sea through this inlet. The entrance of the inlet is silted up mainly due to net littoral drift being transported from south to north causing the operation of fishing vessels extremely difficult through the inlet during rough weather season. Considering the difficulties being faced by the fishermen, Harbour Engineering Department (HED), Kerala, the Project Authority, prepared a proposal for rectifying the problem at Muthalapozhy inlet. To address the siltation issue at the entrance of the inlet, it was proposed to train the inlet by providing an extension to the existing breakwaters. The existing northern breakwater and southern breakwater lengths are 410m and 430m respectively. Recently several accidents of fishing boats are reported. To have a safe entrance at the inlet, it is proposed to train the inlet by providing an extension to the existing breakwaters. Different layouts were simulated and an optimized breakwater extension of southern breakwater of length 420m was found suitable. With optimized layout littoral drift studies indicate that there is no need of sand bypassing for the next 25 years. Wave tranquility studies reveal that significant wave heights will be of order 0.6m at the entrance. From hydrodynamics study it was observed that currents in existing conditions near the bridge will be of the order of 0.3m/s which reduced to 0.2m/s with the proposed development. Sedimentation studies reveal that there is negligible siltation in existing conditions whereas 10cm siltation was observed in the dredged approach channel (-6m below C.D) annually. With the optimized layout there is no adverse impact from wave tranquility as well as hydrodynamics point of view, hence the layout is recommended.



Location Map of Muthalapozhy Fishing Harbor, Kerala



Wave height distribution plot for waves incident from WSW (247.5^0) direction (Incident wave height: 2.5m)

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Desk Studies for navigation and ship maneuvering for the proposed dedicated Lakshadweep jetty at old Mangalore Port, Karnataka	PH-I	6131
2.	Mathematical model studies for hydrodynamics and sedimentation for development of dedicated Lakshdweep jetty, Old Manglore Port, Manglore, Karnataka	PH-I	6137
3.	Mathematical model studies for hydrodynamics and sedimentation for development of waterway in Gurupura and Netravati River for ports & inland water Transport Department Karwar, Karnataka	PH-I	6138
4.	Mathematical modelling studies hydrodynamics and sedimentation due to proposed construction Anit-Erosion bund for development of fishing harbour at Mulgaon, Taluka Srivardhan, Dist. Raigad, Maharashtra	PH-I	6139
5.	Mathematical model studies for assessment of wave, Climate near spillway area for proposed Kalpsar Dyke in Gujarat	PH-I	6142
6.	Physical wave model studies for development do Kakinada gateway Port East Godavari district, Andhra Pradesh	PH-I	6147
7.	Mathematical model studies for hydrodynamics and sedimentation for development of waterway in Suvarna River at Hangarakatta for Port & Inland Water Transport Department, Karwar, Karnataka	PH-I	6151
8.	Mathematical model studies for hydrodynamics and sedimentation to assess the feasibility of resumption of lighterage at existing Tuna barge jetty at Nakti creak, Kandla, Gujarat	PH-I	6160
9.	Desk studies for ship maneuvering for common approach channel for both container berth and multipurpose cargo terminal near Tuna Tekra, Deendayal port, Gujarat	PH-I	6176
10.	Mathematical model studies for hydrodynamics and siltation for proposed MTC pump house in Naval channel, Visakhapatnam	PH-I Confidential	6178
11.	Physical model studies for contemplated development of MTC pump house in Naval basin of Visakhapatnam	PH-I Confidential	6179
12.	Mathematical model studies for hydrodynamics and sedimentation in common approach channel for container berth and multipurpose cargo terminal near Tuna Terka, Deendayal port, Gujarat	PH-I	6196

13.	Mathematical model studies for hydrodynamics, sedimentation and identification of new dumping ground location for Sogal channel dredged material at Deendayal port, Kandla, Gujarat	PH-I	6197
14.	Mathematical model studies for the shoreline changes to evolve the suitable coastal protection for vulnerable coastal site in Puducherry region, Puducherry	PH-I	6208
15.	Mathematical model studies for wave tranquility, hydrodynamics and sedimentation for development of waterway from Sadashivgad to Kalika Mata Island in Kali River for Karnataka Maritime Board, Karwar, Karnataka	PH-I	6224
16.	Field data collection for proposed development at Deendayal Port, Gujarat	PH-I	6225
17.	Physical model studies for wave tranquility to assess the effect of Vizhinjam international seaport breakwater, Kerala on the existing fishing harbour (Phase-II)	PH-I	6261
18.	Analysis of beach profiles north of Vishakhapatnam Port to assess the effect of long-term nourishment (for twenty years period from 2003 to 2022)	PH-I	6262
19.	Mathematical model studies for wave tranquillity for the proposed development at Saheed Dweep (Neil Island), Andaman and Nicobar	PH-II	6132
20.	Feasibility study through physical model experiments at KoPT, Kolkata for permanent opening of HDC water spread / dock basin by removing existing lock gate and adjoining River bank	PH-II	6158
21.	Mathematical model studies to assess the impact of the proposed port development at Vadhvan on flooding in Dahanu Creek and nearby control area under cyclonic conditions	PH-II	6173
22.	Wave transformation studies to assess the wave conditions at the proposed floating pontoon at Elephanta Island, Mumbai	PH-II	6205
23.	Mathematical model studies to assess the impact of finalized layout of the proposed port at Vadhvan on Tarapur Atomic Power Station for JNPA	PH-II	6206
24.	Physical hydraulic model studies to assess the effect of modification in the shape of reclamation and dredged area on the flow field at the fourth container terminal for JN Port	PH-II	6241
25.	Mathematical model studies to assess the impact of proposed multipurpose jetty terminal on the flow field of PanvelCreek for M/s. Shri Saibaba sand dredging company Pvt. Ltd.	PH-III	6133

26.	Mathematical model studies to assess the impact of the proposed multipurpose jetty terminal on the flow field of PanvelCreek for M/s. famous dredging corporation	PH-III	6134
27.	Mathematical model studies for identification of location of the dumping ground site for the disposal of the dredged material resulted from capital and maintenance dredging at Vadhvan port	PH-III	6190
28.	Desk and Wave flume studies for the design of coastal hydraulic structures with utilization of steel slag for M/s. JSW Steel Limited, Dolvi Maharashtra	CHS-II	6140
29.	Desk studies for the design of coastal protection for strengthening of islands in Gurupura River Mangalore, Karnataka	CHS-II	6149
30.	Desk studies for the design of coastal protection works & extension of existing groynes at Kozhikode Corporation, Kozhikode district, Kerala	CHS-II	6150
31.	Desk and wave flume studies for the design and restoration of existing breakwaters/training walls at Varsoli creek, Alibag District. Raigad. Maharashtra	CHS-II	6161
32.	Desk studies for the design of coastal protection work at village Onjalmacchiwad, Tal. Jalalpore, Dist. Navasari, Gujrat	CHS-I	6162
33.	Desk and wave flume studies for the design of breakwater for fishery harbour at Ajanur in Kasargod District. Kerala	CHS-I	6177
34.	Hydraulic model studies for the design of revised breakwater sections for the development of RO-RO terminal at Kashid in Raidgad District, Maharashtra	CHS-II	6180
35.	Desk studies for the design of coastal protection works under Konkan Disaster Mitigation Scheme at various sites in Ratnagiri District, Maharashtra	CHS-I	6188
36.	Desk studies for the design of coastal protection work at Chanch village, Tal. Rajula, Dist. Amreli, Gujarat	CHS-I	6191
37.	Desk and wave flume studies for the design of proposed breakwater for the fishery harbour at Bharadkhol in Raigad District, Maharashtra	CHS-I	6192
38.	Desk studies for the design of coastal protection work at Okha, District. Dwaraka, Gujarat	CHS-I	6193
39.	Desk studies for the design of coastal protection works at Dehari, Govada and Umargaon, Kamalwad in Umargaon, Gujarat	CHS-I	6199
40.	Desk studies for the design of coastal protection at Indira Point Lighthouse in Great Nicobar Island, Gujarat	CHS-I	6200

41.	Desk and wave flume studies for the design of training bund for fish landing centers at Gopalpur Markandi and Sonapur in Odisha	CHS-I	6201
42.	Desk and wave flume studies for design of breakwater for development of fish landing center at Navabag, Tal. Vengurla, Sindhudurg Dist., Maharashtra	CHS-I	6209
43.	Desk and wave flume studies for design of breakwater for develop port facilities at Porbandar, Gujarat	CHS-II	6210
44.	Desk studies for the design of coastal protection work at Vansi Borsi in Tal. Jalapore, Dist. Navasari, Gujarat	CHS-I	6211
45.	Desk and wave flume studies for the design of coastal protection measures at Vaithikuppam, Puducherry	CHS	6229
46.	Desk studies for the design of breakwater extension for the proposed development of Marine Emergency Response Centre (MERC) at Porbandar, Gujarat	CHS	6230
47.	Desk studies for the design of coastal protection work for Juli Kharland Scheme, Taluka Vasai, District Palghar, Maharashtra	CHS	6231
48.	Desk and wave flume studies for the design of cross-sections of breakwater for proposed fish landing centre at Burondi, Tal. Dapoli, Ratnagiri District, Maharashtra	CHS	6232
49.	Field data collection for the design of coastal protection work at Okha, Gujarat	CDC	6220
50.	Mathematical model studies to assess hydrodynamic conditions for the proposed bank protection work at village Borsi-Machiwad Tal. Jalapore Navsari Gujarat	MMCE	6130
51.	Mathematical model studies for Wave Transformation and Wave Propogation for proposed breakwater in fishery harbor at Bharadkhol, Raigad Dist., Maharashtra	MMCE	6165
52.	Field data collection and mathematical model studies for tidal hydrodynamics and sedimentation for proposed fishing harbor at Astaranga, Odisha	MMCE	6166
53.	Mathematical model studies for wave tranquility for fish landing center at Burondi, Tal. Dapoli, Dist. Ratnagiri, Maharashtra	MMCE	6170
54.	Mathematical model studies for hydrodynamics for proposed construction of bridge across Dharamtar Creek in Raigad, Maharashtra	MMCE	6171
55.	Mathematical model studies for hydrodynamics, siltation, wave propagation and shoreline changes for the proposed development of Muthalapozhy Fisheries Harbour, Kerala	MMCE	6215

56.	Mathematical model studies to assess wave transformation and shoreline changes for proposed development of fishing harbour at Versova, Maharashtra	MMCE	6235
57.	Sedimentation and flushing model studies for the proposed barrage on the Tapi River , Surat , Gujarat	MMCE	6236
58.	Field data collection and mathematical model studies to assess hydrodynamics and sedimentation for proposed development of fishing harbour at Versova, Maharashtra	MMCE	6260

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

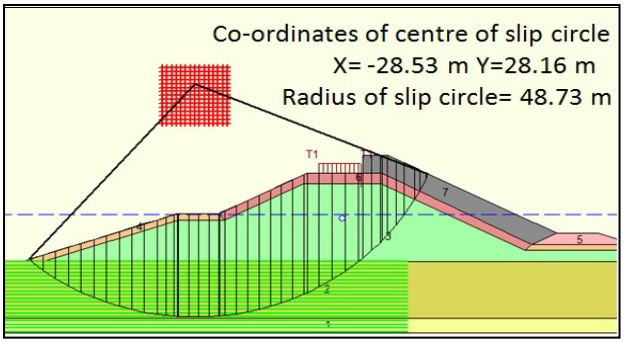
- State Government Authorities
- Polavaram Irrigation Project Head Works, Andhra Pradesh
- Sardar Sarovar Narmada Nigam Limited, Gujrat
- Satluj Jal Vidyut Nigam Limited, Himachal Pradesh
- Karnataka Neeravari Nigam Limited, Karnataka
- Indian Railways

Geotechnical Stability and Settlement Studies for Proposed Breakwaters at Navabandar Fisheries Harbour, Gujarat [Part 1: Eastern Breakwater]

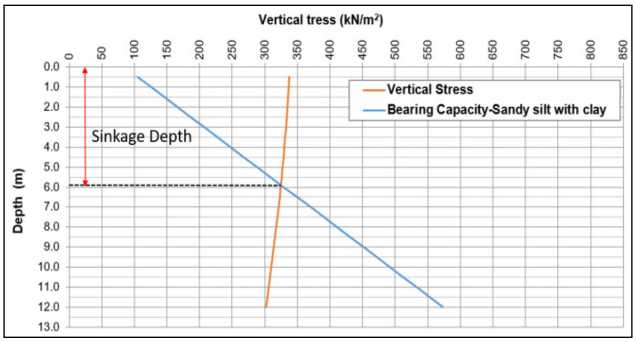
The Department of Fisheries, Government of Gujarat has proposedexpansion of existing fisheries harbour at Navabandarin Junagadh district, Gujarat. For providing tranquility in the harbour, two breakwaters viz. Eastern and Western are proposed in the harbour. Cross-sections of these breakwaters are designed by coastal group of CWPRS based on desk and wave flume studies. During construction, soft sandy silt layer with clay was encountered in different stretches, necessitating geotechnical studies for the breakwaters. In the present studies, five cross-sections viz. B-B, C-C, E-E, F-F and E1-E1 (i.e. section E-E with reclamation on lee side) of the Eastern breakwater were assessed for geotechnical safety by conducting slope stability and settlement analyses. Water level for the studies was considered as 0.8 m CD. Live load of 15 t/m^2 acting on top of the breakwater was also considered during analysis.

Slope stability studies using limit equilibrium method were conducted for static and seismic loading conditions. Results indicated that for sections B-B and C-C, both lee side and seaside slopes are stable with factor of safety (FS) more than critical value of 1.2. However, lee side slope of section E1-E1, lee side and seaside slopes of section E-E and slopes of roundhead section F-F were found to be unsafe indicating that modifications are required from geotechnical point of view. As such, modifications by: (i) flattening slopes, (ii) increasing berm width and (iii) increasing berm level by adding excess core material, are recommended for these sections. As sections B-B and C-C are to be constructed on comparatively stiff foundation, the probable mode of settlement is elastic settlement for these sections. The elastic settlement was estimated by numerical modeling using software PLAXIS 2D. The values were found to be negligible i.e. 2.52 cm and 1.53 cm respectively. On the other hand, sections E1-E1, E-E and F-F are to be constructed on soft foundation with very low SPT values, hence the probable mode of failure is bearing capacity failure. The settlement/ sinkage depth due to bearing failure is calculated by analytical methods by comparing vertical stress due to breakwater and bearing capacity of foundation strata. The settlement depths were found be 4.6 m, 5.9 m and 5.85 m respectively for modified sections E1-E1, E-E and F-F. These values indicate significant settlement for corresponding stretch of the breakwater and hence would require additional construction material for maintaining design crest level.

Liquefaction potential assessment for the sandy silt with clay layer in foundation was conducted using Seed's simplified method. Results indicate factor of safety against liquefaction (FSliq) of more than 1 for earthquake magnitudes of 5.0, 5.5, 6.0 and 6.5; indicating no possibility of occurrence of liquefaction in the soil strata beneath Eastern breakwater for these earthquake magnitudes.



Slope stability analysis - Critical slip circle for modified section E-E (FS=1.21) for static loading

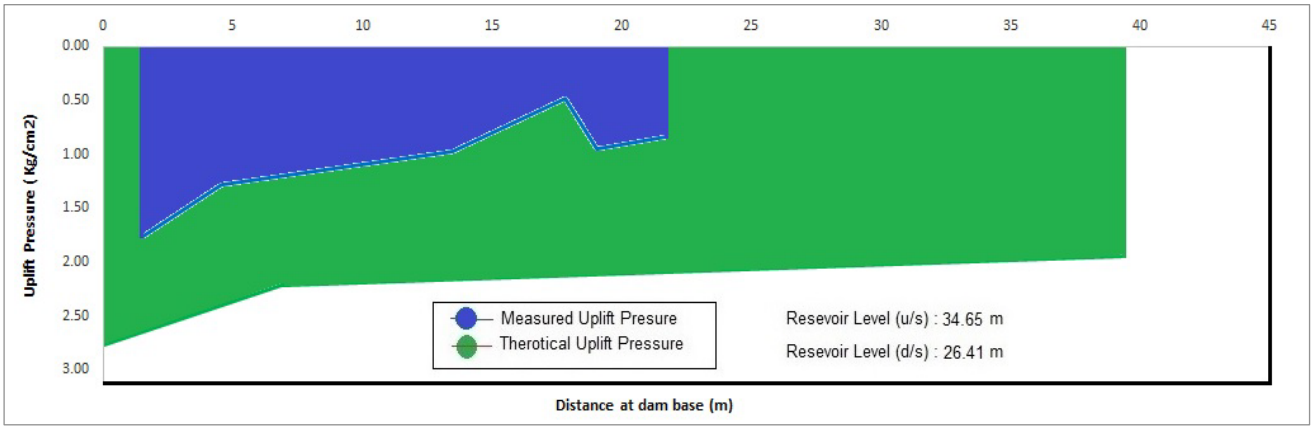


Sinkage depth for section E-E =5.9 m

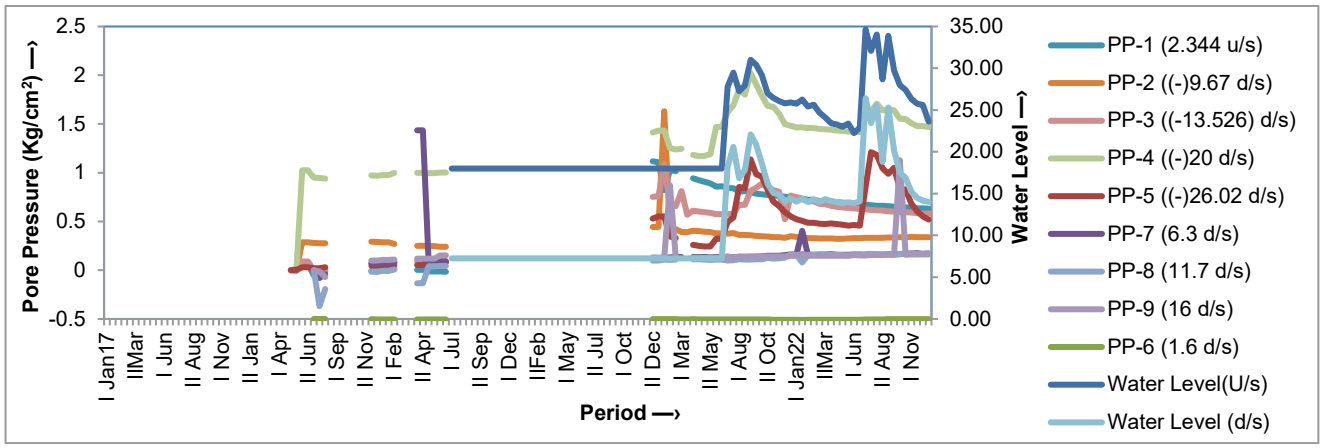
Analysis and Interpretation of Dam Instrumentation Data for the Period January 2017 to December 2022 for Spillway Block 40, Polavaram Project, A.P.

Polavaram Project is under construction on River Godavari in West Godavari district of Andhra Pradesh. Polavaram project consists of 73.5m high and 1128.4-meter-long spillway portionconsisting of 52 blocks. Besides irrigation, the dam further envisages power generation of 960 MW. In order to monitor the structural behaviour of dam, various instruments such as Foundation Piezometers, Uplift Pressure Pipes, Extensometers, Reservoir Water Level Meters, No Stress Strain Meters; Thermometers etc. have been installed in Overflow Block No.4, 26 & 40 at different levels and varying distances from dam axis by M/s Encardiorite Systems under the supervision of Instrumentation group, CWPRS, Pune. Data from installed instruments was collected by Project officials every fortnightsince year 2017 and sent to CWPRS at regular intervals for further studies.

The studies include detailed analysis and plotting of data of various parameters along with reservoir water level Vs time, interpretation of results and comparison with design/theoretical values and plotting of isotherms from installed thermometer data in respect of block no. 40. Studies though primarily cover the results between Jan 2017 to Dec 2022.The pattern of measured uplift Pressure, Pore Pressure, Temperature, Strains & Vertical stress, appears to be normal. However, the joint movement could not be assessed due to inconsistent data. The comparison of measured V/s theoretical uplift pressure indicates that the uplift pressure built up in dam-foundation interface is within limit. The quantum of data is very less hence the analysis may be indicative only. Based on the analysis, structural behaviour of Block No. 40 appears to be normal.



Comparison of Measured and Theoretical Plift Pressure at Dam Base

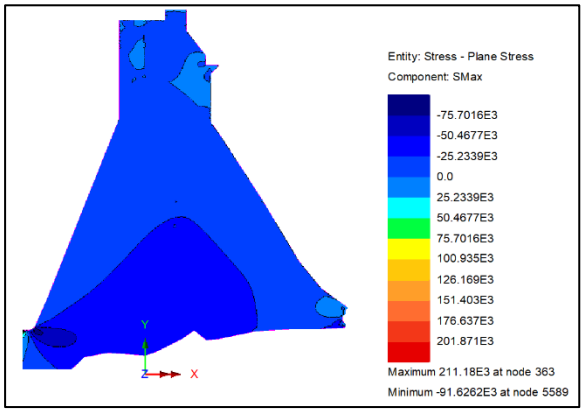


Variation of Pore Pressure in the Dam Body

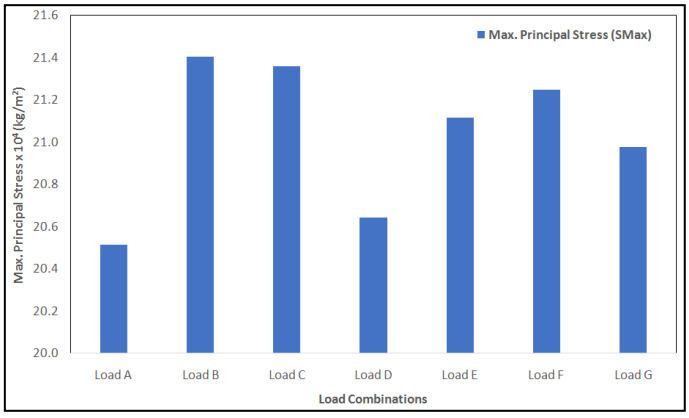
2D Stress Analysis by FEM of Block No. 44 of Sardar Sarovar Dam, SSNNL, Gujarat

The Sardar Sarovar dam having 1210.0 m length with maximum height of 163.00 m above deepest foundation built across Narmada River, near Kevadia in Narmada Dist. of Gujarat state is a concrete gravity dam. The dam is provided with 23 Nos. service spillway gates of size 18.3 m x 16.76 m and 7 Nos. Chute (Auxiliary) Spillway gates of size 18.3 m x 18.3 m each. The project has been constructed to irrigate more than 18,000 km^2 drought prone areas of Kutch and Saurashtra and to generate 1200 MW electricity. The dam's main power plant houses 6 x 200 MW Francis pump turbines with pumped-storage capability. Additionally, a power plant on the intake for the main canal contains five 50 MW Kaplan turbine-generators. The total installed power generation capacity is 1,450 MW.

The foundation stone of the project was laid during 1961 and the project took form in 1979. The construction for dam begun in 1987 but was stalled due to unforeseen reasons. The project was revived in 2000-01 but with a lower height of 110.64 metres, which was later increased in 2006 to 121.92 meters and 138.98 meters in 2017. The water level in the Sardar Sarovar Dam reached its highest capacity at 138.68 m on September 15, 2019. Due to ageing effect, distresses have been observed in the dam in the form of seepage and leaching of cementitious material. Project Authority requested CWPRS to inspect the dam suggest suitable remedial measures as well as review structural safety of the dam as per present day BIS criteria. Accordingly, 2D stress analysis of three spillway blocks namely 35, 44 and 47 is being carried out at CWPRS. As per latest IS: 1893-2002, revised in 2016, Sardar Sarovar Dam lies in Seismic Zone III. Accordingly, spillway block No. 44 has been selected for the analysis of the spillway portion at the beginning.The maximum principal tensile stress of the order of 21.406 x 10^4 Kg/m^2 and of 21.118 x 10^4 Kg/m^2 have been found to develop near the corners of heel portion under load combination B and E respectively.The distribution of maximum principal stress under all seven load combinations shown in bar chart remains within allowable limits and area under tension in dam body is negligibly small. The maximum horizontal displacement of the order of -2.477 x 10^{-3} m towards U/s has been found to develop under static load combinations B at top of the dam and the maximum Horizontal displacement of the order of -4.374 x 10^{-3} mtowards D/s has been found to develop under earthquake load combinations Dat top of the dam. The maximum vertical settlement of the order of 0.016122 m has been observed under load combination D**.** Principal stresses, Direct stresses, Displacements and strains under all load combinations are not excessive and remain well within acceptable limits indicating elastic and normal behavior of the dam.



Maximum principal stress distribution in dam body under load combination



Peak value of maximum principal stress under seven load combination

Laboratory Studies for Designing Suitable Cementitious Grout Mix for Controlling Seepage through Dam Body of Warna Dam, Kolhapur, Maharashtra

The Warna dam, also popularly known as Chandoli dam constructed across River Warna, a tributary of River Krishna, was completed during the year 2000. It is a composite dam with a maximum height of 56 m and located in Kolhapur Dist. of Maharashtra. Out of the total length of 1580 m, the central earthen portion is 837 m in length with masonry flanges of 743 m on both sides. Besides irrigation, the dam further serves the purpose of power generation with installed capacity of 16 MW. The dam has been plagued by problems due to ageing, including leakage/ seepage through the dam body. To control seepage, the Project Authorities has carried out investigative studies such as seismic tomography and nuclear borehole logging to identify the voids and assess the density of dam body. Based on these studies, to arrest seepage through dam body, CWPRS has recommended for dam body grouting for the NOF and OF portion to provide an effective barrier against the water spread through the dam body. Therefore, after the suggestions given by CWPRS Scientists, laboratory studies towards cementitious grout material mix design for controlling seepage through dam body of Warna dam, Kolhapur has been undertaken by CWPRS, Pune. Laboratory studies have been conducted on many combinations of mix design by varying proportions of cement, flyash, silica fume, admixtures and quantity of water. The grout mix design has been carried out after satisfying most of the requisite criteria about strength, flowability, impermeability, segregation and bonding with the parent material. Based on the results of the studies conducted in CWPRS laboratory, grout mix design and grout pattern including methodology to be adopted and have been recommended. After adopting the recommendation of the CWPRS, significant reduction in seepage of water through dam body has been observed.

Downstream view of Warna dam at FRL before partial grouting

Location Map of Warna Dam, Maharashtra

Downstream view of Warna Dam at FRL at Partial Post Grouting Stage

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Slope stability analysis between Ch. 9/735 m to Ch. 9/920 m of Banda Branch Canal to Tillari Interstate Irrigation Project Dist. Sindhudurg, Maharashtra	GE-I	6159
2.	Geotechnical stability and settlement studies for proposed breakwaters at Navabandar fisheries harbour, Gujarat (Part 1: Eastern Breakwater)	GE-II	6148
3.	Site inspection of Hidkal dam, Tal. Hukkeri, Dist. Belagavi, Karnataka	GE-II	6164
4.	Geotechnical studies to assess the effect of dredging at proposed location of MTC pump house at SBC, Visakhapatnam Port, Andhra Pradesh	GE-II	6189
5.	Studies for rehabilitation of embankment on Miraj-Kolhapur railway line near bridge No.36/1 on Panchganga River, Maharashtra	GE-II	6257
6.	Analysis interpretation of dam instrumentation data up to December 2022 for Polavaram concrete gravity dam, Andhara Pradesh	SMA	6127
7.	Analysis and Interpretation of dam Instrumentation data up to December 2022 for Polavaram Concrete Gravity Dam A.P.	SMA	6144
8.	Analysis and interpretation of dam instrumentation data up to December 2022 for Polavaram concrete gravity dam, Andhra Pradesh	SMA	6204
9.	2D stress analysis by FEM of 3 sections namely block No. 35, 44 and 47 of Sardar Sarovar Dam , SSNNL, Gujarat	SMA	6222
10.	Analysis and interpretation of dam instrumentation data for the period January 2021 to December 2022, Indira Sagar Dam , M.P.	SMA	6237
11.	Site visit for inspection and verification of installation report, initial readings and observations of instrumentation readings pertaining to dam instrumentation data of Sripada Yellampalli Barrage, Telangana	SMA	6248
12.	Analysis and interpretation of Joint Meter & Inclinometer Instrumentation data for the period January 2020 to December 2021 and observations on Old Instrumentation functioning of Sardar Sarovar Dam, SSNNL, Gujarat	SMA	6259

13.	Laboratory studies for designing suitable cementitious grout mix for controlling seepage through the dam body of Warna dam, Kolhapur Maharashtra	CT	6227
14.	Laboratory Studies for designing suitable cementitious grout mix for controlling seepage through the dam body of Dudhganga Dam, Kolhapur, Maharashtra	CT	6240

APPLIED EARTH SCIENCES

Divisions

- Engineering Seismology
- Vibration Technology
- Geophysics
- Isotope Hydrology

Areas of Specialization/ Expertise

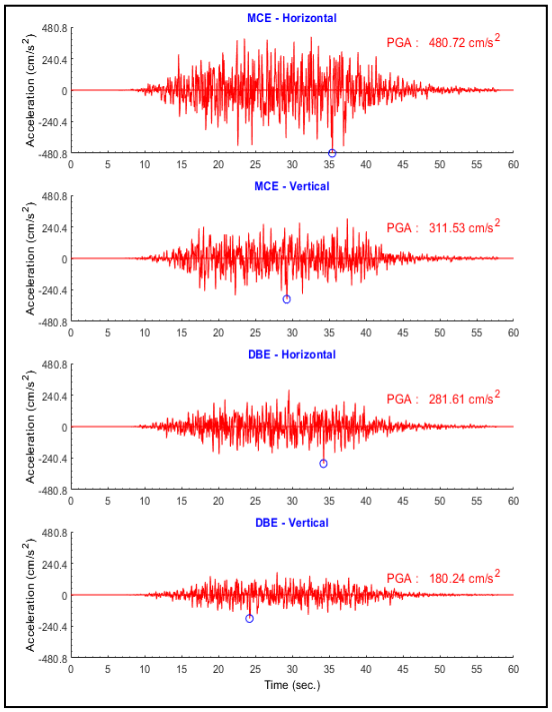
- Site Selection & Installation of Instruments for setting up of Seismological Observatories
- Analysis & Interpretation of Instrument Data (MEQ) for Epicenter Location, Source Parameter & Magnitude Estimation etc.
- Analysis & Interpretation of Data for estimation of Strong Motion Parameters for Peak 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

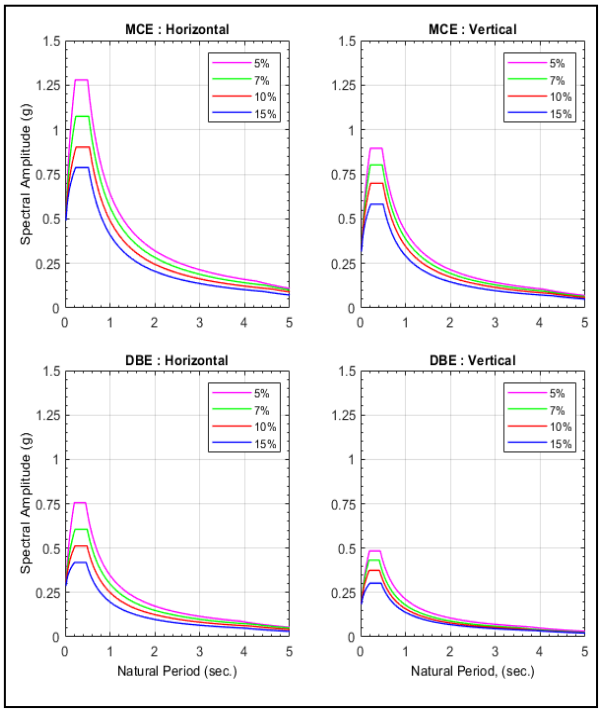
- Govt of Karnataka
- NHDC
- Govt. of Maharashtra
- JKSPDC
- Govt of Mizoram
- WAPCOS
- NHPC
- Mazgaon Dock Ltd., Mumbai
- Govt. of Goa
- Central Water Commission
- NPCIL
- NWDA

Estimation of Site-Specific Seismic Design Parameters for Katakhal Irrigation Project, Assam

The Katakhal Irrigation Project (KIP) envisages construction of a barrage with 17m height across Dhaleswari / Katakhal River in the district of Hailakandi, Assam. The geographical coordinate of the barrage site lies at 24º 17' 08" N and 92º 30' 59" E. As per the zoning map of India (IS: 1893-2002 & 2016 Part-1), the KIP site lies in seismic zone V, which is in the highly seismic northeast India region. Site-specific design ground motion corresponds to Riverbed and rock out-crop levels has been estimated for earthquake resistant design of the KIP using regional data on tectonic features, seismicity and local geotechnical characteristics in the region. Both deterministic and probabilistic approaches have been applied to arrive at the Maximum Credible Earthquake (MCE) and Design Basis Earthquake (DBE) levels of ground motion. The deterministic spectra of KIP are found to be governed by the envelope of MCE magnitude 6.0 and 7.5 associated with a nearby lineament (Lnmt-1) and Sylhet Fault at a closest rupture distance of 14.3 km and 96.2 respectively. The probabilistic spectra are based on the total seismicity expected to occur in various seismic source zones identified in the region. For MCE and DBE levels of ground motion, the probabilistic and deterministic spectra are seen to differ by more than 25% and hence the average of the deterministic and probabilistic spectra have been taken as the target spectra for the horizontal and vertical components for both Riverbed and rock out-crop levels. The design accelerograms of horizontal and vertical components of motion are obtained separately using the respective target spectra with suitable phase differences. The values of the peak ground acceleration (PGA) for Riverbed motion for horizontal and vertical components are found to be 0.4902g and 0.3176g for MCE condition and 0.2872g and 0.1838g for DBE condition respectively and the horizontal and vertical components of PGA for rock out-crop motion are found to be0.4003 g and 0.2499g for MCE condition and 0.2024g and 0.1319g for DBE condition respectively. Smoothed design response spectra are computed for damping ratios of 5%, 7%, 10% and 15% of critical from these design accelerograms for Riverbed and rock out-crop. Recommendations are also made for site specific design seismic coefficients needed for conventional stability analysis.



The MCE and DBE level of design accelerogram for the horizontal and vertical components of ground motion for riverbed



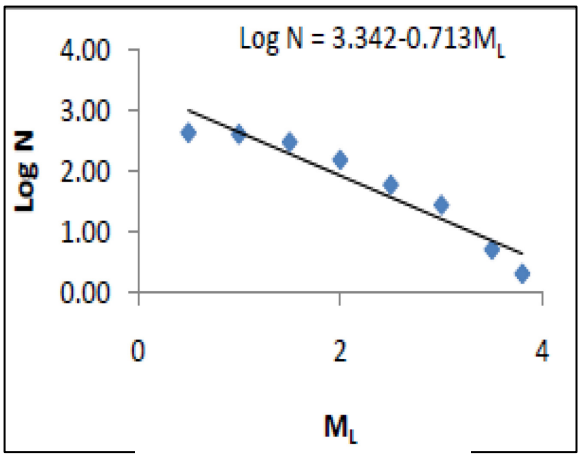
Design response spectra with damping ratios of 5%, 7%, 10% and 15% critical as computed from the MCE and DBE level of accelerograms for horizontal and vertical components of ground motion for riverbed

Analysis and Interpretation of Micro earthquake Data for Kirthai I & II Hydro Electric Project, Jammu & Kashmir

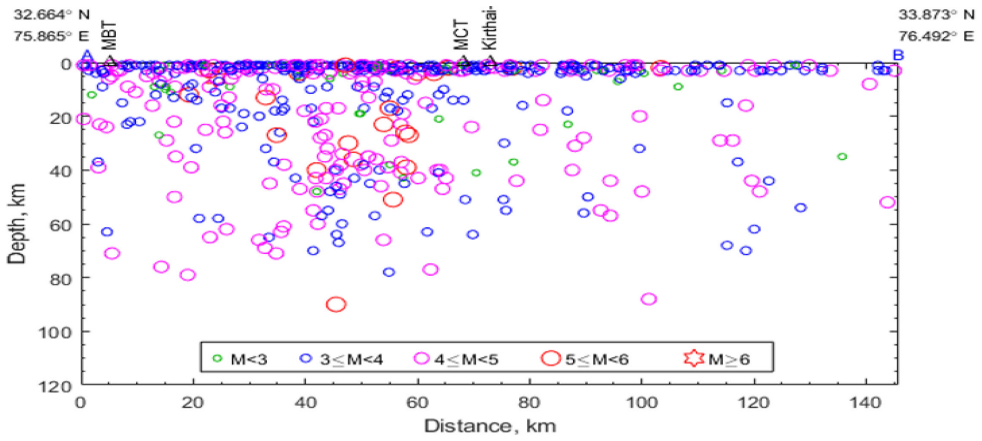
The Kirthai Hydro Electric Project Stage-I & II (KHEP) is in Kishtwar Districtof Jammu and Kashmir. The project envisages the construction of two dams namely Kirthai Iand Kirthai II on River Chandra Bhaga, which is one of the tributaries of River Chenab. The Kirthai I & II dam sites are located at Latitude 33° 15' 33" N & Longitude 76° 10' 10" E and Latitude 33° 18' 41" N & Longitude 76° 04' 37" E, respectively. The KHEP sites lie in seismic zone IV as per the zoning map of India (IS: 1893-2002 & 2016 Part-1) which is in the highly seismic Himalayan tectonic province having complex geological setup. Incidentally, the project site lies between Main Boundary Thrust (MBT) and MCT. Prominent tectonic features of the area are Main Central Thrust (MCT), Main Boundary Thrust (MBT), JawlaMukhi Thrust, Main Frontal Thrust, Sunder Nagar Fault and Kishtwar fault.

To carry out micro earthquake studies at and around KHEP sites, seven stations at and around Kirthai-I & Kirthai-II dam sites were deployed as per guidelines of NCSDP. More than 700 earthquakes have been recorded by the KHEP Seismological Network during the study period April 2022 to Oct 2022. Within a 50 km radius of Kirthai-I dam axis, about 369 earthquakes in the magnitude range of M_L 0.5 to M_L 3.6, and focal depth range of 0.1 km to 30 km has been recorded. Within 50 km radius of Kirthai-II dam axis, about 374 earthquakes in the magnitude range of M_L0.5 to M_L 3.6, and focal depth range of 0.1 km to 30 km has been recorded. The maximum magnitude earthquake recorded during the study period within 10 Km radius from dam axis is $M_{L\ 2.4.}$ The maximum Magnitude earthquake recorded during the study period is M_L 3.8 at epicentral distances of 117 km and 127 km from Kirthai I & Kirthai II dam axis respectively. The calculated values of seismicity parameters 'a' and 'b' in the area are 3.342 and 0.713 respectively.

Locations of seismological observatories for Kirthai I & II HE Project



b- value calculation



Depth Section of Historical Earthquakes

Controlled Blast Studies for Estimation of Safe Charge and Monitoring of Blast Vibrations during Excavation of Hard Rock at Bhira Tailrace Dam, Raigad, Maharashtra

Bhira Hydroelectric Project (HEP) located in the Raigad district of Maharashtra, consists of Tailrace Dam of28 meter high earthen dam constructed across Kundalika River during the year 1927 and a 300 MW capacity Powerhouse. It wasconsidered asone of the major hydroelectric projects in India at that time having installed capacity of 300 MW. The water from this dam is mainly utilized for irrigation purposes by the nearby villages as well as for power generation by Tata Power Company Ltd., Maharashtra to fulfill the power demand of Mumbai and Pune regions. Presently, it was not possible to operate the Bhira Hydropower station in pump mode condition due to the unavailability of the required quantity of water in the pickup pond. To overcome this problem, Tata Power Company Ltd. decided to construct an open channel in hard rock for regulation of water flow.

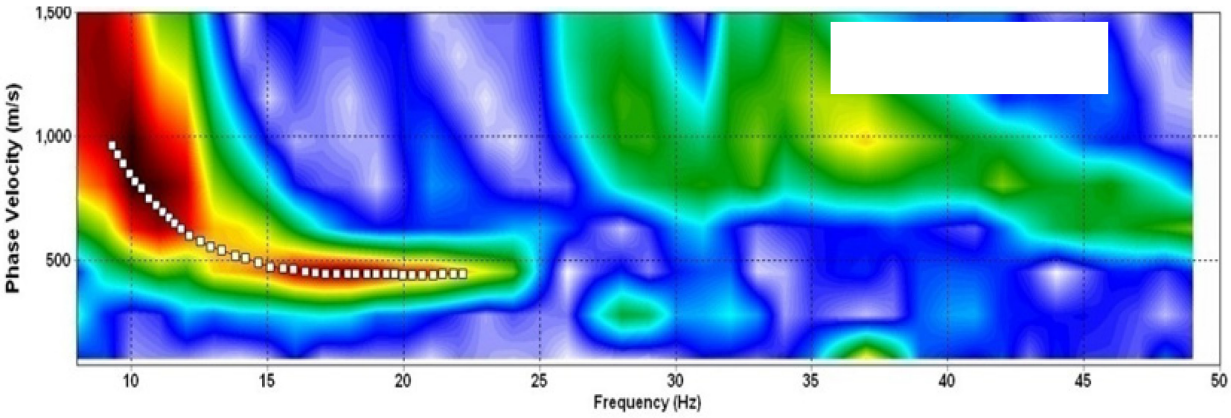
In this connection, Project authority approached CWPRS, Pune to provide the necessary technical guidance for excavation of rock at site by using the methodology of controlled blasting in order to ensure the safety of the earthen dam and other important nearby structures.Accordingly, several trial blasts at site has been carried out to recommend the safe charge weight per delay and the blasting pattern to be used during actual rock excavation by ensuring the safety of the earthen dam and concrete lined tunnel. The recommended safe charge has been used for conducting actual blasting operations at site. Vibration level generated from all these blasts have been continuously monitored on rock bed close to dam, NOF section, top of the dam and tunnel by using tri-axial seismographs and strong motion accelerographs. Maximum Vibration level observed on top of earthen dam has been found to be about 0.8 mm/s, whereas maximum vibration level recorded on top of tunnel has been found to be about 35 mm/s which are far lower than the recommended safe vibration level of 10 mm/s and 50 mm/s for dam and tunnel respectively for ensuring safety. Maximum acceleration level of about 0.0035 g has been recorded at top of the dam which is also far lower than the safe limit. Post blast inspection of the dam and tunnel has been carried out to figure any possible damage occurred in these structures due to controlled blasting operations. However, NO visible damage has been observed in these structures during the critical inspections after the completion of rock mass excavation using controlled blasting. Hence, it can be concluded that the present excavation work by blasting operation has been successfully completed using the methodology of controlled blasting by ensuring the safety of the dam as well as the tunnel.

Aerial view of Bhira Tailrace Dam, Maharashtra

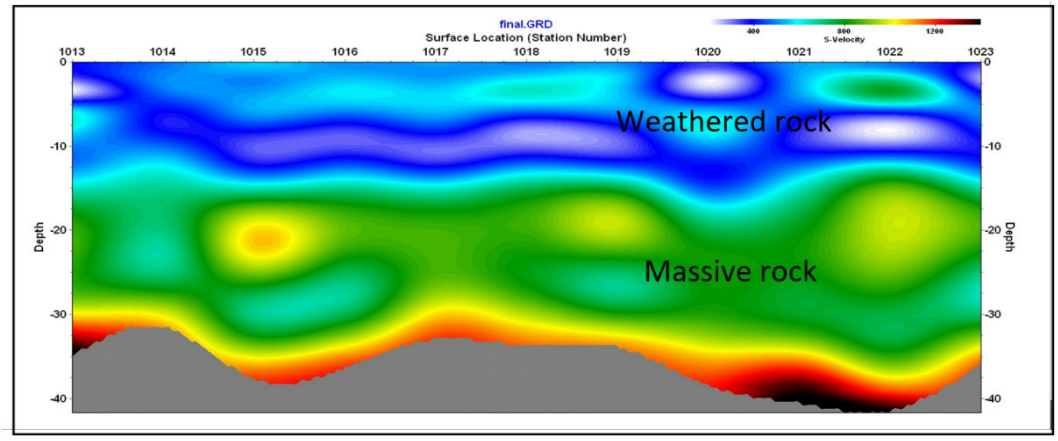
Location map showing the excavation area (Courtesy: Google)

Estimation of Average Shear Wave Velocity (Vs30) at Ghatti Basavanna Dam Site, Karnataka

The Ghatti Basavanna Dam project envisages construction of a Concrete Gravity dam with maximum height of 86.5 m and length 407.5 m across Markandeya River at GhattiBasavanna village of Belgaum district of Karnataka.The purpose of geophysical investigations is to estimate the average shear wave velocity (Vs30) at different locations in vicinity of dam site by Multi Channel Analysis of Surface Waves (MASW) technique. Vs30 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. From the 2-D cross section of the profile-1, profile -2 and profile -3 on the right and left banks, it is inferred that engineering bedrock comprising the shear wave velocity greater than 760 m/s is found at varying depth of 10-15 m. The results are validated with the borehole log of nearby boreholes DH-01 on the right bank and DH-11 on the left bank and found reasonably good correlation at the borehole location. Based on the observed shear wave velocities and available borehole litho logs, it is inferred that the project site is covered by weathered rock strata up to a depth ranging from 10 to15m on right and left banks of the river. It is followed by compacted massive rock of Gneiss up to the investigated depth. The shear wave velocities observed in the range of 200 to 700 m/s may corresponds to weathered rock strata comprises of boulder or fragments of sandstone and Gneiss up to a depth of 10 to15m.The Vs30 values estimated were varying from 563.26 m/s to 627.56 m/s on right and left banks of the river. The average of these values was calculated to be 601.18 m/sec. The final Vs30 value of the project site is calculated by taking the average Vs30 values obtained on the right bank and left bank of the river.



Dispersion curve extracted from the dispersion image obtained for one of the shot gathers at Ghatti Basavanna Dam site



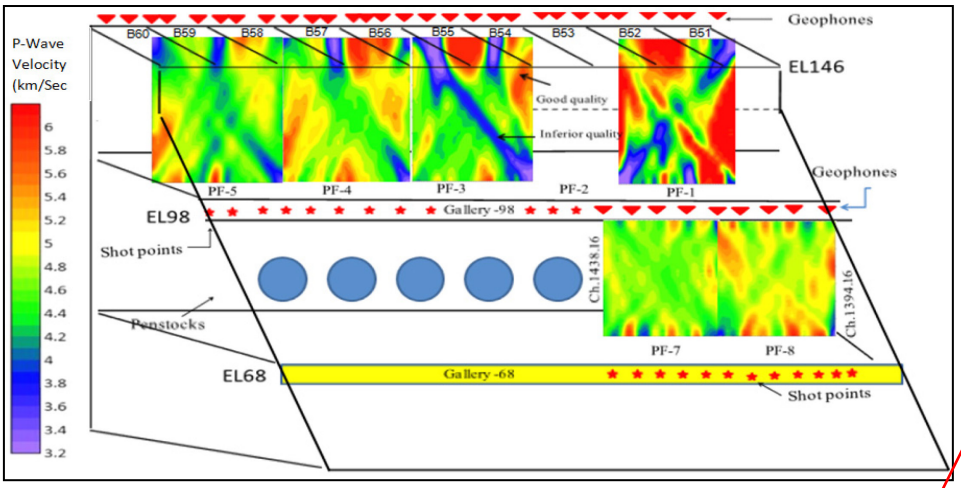
2-D Shear wave velocity section

Delineation of Distressed Zones/Voids by Seismic Tomography in Right NOF Blocks (B51-B60) of Sardar Sarovar Dam, Gujarat

The Sardar Sarovar dam is a concrete gravity dam having length of 1210.0 m with maximum height of 163.0 m above deepest foundation built across Narmada River near Kevadia in Narmada Dist., Gujarat. The dam is provided with 23 Nos. service spillway gates and 7 Nos. Chute (Auxiliary spillway gates). On either side of spillway, there are 9 NOF blocks (B51 to B60) on the right bank and 20 NOF blocks on the left bank. The dam has been constructed in multiple stages and several floods have passed over the partially constructed dam during the long period of construction. Also, maximum size of aggregate has been used as more than 80 mm which may result improper compaction and honeycombing on upstream face and at lift joints. During FRL condition, seepage/leakage of water has been observed through lift joints in Non-Overflow Blocks as well as in inspection galleries.

The purpose of this study was to delineation of potential weak or honeycombed zones which are susceptible for seepage in right Non-overflow (NOF) section of Sardar Sarovar dam from block no. 51 to 60 using seismic tomography technique. It involves measurement of travel times of seismic energy which has propagated through a medium in between source and receiver arrays. These travel times are used to infer the internal compressional velocity (Vp) distribution of the medium at the site.

A total of seven profiles were selected from Block nos 51 to 60 (NOF section). In which tomography study was carried out along five profiles from dam top at EL 146m to Inspection gallery at EL 98 m (Block no 51-60). On the other hand, study was carried out along two profiles from inspection Gallery at EL 98 m to Inspection gallery at EL 68m with overlapping between Block numbers 51-53. From the resultant seismic tomograms, it is observed that seismic velocities are observed in the range of 2.8 km/s to 6.2 km/s in the concrete section between 98 gallery and dam top. The velocities less than 4km/s infer relatively distressed zones of concrete whereas the velocities from 4km/s to 5 km/s may indicate the moderate quality. The velocities greater than 5km/s represents the good quality of concrete. Significant portion of NOF has been observed to consist of voids / honeycombing concrete as shown in the below figure. These distressed zones delineated by the geophysical investigations should be treated with suitable grouting.

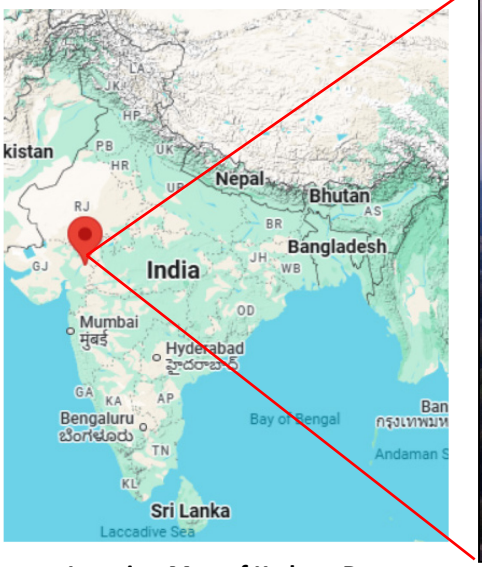


3-D View of tomograms of Sardar Sarovar Dam for right NOF blocks (B51-B60)

Location Map of Sardar Sarovar Dam, Gujarat

Tracer Studies for Delineation of Seepage in the Spillway Portion & Divide Wall of Tail Race Channel at Kadana Dam, Gujarat

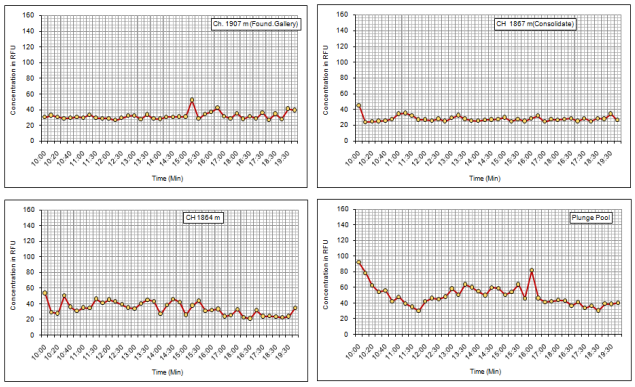
Kadana Dam is a composite earthfill and masonary dam constructed in 1979 across Mahi River through a low range of hills in Mahisagar district in Gujarat, India. The height of the dam above the deepest Riverbed level is 66 m with a crest length of about 1500m. Kadana dam is the major source of water towards irrigation and for hydroelectric power which has a capacity of 240MW. Due to aging, distresses in the form of seepage have been observed in the foundation gallery. Also, water is seen ponding at the downstream near the plunge pool area probably due to anomalies/fissures/fractures if any in the foundation strata. Tracer studies have been conducted at Kadana Dam at different reservoir levels to determine the interconnectivity between the leakage from the dam upstream by injecting tracer(s) in the reservoir at suitably desired depth(s) andmonitoring the seepage points in the gallery and downstream portion (plunge pool area) of the dam. The results of the tracer studies indicated the presence of interconnectivity between reservoir and seepage point near Ch.No.1789 m inside the gallery. However, seepage through the foundation probably due to the presence of anomaly/fissure/fracture etc., (if any) could not be ascertained due to depth constraints in injecting tracer in the reservoir.



Location Map of Kadana Dam, Gujarat

Panoramic view of Kadana Dam, Gujarat

Tracer Injection in 150 mm borehole



Breakthrough curves of tracer test conducted

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Dam break studies and emergency action planning for Venkatadri reservoir, Telangana	DMP	6213
2.	Estimation of sitespecific seismic design parameters for Kathkal Irrigation Project Assam	ES	6135
3.	Analysis and Interpretation of Microearthquake data for Kirthai I & II hydroelectric project, Jammu & Kashmir	ES	6195
4.	Estimation of sitespecific seismic design parameters for Ghatti Basavanna dam, Karnataka	ES	6202
5.	Estimation of site-specific seismic design parameters for Ekdare Dam, Maharashtra	ES	6238
6.	Site inspection for checking out the feasibility of conducting various studies towards structural audit of Nashik Thermal Power Station, Maharashta	VT	6167
7.	Qualitative assessment of concrete by Non destructive testing of three aqueducts and one under passage structure located between left bank canal and branch canal, Ujjani, Solapur, Maharashtra	VT	6172
8.	Controlled blast studies and monitoring of blast vibrations during excavation of rock in close proximity of Bhira Tail Race dam site at Ravalje, Raigad for M/s TATA Power Company Ltd., Pune, Maharashtra	VT	6198
9.	Vibration measurement studies for Rengali H.E. project, Rengali, OHPC Ltd., Odisha	VT	6216
10.	Controlled blast studies for estimation of safe charge and monitoring of blast vibrations during excavation of hard rock at Sani dam, Gujarat	VT	6217
11.	Estimation of average shear wave velocity (Vs 30) at Sarasvati heritage development project, Haryana	GP	6156
12.	Estimation of average shear wave velocity (Vs 30) at GhattiBasavanna Dam site, Karnataka	GP	6157
13.	Delineation of distressed zones/voids by seismic tomography in right NOF block (B 51- B60) of Sardar Sarovar dam, Gujarat	GP	6203
14.	Estimation of average shear wave velocity (Vs30) at Ekdare Dam of Damanganga -Ekdare –Godavari (DEG) Link project, Maharashtra	GP	6214
15.	Tracer studies for delineation of seepage in the spillway portion and divide wall of tail race channel at Kadana dam, Gujarat	IH	6187
16.	Borehole logging and Tracer studies for seepage at Dudhganga Dam, Maharashtra	IH	6239

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

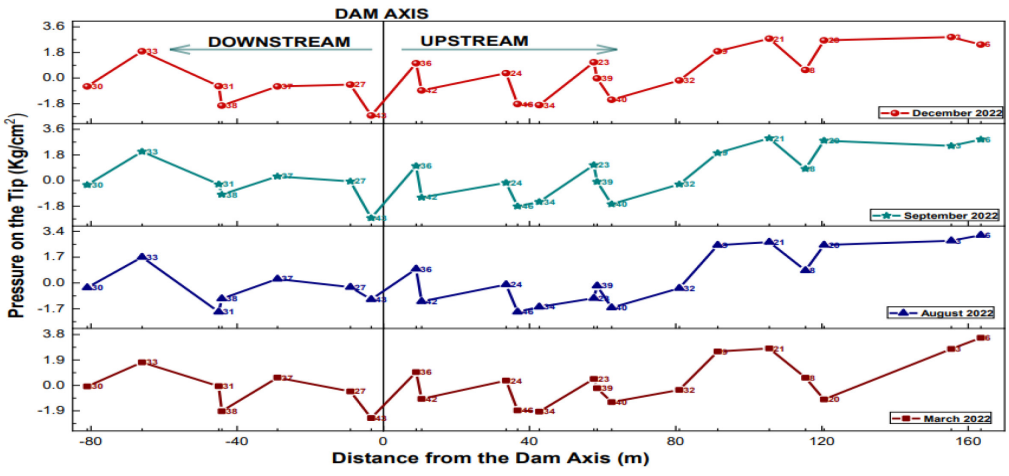
List of Clients

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

Revival of Dam Instrumentation of Ukai Dam, Gujrat: Twin Tube Piezometers

The instrumentation program in a dam is essential for evaluating the performance of the dam structure during construction as well as during the operation stage. It is an important and integral component of a dam for monitoring the health and for analyzing the performance of the dam structure under continuous stress from water pressure and changing weather conditions. The basic purpose of instrumentation is to provide input data (usually include pore pressure, seepage, dynamic loads, stress and strain, uplift pressure, temperature, displacement, water level etc.). This data, then, should be analyzed by an expert to check for any anomaly, if any, and predict at early stages. so that remedial measures can promptly be initiated to ensure the integrity of the structure. 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 Ukai was nearly 50 years old and was in non-working conditions. CWPRS team has played a vital role in revival of Twin Tube Piezometers (TTPs) at Ukai Dam. 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 Lower Bank (L/B) of Ukai Dam, around 56 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. Continual observation of TTPs measurement were maintained for next few years after revival and observed to be working properly.

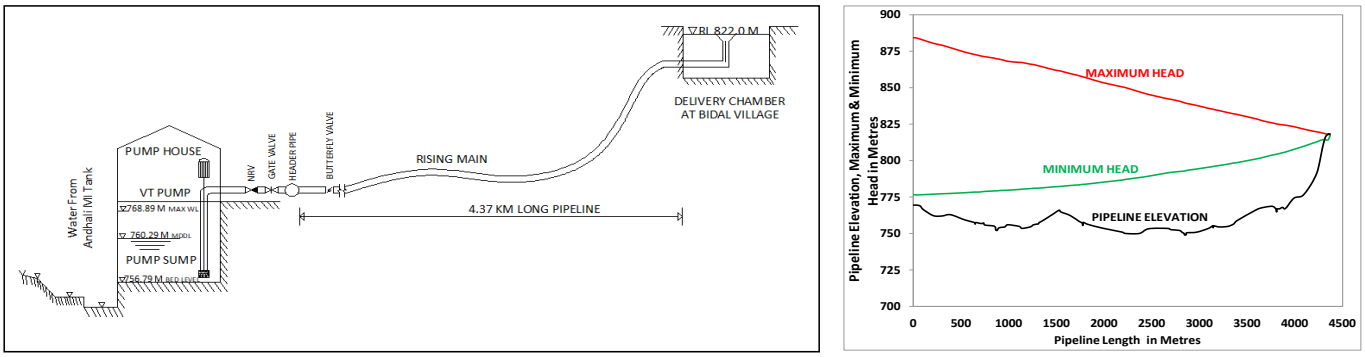


Pore Pressure Run Chart of Ukai Dam for March-December 2022

Location Map and aerial view of Ukai Dam, Gujarat

Surge Analysis for Andhali Lift Irrigation Scheme Under Guruvarya Late Lakshmanraoji Inamdar Lis, (Jihe Kathapur), Satara

Water Resources Department (WRD), Maharashtra proposed Andhali LIS to supply water for irrigation purpose. In this connection, Executive Engineer, WRD, Satara requested CWPRS for Surge Analysis for Andhali Lift Irrigation Scheme under Guruvarya Late Lakshmanraoji Inamdar LIS, (Jihe Kathapur) of Satara district. This envisages supply of water through pipeline of 1130 mm diameter with 7 mm thick MS pipeline, running from pump house to delivery chamber located at Bidal Village. The pumping main is designed for a discharge of 1.3948 m3/s of water through rising main to a distance of 4.37 km to deliver water throughout the year. The pumping station has 2 pumps working of Vertical Turbine Pumps; each designed for the duty point capacity of 0.6974 m3/s and 65.33 m head. Each of the above pumps is driven by 750 rpm, 580 kW electric motor. The diameter of the delivery pipe, off taking from each of the above 2 pumps is 600 mm. On coming out from the pump house, each of the above 600 mm pipeline is connected to common manifold and the header connected to single 1130 mm diameter MS rising main pipeline, which in turn feed water to delivery reservoir of Bidal Village for purposes of irrigation to the command area. CWPRS carried out exhaustive analysis with different runs of surge analysis for optimising size of air vessel and number of air valves with an objective of safeguarding system components against surge pressures. The analysis mainly focused on use of optimum size of air vessel and number of air valves and their location.

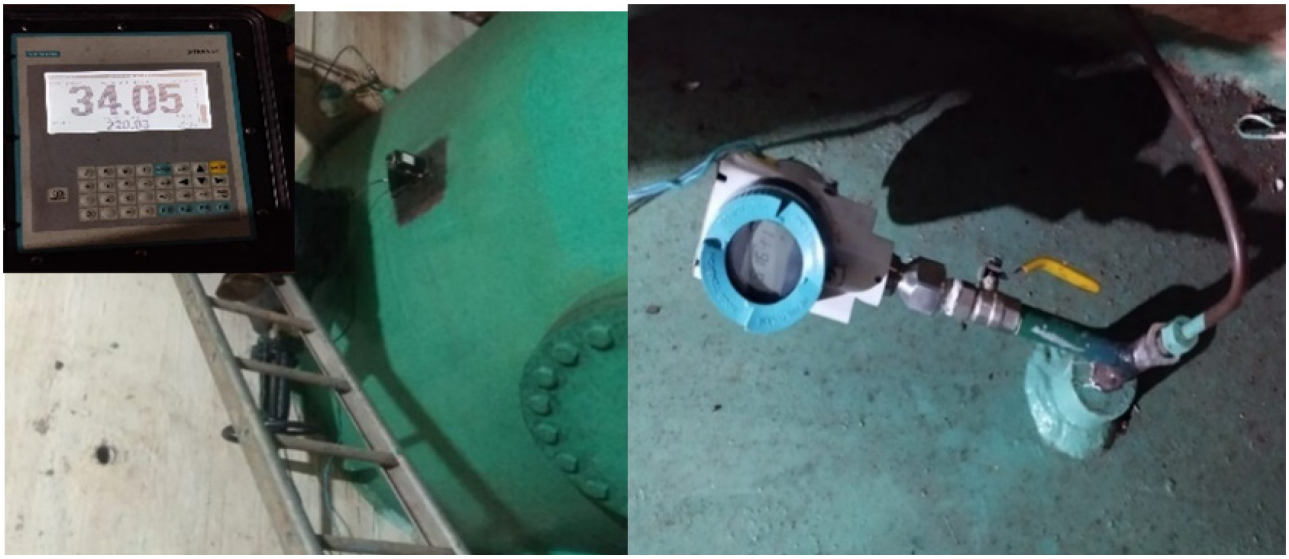


Proposed schematic of water supply through pipleline and pipeline elevation plot for max and min head along length of pipeline

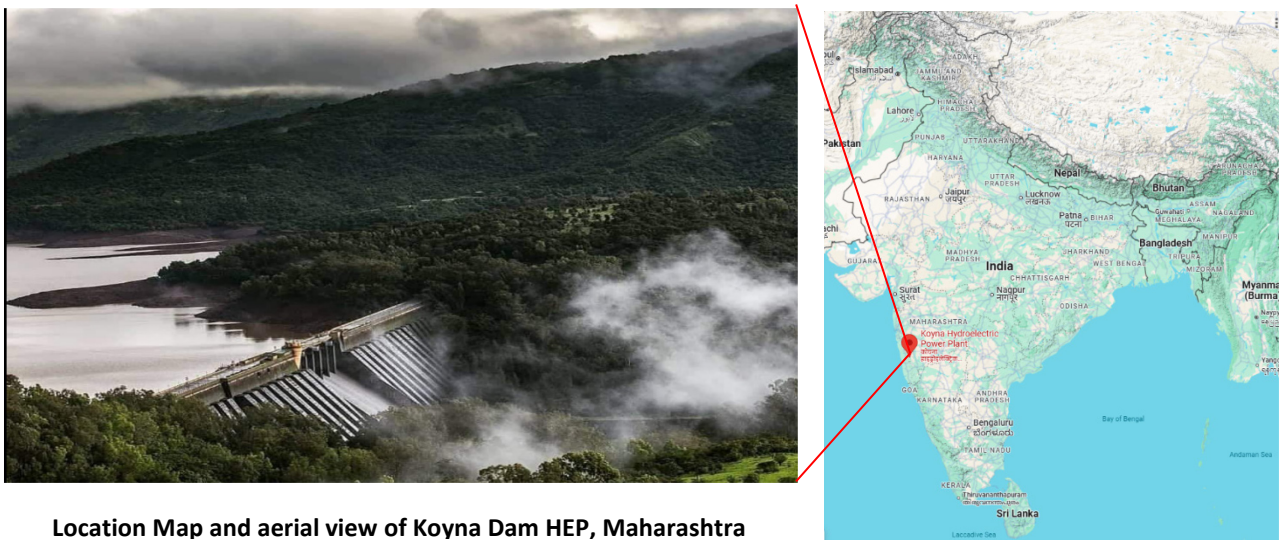
Location Map and aerial view of Andhali Lift Irrigation Scheme under Guruyarya Late Lakshmanraoji Inamdar Lis, (Jihe Kathapur), Satara

Measurement of Water Discharge through Penstock of Koyna Dam Powerhouse of Koyna HEP

Chief Engineer, MAHAGENCO, KGSC, Pophali, Maharashtra had approached Central Water and Power Research Station, Pune, (CWPRS) to explore the feasibility of undertaking water discharge measurements at Koyna Dam Powerhouse (KDPH), Pophali. Efficiency evaluation of two Francis turbines of Koyna Dam Powerhouse situated at Koyna Nagar was carried out at 620.90 mKRL, 639.05 mKRL, 652.469 mKRL and 658.945 mKRL. The discharge and pressure measurements were carried out covering the operating range of the hydro turbines in terms of power output. Measurement of discharge passing through four turbine units of KDPH was done using clamp-on type Ultrasonic flow meter, for load variation between 03 MW and 18 MW in steps of 02 MW. From the data recorded, it is observed that turbines are operating at net head of 36 m, 54 m, 68 m and 75 m when the reservoir level is around 620.90 mKRL, 639.05 mKRL, 652.469 mKRL and 658.945 mKRL respectively. At designed load of 18 MW the maximum efficiency (η_{max}) was observed for the range of discharge from 27.491 m^3/s to 28.320 m^3/s for unit - I and 27.048 m^3/s to 29.889 m^3/s for unit -II & under reservoir levels 652.469 mKRL and 658.945 mKRL. For the tested load range from 03 MW to 18 MW the average Flow factor computed was around 7.518 m^3/kwh to 16.985 m^3/kwh for the turbine units operating between 620.90 m KRL to 658.945 m KRL respectively.



Measurement of discharge and pressure at Koyna Dam Powerhouse



Location Map and aerial view of Koyna Dam HEP, Maharashtra

TECHNICAL REPORTS SUBMITTED TO CLIENTS

Sr. No.	Title	Division	Report No.
1.	Identification and selection of rain gauge and stream gauge sites for development of Early Flood Warning system for Rammam (Stage-III) Project, District Darjeeling, West Bengal for NTPC	INST-I	6218
2.	Implementation of telemetry system in Phase-II under KRMB, Hyderabad	INST-I	6219
3.	Satellite derived bathymetry to model reservoir profile using multiband satellite data and validate it for three reservoirs in Jharkhand State under National Hydrology Project	HI	6245
4.	Technical expert services in supporting the evaluation process of bid and in the installation of the instruments for the work of real time dam monitoring project under DRIP for Tamilnadu State.	HI	6253
5.	Calibration testing and assistance in installation of dam instruments for Polavaram Irrigation Project, Andhra Pradesh	HI-II	6246
6.	Field visit for observation of functionality of Dam Instruments at Sharavathi and Varahi Hydro Electric Project of KPCL	DI	6247
7.	Revival of dam instrumentation of Ukai Dam, Gujarat: Twin Tube Piezometers.	DI	6252
8.	Efficiency evaluation of turbine unit (1x16 MW) of Bhatghar Hydro Power Station	HMC	6128
9.	Studies Dimensional investigation of similar Centrifugal pumps for M/s. Kirloskar Brothers Limited Pune	HMC	6145
10.	Efficiency evaluation of turbine unit 2x8 MW of Warana hydro power station.	HMC	6146
11.	Surge analysis for Andhali Lift Irrigation Scheme under Late Lakshmanraoji Inamdar LIS, (JiheKathapur), Satara	HMC	6163
12.	Measurement of water discharge through penstock of Koyna Dam Powerhouse of Koyna HE Project	HMC	6182
13.	Performance and overload tests of sample submersible pumpsets for M/s Rockwell Pump Motors Pvt. Ltd. Ghaziabad (UP)	HMC	6233
14.	Performance and NPSH tests of pumps for M/s SPX FLOW Technology(I) Pvt. Ltd. Pune.	HMC	6234
15.	Inspection of SCADA based automatic gates control system installed in Choudhary Charan Singh Ganga Barrage, Narora, Bulandshahar, U.P.	HMC	6249
16.	Surge Analysis of Lift Irrigation Scheme of Ambawade and Kamathi, Satara, Maharashtra	HMC	6250
17.	Site calibration of water meters of JSW steel limited. Dolvi, Dist. Raigad, Maharashtra	HMC	6256
18.	Assessment of water in vadation (if any) using satellite Remote Sensing Techniques for the proposed MAHDA residential layout mass housing scheme at S.No.392 (PT) of village Bolinj& S. No. 376(Pt) of village Virar, Tal. Vasai, Dist Palghar.	RSA	6143

PROJECTS OF NATIONAL IMPORTANCE

NATIONAL HYDROLOGY PROJECT

The Government of India has approved the implementation of National Hydrology Project (NHP) under the Ministry of Jal Shakti, Department of Water Resources, River Development Ganga Rejuvenation (MoJS, DoWR, RD&GR) with an outlay of Rs 3679.7674 crore. The project duration, initially, was 8 years from the beginning of FY 2016-17 which has been extended beyond March 2024 and further, till September 2025 in March 2023. The Project Implementation Plan (PIP) of CWPRS has been approved by Secretary, MoJS, RD&GR with 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. Accordingly, revised PIP of CWPRS has been approved by the Ministry amounting Rs 39.74 crore. By the end of financial year 2023-24, the total cumulative expenditure of the project is Rs 26.75 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 etc.

Purpose Driven Studies (PDS) & Studies/ Knowledge Product

CWPRS is carrying out three PDS under NHP, out of which, two PDS have been completed. The reports for PDS namely,

1) Study of Surface and Subsurface Water Interaction using Remote Sensing, Geohydrological and Geophysical Techniques and its Modeling and

2) River Rejuvenation of Mutha River Reach Flowing through Pune City and Suburbs, Maharashtrahave been submitted to National Institute of Hydrology (NIH).

For the third PDS, 'Field survey, mathematical model and remote sensing studies for coastal processes associated with coastal erosion, shoreline changes assessment at few locations in Maharashtra Coast', the report is under preparation. In addition to this, three studies/ Knowledge product assign to CWPRS Viz. Bathymetry Survey of Three Dams in Northeast Viz. Singda Reservoir, Khuga Reservoir, Khoupum Reservoir (Completed), Bathymetry of Jharkhand Dams Viz. Dhruwa, Tenughat, Getalusand (using survey method-completed), Sedimentation Survey using Sentinel Satellite Remote Sensing Technology (for Dhruwa, Tenughat, Getalusand Reservoirs-Report Submitted)

Establishment of Testing, Calibration and Certification Facility under NHP

Various laboratories are being established 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. INGRESS PROTECTION (IP XX) Test Lab is also established at CWPRS.

Following major activities under NHP have been completed:

- Up-gradation of CMRT Lab for Testing/ Calibration of Current Meter, ADCP etc
- Establishment of Reference AWS for Testing/ Training Purpose to IA'S
- Establishment of FieldTesting setup (Field Calibrator) for AWS Senor
- Establishment of Reference GW Station for Testing/ Training Purpose to IA'S
- Establishment of Field Testing/ Calibration (Field Calibrator) Setup for GW level Sensor
- Establishment of laboratory Calibrator Setup for GW level Sensor
- Establishment of Field and lab Testing/ Calibration Setup for Telemetry-GSM/GPRS
- Establishment of Reference Data Logger Setup for Training Purpose to IA'S
- Establishment of Lab Testing/Calibration Setup for Data Logger
- Establishment of Reference Surface Water Level Station for Training Purpose to IA'S
- Establishment of Testing/Calibration Setup for Water Quality Sensor
- Establishment of Ingress Protection (IP) Laboratory

Capacity Building

Twelve national trainings in physical mode for support to IAs and 5 webinars/in-house trainings were conducted in 2023-24 under NHP. So far 42 national trainings are conducted under NHP by CWPRS including the field trainings. CWPRS team visited following states for technical guidance/ inspection of recently installed Hydromet instruments under NHP during FY 2023-24.

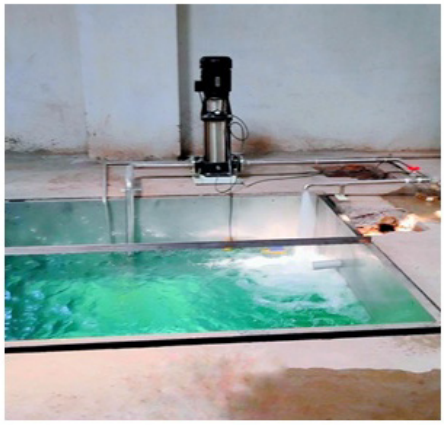
Sr. No	Site Type	IA's Name
1	Automatic Weather Station (AWS)	Maharashtra, Gujarat
2	Automatic Water level Recorder (AWLR)	Kerala, Maharashtra, Gujarat
3	Ground water level Sensor (DWLR)	Gujarat, Tamil Nadu, Jharkhand, Maharashtra
4	Real Time Water Quality Monitoring Systems (RTWQMS)	Maharashtra

Ingress protection laboratory at CWPRS, Pune

Test probes (IP 1X -4X)

Dust Chamber (IP 5X & 6X))

Water testing facility (IP X1- IP X8)



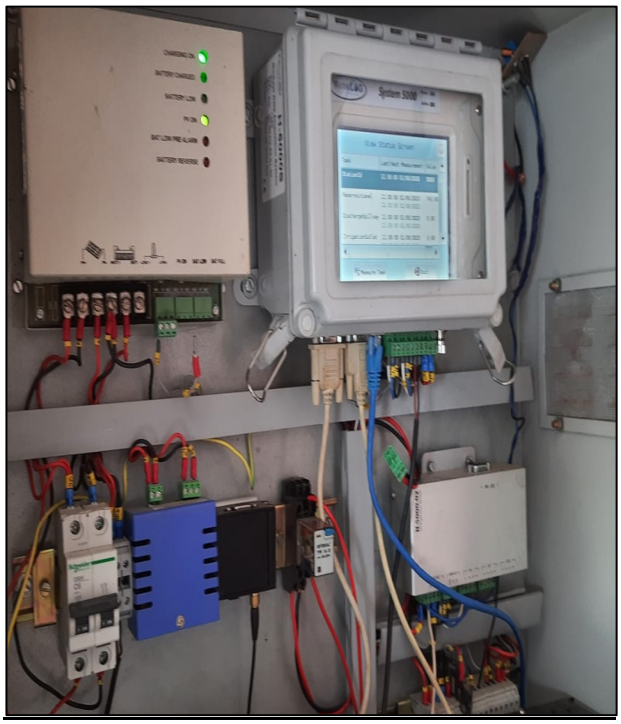
Immersion tank for IP X7 & X8

IP X9K testing facility

RO plant facility for IPX1 to IP X9K

Air temperature sensor calibration system

Atmospheric pressure sensor calibration system



Field inspection of AWS and AWLR, installed at Koynanagar, Satara by Water Resources Department (WRD), Maharashtra

Testing of DWLR at GWDC, Rajkot

Piezometer at Juthal, Junagad

Site inspection of installed DWLR at GWDC, Rajkot in presence of M. J. Raval, Nodal Officer, Groundwater, NHP, Gujarat

Hands on training, testing of installed DWLR and brief to the officers of GWRDC, Gujarat about site inspection

Training program on "Real time monitoring network for Groundwater Level, its Installation, Maintenance and Testing"

Training program on "Calibration/Testing facilities" at CWPRS for various hydrological parameters

COASTAL MANAGEMENT INFORMATION SYSTEM (CMIS)

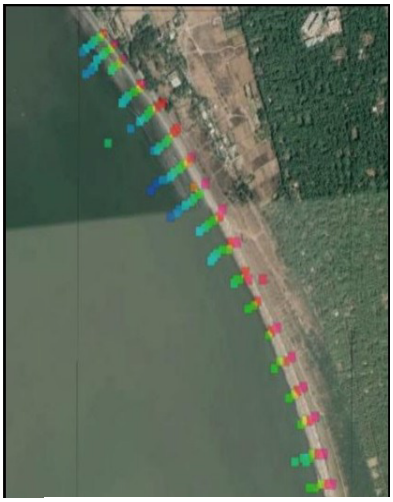
Field observed data on coastal processes is one of the essential requirements for evolving long-term plans and coastal protection measures. In view of this, for the collection of such data a scheme of Coastal Management Information System (CMIS) was approved by the Government of India under the ongoing Scheme 'Development of Water Resource Information System (DWRIS)' of the 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 implementing CMIS at two sites viz. Satpati is in Maharashtra (Northern region), and Nani Danti- Moti Danti is in Gujarat (Southern region). The total cost of the project is Rs. 6.95 Crores 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 for a continuous period of two years. Further, these data would be processed to be used at the front-end and linked to the Centralised Data Centre (CDC). The equipment viz., detailed bathymetric survey instruments, 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.

During the year 2023-24, a comprehensive Beach survey and beach sediment analysis was carried out seven times for a reach of about 1.5 km each to assess shoreline changes at these sites. A bathymetry survey was carried out for pre-monsoon in May 2023 and post-monsoon in January 2024. Similarly, Riverine data which include River discharge, salinity, temperature and River sediment load was collected in pre-monsoon, monsoon and post-monsoon period of 2023-24. The data collected is proposed to be hosted on a dedicated web portal shortly. As part of the capacity building initiatives under the project, a training program on "Coastal Engineering Aspect and CMIS Activities" was organized at CWPRS from 4th - 8th September 2023. The sea-based equipments viz., wave rider buoys, MADCPs and PTG units will be installed from May 2024 onwards.

The deliverables of this project will setup a comprehensive field monitoring programme which will help in the decision-making in the long term and a sustainable manner. This project will also provide data relevant to the designers, decision-makers, and modelling groups that are not available otherwise. This project is very significant as it will reduce the risk to 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.

Bathymetric Survey

Measurement of River Discharge using ADCP



Extensive Beach Surveys

Training program at CWPRS under CMIS during 4th - 8th September 2023

PART-III

DISSEMINATION OF INFORMATION

PAPERS PUBLISHED

1. N. Vivekanandan, C. Srisailam, R. G. Patil, "Intercomparison of rainfall estimates of three distributions for computation of PFD using rational formula and SUH approach" published in Journal of Civil Engineering and Urbanism by Scienceline Publication Limited, Turkey 25th March 2023.

2. Sathasivam Sathish, Roop Singh Kankara, Palanisamy Thanabalan, Rathinam Arthur James, "Provenance discrimination and geodynamics analysis of open and island coasts, South East coast of India: Inference on heavy minerals and hydrodynamics" published in Journal of Resource Geology by John Wiley & Sons Australia Ltd, 12th April 2023.

3. P. Thanabalan, R. Vidhya , R. S. Kankara, R. Manonmani, "Time-series analysis of MODIS (LST and NDVI) and TRMM rainfall for drought assessment over India" published in Journal of Applied Geomatic by Springer, 25th April 2023.

4. V. Noujas, R. S. Kankara, B. Rajan, "Assessment of beach morphological changes in the east coast of India during cyclone Phethai, through field data and numerical modeling" published in Journal of Marine Geodesy by Taylor & Francis Online, 27th April 2023

5. Pratap Singh Solanki, M. S. Hanumanthappa, N. D. Atkekar, "Fast accessing, monitoring and analysis of water resource management information using 5G technology and IoT" published in International Journal of Scientific Research in Computer Science and Engineering by isroset.org (online) 30th April 2023.

6. T. K. Swain, "Emerging Trends in Engineering and Technology-Industry 4.0 (ETETI-2023)" published in International Conference at Indira Gandhi Institute of Technology (IGIT), Sarang, Odisha 06 -07 May 2023.

7. Pratap Singh Solanki, A. D. Kadam, P. S. Khairnar, N. D. Atkekar, "Enhancement of cyber security and protection of sensitive R&D data using next generation firewall" published in International Journal of Applied Research on Information Technology and Computing (IJARITC) published by indian journals.com 10th May 2023.

8. Omkar Sakurikar, "International Conference on Data Analytics and Insights (ICDAI-2023)" published inInternational Conference at Techno International New Town (TINT), Kolkata, West Bengal 11-13 May 2023.

9. Aditya Thakare, Arun Goel, M. K. Verma, M. Z, Qamar, "Performance Assessment of Desilting Chamber using FLOW-3D" published in National Conference on Sustainable Development of Smart Cities Infrastructure (SDSCI-2023) organized by NIT, Kurukshetra during 27-28 May 2023.

10. Ishfakh M Shafeekh, M. Phani Kumar, "Numerical modeling to determine the groyne field dimensions for an artificial beach fill" published in International Journal of Engineering Research & Technology (IJERT), 05th May 2023.

11. Raghuchandra Garimella, M. Selva Balan, V. K. Shukla, Sreekanth Sampath, "Role of Artificial Intelligence based Image-Processing techniques for port development activities in physical tidal models" published in ISH Journal of Hydraulic Engineering, Taylor & Francis Online, 01st June 2023.

12. Vivek C. Jadhav, A. R. Deshmukh, M. Phani Kumar, "Setting up of a mathematical model using MIKE Software for a coastal project" published in International Journal of Innovative Science and Research Technology, 6th June 2023.

13. Tomesh Kumar Sahu, "राष्ट्रीय जलविज्ञान संस्थान" द्वारा रुड़की मे आयोजित "राष्ट्रीय जल संगोष्टी-2023" में 'जल वायु परिवर्तन एंव जल प्रबंधन' विषय पर तकनीकी शोध पत्र का प्रकाशन| 17-18 August 2023.

14. Naren A., "Assessment of sea level rise over Bay of Bengal and Arabian Sea" published in 'Eighth National Conference of Ocean Society of India (OSICON-23)' organized by Indian National Centre for Ocean Information Services (INCOIS) and Ocean Society of India. 23-25 August 2023.

15. Sanjay N. Jha, "Application of numerical modelling in River Training Structures for development of a fishery harbour" published in 'Eighth National Conference of Ocean Society of India (OSICON-23)' organized by Indian National Centre for Ocean Information Services (INCOIS) and Ocean Society of India. 23-25 August 2023.

16. Vaibhawi Roy, "Wave tranquility and prediction of shoreline evolution along a site on East Coast of India" published in 'Eighth National Conference of Ocean Society of India (OSICON-23)' organized by Indian National Centre for Ocean Information Services (INCOIS) and Ocean Society of India. 23-25 August 2023.

17. M. Selva Balan, Om Pimpalgaonkar, "Satellite derived bathymetry using Sentinel-2 MSI satellite data for inland waterbodies" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

18. S. D. Marulkar, Dheeraj Tamrakar, Amit Kumar, Neena Isaac, "Dam break analysis using 1-D mathematical model for Khadakwasla irrigation system published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023

19. M. Z. Qamar, M. K. Verma, "Sediment management in hydropower projects-CWPRS contributions" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

20. Prakash K. Palei, Vijay K. Ghodake, S. Santhosh Kumar, Rizwan Ali, "Ensuring safety of earthen dam during controlled blasting for rock excavation in spillway portion" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

21. Amit Kulhare, Kiran More, "Rehabilitation of energy dissipater and performance improvement of main and auxiliary spillways- A case study" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

22. S. A. Burele, G. C. Singarkar, Pravuram Panda, K.A.M. Bagwan, Rizwan Ali, "Estimation of in-situ strength parameters in gravity dam using non-invasive technique" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

23. G. A. Panvalkar, Rolland Andrade, S. Bhowmick, A. D. Chunade, "Application of well logging and tracer techniques for density determination & weak zone delineation in dams" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

24. Vinesh Katte, Lata Gupta, N. D. Atkekar, "Study of operation and monitoring of dams using SCADA system for achievement of dam safety" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

25. S. Santhosh Kumar, Vijay K. Ghodake, Prakash K. Palei, Rizwan Ali, "Assessment of structural safety of dam and allied structures against induced vibrations in a power house- A case study" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

26. Vijay K. Ghodake, Prakash K. Palei, S. Santhosh Kumar, Rajendra Singh Gurjar, Rizwan Ali, "Qualitative assessment by non-destructive testing of stilling basin, Sardar Sarovar dam, Gujarat (A case study)" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

27. Sunil J. Pillai, Vigneswaran R., Sarbjeet Singh, Balachandran K., Jai Prakash Meena, Rizwan Ali, "Seepage control measures using cementitious grouting of masonry gravity dams- CWPRS experiences" published in "International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank at Jaipur, Rajasthan. 14-16 September 2023.

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PARTICIPATION IN SEMINARS/ SYMPOSIA/ CONFERENCES/ WORKSHOPS

Sl. No.	Title/Event	Place and Date of Event	No. of Participants / Officer
1	International Conference on "European Geosciences Union (EGU) General Assembly 2023"	Vienna, (online mode) 23-28 April, 2023	01
2	International Conference on "Emerging Trends in Engineering and Technology- Industry 4.0 (ETETI-2023)"	Indira Gandhi Institute of Technology (IGIT) Sarang, Odisha. 06-07 May 2023	01
3	International Conference on "Data Analytics and Insights (ICDAI)-2023)"	Techno International New Town (TINT), Kolkata, West Bengal 11-13 May 2023	01
4	National Workshop on "Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development"	Ministry of Jal Shakti, Indian International Centre, New Delhi 19th June 2023	05
5	Workshop on "Challenges in Selection, Operation and Maintenance of Large Pumping and Hydro Turbines"	CWPRS, Pune 05-06 July 2023	05
6	Workshop on "Training Needs Assessment (TNA) for Water Resources Development & Management (WRD&M) organized by DoWR, RD & GR, Ministry of Jal Shakti"	SCOPE Convention Centre, Lodhi Road, New Delhi 07th July 2023	02
7	Seminar on "Developing Reading Habits: Competencies, Skills & Techniques for Librarians"	SNDT Women's University, Mumbai and Bombay Science Librarians' Association (BOSLA) 19th August 2023	01
8	7th International Conference on "Construction, Real Estate, Infrastructure and Projects Management (ICCRIP-2023)"	NICMAR University, Pune 11-12 August 2023	01
9	जल वायु परिवर्तन एंव जल प्रबंधन'	"राष्ट्रीय जलविज्ञान संस्थान" रुड़की 17-18 August 2023	01
10	"Eighth National Conference of Ocean Society of India (OSICON-23)"	Indian National Centre for Ocean Information Services (INCOIS) and Ocean Society of India. 23-25 August 2023	03
11	"International Conference on Dam Safety (ICDS) 2023" organized by DoWR, RD & GR, MoJS in collaboration with Rajasthan WRD, CWC, National Dam Safety Authority, MNIT Jaipur, WAPCOS ltd and World Bank.	Jaipur, Rajasthan. 14-16 September, 2023	20

12	"Rock Mechanics and Tunnelling Techniques" organized by Indian National Group of International Society for Rock Mechanics (ISRM-India) in association with Central Board of Irrigation & Power (CBIP).	New Delhi. 14th -15th September 2023	04
13	"44th Annual Conference of Maharashtra Chapter: MAPCON 2023" organized by Symbiosis Medical College for Women, Pune.	Symbiosis Medical College for Women, Pune. 06-08 October, 2023	01
14	"4th International Conference on Futuristic and Sustainable Aspects in Engineering and Technology (FSAET-2023)" organized by GLA University, Mathura in collaboration with National Council for Cement and Building Materials (NCCBM), Faridabad.	Online mode. 28-30 November, 2023	01
15	National workshop on "Risk Informed Dam Safety Management" organized by the Indian National Committee on Large Dams (INCOLD) in association with Central Board of Irrigation & Power (CBIP)	THDC-Takshashila Training Centre, Rishikesh, Uttarakhand 21-22 December 2023	02
16	28th International Conference on "Hydraulics, Water Resources, Environmental and Coastal Engineering (HYDRO-2023)" by Department of Civil Engineering, National Institute of Technology (NIT) Warangal, Telangana in association with Indian Society for Hydraulics (ISH), Pune.	NIT, Warangal 21-23 December 2023.	22
17	" International Conference on Future of Water Resources (ICFWR-2024)" jointly organized by Department of Water Resources, Development and Management, IIT Roorkee and Indian Water Resources Society (IWRS)	IIT Roorkee 21-22 December 2023	01
18	"International Conference on Futuristic Advancements in Materials, Manufacturing and Thermal Sciences (ICFAMMT-2024)" jointly organized by Institute of Infrastructure Technology Research and Management (IITRAM), Ahmedabad and Space Society of Mechanical Engineers (SSME), ISRO Ahmedabad.	IITRAM. Ahmedabad 19-21 January, 2024	01
19	Conference on "Water Vision@2047-Way Ahead" organized by NWM, MoJS.	Mahabalipuram, Tamilnadu 23rd January 2024	01
20	"Assessment of wave tranquility aspects for development of Passenger Terminal near Gateway of India Mumbai" published in "World Ocean Science Congress (WOSC-2024) conference" by National Institute of Ocean Technology(NIOT), Chennai; Indian Institute of Technology Madras and Vijnana Bharati (VIBHA).	IIT Madras Research Park, Chennai. 27-29 February , 2024	01
21	"Design of layout of suitable anti erosion bund for development of the fishing harbour" published in		01

	"World Ocean Science Congress(WOSC-2024) conference" by National Institute of Ocean Technology(NIOT), Chennai; Indian Institute of Technology Madras and Vijnana Bharati (VIBHA).		
22	"Importance of Spectral Peakedness Parameter for Realistic Simulation of Wave Climate for Marinas" published in "International Water Conference for Sustainable Development Goals (IWCSDG-2024)" being organized by Maulana Azad National Institute of Technology (MANIT), Bhopal in association with MPCST- Bhopal, WALMI-Bhopal, NIH-Roorkee, CWC-Bhopal, IGS & IEI MP State Centre.	MANIT, Bhopal 22- 23 March, 2024	01
23	"Coupled Sediment Modelling: A Comprehensive Approach for Anchorage Development in Estuarine Regions" published in"International Water Conference for Sustainable Development Goals (IWCSDG-2024)" being organized by Maulana Azad National Institute of Technology (MANIT), Bhopal in association with MPCST- Bhopal, WALMI-Bhopal, NIH-Roorkee, CWC-Bhopal, IGS & IEI MP State Centre.		01

INVITED LECTURES DELIVERED

Sl. No.	Title/Topic	Event	Place and Date	Name of Officer
1.	Office Procedures, Filing System & Record Management	Induction Training Program for newly recruitment AEs/JEs Engineers of National Water Development Agency	National Water Academy, CWC, Khadakwasla, Pune 17th April, 2023	Shri Vishal Dond, CAO
2.	FR & SR-I &II-Pay, Allowances, Leave Rules, TA/DA etc.			
3.	Geotechnical Applications like Slope Stability, Permeability and Insitu Properties	Technical Lecture Series	Bharati Vidyapeeth's College of Engineering, Lawale, Pune 20th April 2023	Dr. Sanjay. A. Burele, Sci 'B'
4.	"Reservoirs and Appurtenant Structure"	Technical Lecture Series	Bharathi Vidyapeeth College of Engineering, Lawale, Pune 22nd April 2023	Dr. R. G. Patil, Sci 'E'
5.	"Role of Central Water Power Research Station in Water Resources Development and Management"	33rd Induction Training Programme for Central Water Engineering Services (CWES) Group 'A' probationary officers.	National Water Academy, CWC, Khadakwasla, Pune-411024 26th April 2023	Dr. R. G. Patil, Sci 'E'
6.	'संघ के राजभाषा नीति एवं कार्यान्वयन "	33rd Induction Training Program for Central Water Engineering Services (CWES) for Group 'A' probationary officers	National Water Academy (NWA), Khadakwasla, Pune 03rd May 2023	Smt. Vijaya Nagpure, Assistant Director (OL)
7.	"CCS Conduct Rules, Vigilance / Disciplinary Rules"	33rd Induction Training Program for Central Water Engineering Services (CWES) for Group 'A' probationary officers	National Water Academy (NWA), Khadakwasla, Pune 04th May 2023	Shri Vishal Dond, CAO
8.	"Use of Sampling in Audit"	Training Program for AAOs, due for promotion to the post of Sr. AO	Director General of Commercial Audit, Mumbai 24th May 2023	Dr. Ruhi Kulkarni, SRO
9.	"Grouting Techniques and various Grout Mixes: Case study Pointing and Raking Treatment: Case Study"	Training program on 'Dam Safety Aspects- An Overview'	National Water Academy (NWA), Khadakwasla, Pune 25th May 2023	Shri R. Vigneswaran, Sci 'B'
10.	"Introduction to Coastal Process"	33rd Induction Training Program (ITP) for for Central Water Engineering Services (CWES) for Group 'A' Officers	National Water Academy (NWA), Khadakwasla, Pune 15th June 2023	Dr. Phani Kumar, Sci 'D'

11.	"Coastal Erosion and Littoral Process"			Shri Sanjay Jha, ARO
12.	"CMIS Costal site selection and Data Requirements"			Shri S. G. Manjunatha Sci 'E'
13.	"Beach Surveys and Data Analysis"			
14.	"Introduction to Mathematical Modeling in Coastal Engineering		National Water Academy (NWA), Khadakwasla, Pune 16th June 2023	Dr. J. Sinha, Sci 'E'
15.	"Field data collection of waves currents, tides, River discharge, sediment and water samples and analysis "			Shri Raman Rao, Sci 'E'
16.	Data Collection of Bathymetry Surveys, Automatic Weather Station"			Smt. R. B. Deogade, Sci 'E'
17.	River Morphology, Basic concepts of processes and terminology brief introduction to physical modeling aspects of a reverse course example Kosi River Model"		National Water Academy (NWA), Khadakwasla, Pune 19th June 2023	Shri Arun Kumar, Sci 'D'
18.	River Behavior management and River Training structure/works for flood management"			
19.	"Design of Breakwaters and coastal Protection Works"		National Water Academy (NWA), Khadakwasla, Pune 20th June 2023	Shri. A.V. Mahalingaiah, Sci 'E'
20.	"Seismic Studies for Feasibility Study and DPR for River Valley Projects"	Training Program on "Survey, Investigation and Preparation of Detailed Project for River Valley Projects	NWA Pune and Brahmaputra Basin Organization, CWC, Guwahati 27th June 2023	Shri Sachin N. Khupat, Sci 'C'
21.	"Instrumental Techniques in Water Chemistry"	National Seminar Organizing Committee, Department of Chemistry	St. Paul's College Kalamassery, Cochin, Kerala 10th July 2023	Dr. P. S. Akhil, Sci 'B'
22.	Workshop on "Innovative Concepts in Ocean Engineering"	One day workshop on "Innovative Concepts in Ocean Engineering" organized by Department of Water Resources and Ocean Engineering, NITK, Surathkal.	NITK, Surathkal, Mangalore 28th July 2023	Dr. V. Kumaran, Sci 'B'
23.	"Establishment Matters, Conduct Rules, Dos and Don'ts to Government Servant"	Two Weeks Mandatory Induction Training Program for newly recruited Multi Tasking Staff (MTS)	National Water Academy (NWA), Khadakwasla, Pune 02nd August 2023	Shri Vishal Dilip Dond, CAO

24.	"Climate change- its importance and impact in our life"	In-house lecture under TMC, CWPRS	CWPRS, Pune 03rd August 2023	Dr. K. C. Sahu, Sci. 'C'
25.	"Automation in Irrigation and SCADA"	Training Program for newly recruited CWES Group 'A' probationary Officers	National Water Academy (NWA), Khadakwasla, Pune 10th August 2023	Dr. M. Selva Balan, Sci. 'E'
26.	"Officials Statics"	Guest speaker for alumni lecture series	Department of Statistics, University of Kerala (Online mode). 19th Aug 2023	Dr. K. V. Reshmi, C.R.O (STAT)
27.	"जल गुणवत्ता प्राचलों का महत्व"	हिंदी कार्यशाला	CWPRS, Pune 25th August 2023	Shri Jitesh Vyas, Sci. 'C'
28.	"जल संरक्षण और प्रबंधन के लिए बांध सुरक्षा का महत्व "			Shri A. D. Chunade, ARO
29.	"तटीय हाइड्रोलिक संरचनाओं का डिजाईन"			Shri Uday Patil, Sci. 'C'
30.	"उत्पलाव मार्ग और उर्जा क्षयकारक के लिए भौतिक और संख्यात्मक प्रतिमान अध्ययन "			Smt Prajakta Gadge, Sci. 'C'
31.	"Hydrological, hydraulic and sediment transport modeling for planning and design of River works from the prospective of flood and erosion risk management"	Training Program on "Survey, Investigation and Preparation of Detailed Project Report for River Valley Projects (for Officers of Govt. of Assam).	National Water Academy (NWA), Khadakwasla, Pune and Govt. of Assam at Assam Water Centre, Guwahati 23rd August 2023	Shri P. S. Kunjeer, Sci. 'D'
32.	"Indian statistical system and career opportunities"	Lecture series on 'Indian statistical services and role of statistical in governance'	Online mode Symbiosis Statistical Institute, Pune 02nd September 2023	Dr. Ruhi Kulkarni, SRO
33.	"The future scope in statistics and data analytics"	Orientation programme for M.Sc. (Statistics-Data Analytics) students.	Online mode Mar Ivanios College, Trivandrum 25th September 2023	Dr. Reshmi K. V., CRO
34.	"FEM: Theory, methodology, assumption & limitations, different types of elements and its application, static & dynamic analysis"	33rd Induction training program for CWES (Group A) Probationary officers.	NWA, Pune 22nd September 2023	Shri Hanumanthappa M. S., Sci 'D'
35.	"Role of artificial intelligence and machine learning for innovative projects "	Lecture series for2nd Year Petroleum Engineering students on 'RIDE23: Research, Innovation , Design and Entrepreneurship '	MIT World Peace University, Pune 06th October 2023	Dr. M. Selva Balan, Sci 'E'
36.	"Role of Hydraulic Model Studies: Theory and concept of resorting to hydraulic model studies in Hydel Civil Design"	Training programme organized by NWA for newly recruited CWES Group 'A' officers for M.Sc. (Statistics-Data Analytics) students.	NWA, Pune 13th October 2023	Shri V. S. Ramarao, Sci 'C'

37.	"Advantages of GNSS,SAR and SDB technology over traditional VW instruments in dam health assessment along with case studies"	Training course on "Role and Application of Geotechnical Instrumentation in Water Resources Projects" organized by CSMRS, New Delhi	New Delhi 27th October 2023	Dr. M. Selva Balan, Sci 'E'
38.	Reservoir Sedimentation: Bathymetry Survey (Remote Sensing and Hydrographic) with a Case Study; Reservoir Sedimentation Studies under DRIP: Methods, Codal provisions and Case Studies.	33rd Induction Training Program (ITP) for CWES (Group A) Probationary Officers on "Dam Safety and Instrumentation" is being organized by NWA, Pune from 06th to 10th November 2023'	NWA, Pune 07th November 2023	Shri Kunjeer P. S., Sci 'D'
39.	Structural Health Monitoring through Instrumentation of Dams (Hydrometeorological, Geotechnical, Geodetic and Seismic Instruments): Need, Types, installation testing and commissioning, Data Acquisition and Dissemination, result interpretation and analysis etc"		NWA, Pune 08th November 2023	Shri Rizwan Ali, Sci 'E'
40.	Investigation for seepage issues: Seepage Issues in Concrete, Masonry Dams& Earthen Dams - Monitoring and collection of Data, Various Remedial measures available		NWA, Pune 08th November 2023	Dr. Naidu G. D., Sci 'C'
41.	Nanotechnology Intervention in Wastewater Treatment	National Seminar organized by K.L University Hyderabad	K.L. University Hyderabad, Telangana 22nd November 2023	Dr. Srinivas Billakanti, Sci 'B'
42.	"Establishment and Administrative Matters, FR& SR, RTI etc. from an audit standpoint"	Training program organized by NWA, Pune for Batch-III Mandatory Cadre Training Program Level-1 for Central Water Engineering Service Officers (Group A) of the level of Junior Time Scale Officers(AD/AEE/AC)	NWA, Pune 28th November 2023	Shri Vishal Dilip Dond, CAO
43.	"Model studies for pumped storage hydroelectric project"	One week training program on the "Pumped storage hydroelectric projects "	NWA, Pune 12th January 2024	Shri P. M. Abdul Rahiman, Sci 'E'

44.	"Hydrological, hydraulic and sediment transport modeling for planning and design of River works for flood and erosion risk management"	The training program on 'Preparation of DPRs for Flood Protection, Anti Erosion and River Training Works (for Officers of Govt. of Bihar)' being organized by NWA, Pune	WALMI, Patna 01st February,2024	Shri P. S. Kunjeer, Sci 'D'
45.	"Non contact measurement techniques for flow level and discharge in canal and Rivers"	One week training program on "Hydrometeorological Observations" being organized by NWA, Pune during 19-24 February, 2024	NWA, Pune 24th February, 2024	Dr. M. Selva Balan, Sci 'E'
46.	"Advanced bathymetry- Survey technology for mapping sedimentation"			Dr. M. Selva Balan, Sci 'E'
47.	"Application of mathematical modelling for design of water resources structures – Structural Aspects"	One week training program on "Use of Advanced Software in Design of Water Resources Structures" being organized by NWA, Pune during 26th February to 01st March, 2024	NWA, Pune 26th February, 2024	Shri Hanumanthappa MS, Sci 'D'
48.	"Application of mathematical modelling for design of water resources structures – Hydraulic Aspects"			Dr. (Mrs.) Prajakta P. Gadge, Sci 'C'

TECHNICAL COMMITTEE MEETINGS ATTENDED

Sl. No.	Name of Committee	Date and Venue	Participants
1.	Meeting at NCCR, Chennai of PMC for Kalpasar Project.	NCCR, Chennai 03rd April 2023	Dr. R. S. Kankara, Director
2.	Meeting with Joint Secretary (A), DoWR to review the status of RR and cadre review of different posts at CWPRS.	New Delhi 05th April 2023	Dr. R. S. Kankara, Director
3.	1st Meeting of the Committee for conducting a joint technical study to formulate an integrated plan to combat threat of erosion posed by Ganga-Padma River system in West Bengal.	CWC, New Delhi 06th April 2023	Dr. R. S. Kankara, Director Shri Arun Kumar, Sci 'C'
4.	Meeting with Secretary (WR) regarding filling up vacancies in mission mode.	New Delhi (online mode) 18th April 2023	Dr. R. S. Kankara, Director
5.	Review meeting the Chairmanship of Secretary (WR)	01st May 2023	Dr. R. S. Kankara, Director
6.	Governing Council meeting of CSMRS.	CSMRS, New Delhi 11th May 2023	Dr. R. S. Kankara, Director
7.	Workshop for Chairmen of Technical Committees of BIS.	NITS, Noida 12th May 2023	Dr. R. S. Kankara, Director
8.	Meeting chaired by Shri Kushvinder Vohra, Chairman, CWC on Polavaram Irrigation Project Andhra Pradesh.	Online mode 06th June 2023	Dr. R. S. Kankara, Director Shri Y.N. Srivastava, AD Shri V.S. Ramarao, Sci 'C'
9.	Meeting review expenditure under chairmanship of Secretary (WR).	Online mode 07th June 2023	Dr. R. S. Kankara, Director
10.	28th meeting of Rock Mechanics Sectional Committee, CED 48 organized by BIS, New Delhi.	Online mode 13th June 2023	Shri Rizwan Ali, Scientist 'E' Dr. Sanjay Burele, Sci 'C'
11.	National workshop organized by MoJS on "Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development"	New Delhi 19th June 2023	Dr. R. S. Kankara, Director
12.	Meeting held by Morphology Directorate, CWC of joint technical study to formulate plan to combat threat of erosion posed by Ganga Padma River System West Bengal.	Online mode 21st June 2023	Dr. R. S. Kankara, Director
13.	Review meeting held by Secretary (WR) to review progress of filling up of vacancies under mission recruitment.	Online mode 22nd June 2023	Dr. R. S. Kankara, Director
14.	23rd meeting of WRD-10 sectional committee for reservoir and lakes of bureau of Indian standards (BIS) via virtual mode.	Online mode 22nd June 2023	Dr. Neena Isaac, Scientist 'E'
15.	18th meeting of CPDAC	Mumbai 27-28 June 2023	Shri S. G. Manjunatha, Scientist 'E'

16.	Attended the Board of Assessment of Scientist 'B' to Scientist 'C' of CWPRS at UPSC.	New Delhi 11-13 July 2023	Dr. R. S. Kankara, Director
17.	International Workshop on "Advance in Coastal Research with special reference to Indo Pacific-2023"	NCCR, Chennai 21-22 July 2023	Dr. R. S. Kankara, Director
18.	Departmental Advisory Board (DAB) meeting of Dr. D.Y. Patil Institute of Technology, Pimpri.	Online mode 28th July 2023	Dr. R. S. Kankara, Director
19.	Meeting regarding assessment of manpower for NEHARI activities.	Brahmaputra Board, Guwahati 04th August 2023	Dr. R. S. Kankara, Director
20.	Meeting with Secretary (WR) regarding pending pension cases.	Online mode 11th August 2023	Dr. R. S. Kankara, Director
21.	Review meeting by Secretary (WR) regarding recruitment, expenditure, VIP references etc.	Online mode 16th August 2023	Dr. R. S. Kankara, Director
22.	Meeting with Chairman (CWC) regarding flood management between Hathnikund and Okha barrage	Delhi 04th September 2023	Dr. R. S. Kankara, Director
23.	1st meeting of National Technical Committee (NTC) of ICOLD	Hybrid mode 18th October 2023	Dr. R. S. Kankara, Director
24.	7th DSRP meeting at Sardar Sarovar dam, Gujarat	Sardas Sarovar dam, Kevadiya Colony, Gujarat 20-22 October 2023	Dr. Naidu Suneetha, Sci 'B' Shri Santosh Kumar Ranga, ARO
25.	4th panel meeting of WRD 14 Sectional Committee on Water Conductor System.	Online mode 26th October 2023	Shri M. K. Verma, Sci 'D' Shri M. Z. Qamar, Sci 'C' Smt. Sushma Vyas, Sci 'C'
26.	WRD 09 Sectional Committee meeting on Dams and Spillway	Online mode 27th October 2023	Dr. Prajakta Gadge, Scientist 'C'
27.	Gandak High Level Standing Committee (GHLSC)	Kushinagar, U.P. 31st October 2023-03rd November 2023	Shri B. Raghuram Singh, Scientist 'D'
28.	Meeting regarding Research & Development (R&D) initiative of BIS.	Online mode 9th November 2023	Shri M. K. Verma, Sci. 'D' Shri M. Z. Qamar, Sci. 'C' Smt. Sushma Vyas, Sci. 'C'
29.	5th panel meeting of WRD 14 Sectional Committee.	Online mode 9th November 2023	Shri M. K. Verma, Sci. 'D' Shri M. Z. Qamar, Sci. 'C' Smt. Sushma Vyas, Sci. 'C'
30.	2nd meeting of committee for flood management study for Hathnikund and Okha barrage.	CWC, Delhi 13th November 2023	Dr. R. S. Kankara, Director
31.	1st committee meeting for joint flood management study in wake of floods in state of Himachal Pradesh, Punjab and Uttarakhand in CWC	Online mode 21st November 2023	Dr. R. S. Kankara, Director
32.	Meeting with BIS for WRD 13-Canals and cross drainage works sectional committee	Virtual mode 21st November 2023	Shri Suresh Kumar, Sci. 'D' Dr. Sampath S., Sci. 'C'

33.	Internal meeting of CWC and Ministry representatives in the committee of Ganga Padma River System.	CWC, Delhi 23rd November 2023	Dr. R. S. Kankara, Director
34.	3rd meeting of the committee of Ganga Padma River System.	CWC, Delhi 24th November 2023	Dr. R. S. Kankara, Director
35.	29th meeting of Rock Mechanics Sectional Committee, CED 48.	Online mode 30th November 2023	Shri Rizwan Ali, Sci. 'E' Shri Sanjay Burele, Sci. 'C'
36.	22nd meeting of Water Conductor Systems Sectional Committee under WRD 14	Online mode 11th December 2023	Shri M. Z. Qamar, Sci. 'C' Smt Sushma Vyas, Sci. 'C'
37.	171th meeting of MCZMA for CRZ clearance with regard to development of port at Vadhvan.	Online mode 15th December 2023	Shri M. M. Vaidya, Sci. 'D'
38.	4th meeting of committee of Ganga-Padma River system under chairmanship of chairman, CWC.	Online mode 19h December 2023	Dr. R. S. Kankara, Director
39.	25th Sectional Committee meeting under WRD 08.	Online mode 21st December 2023	Shri Rizwan Ali, Sci.'E' Dr. Sanjay Burele, Sci.'C'
40.	26th meeting of Canal Study Group (CSG) and 68th meeting of GATE regulation committee of Farakka barrage project	West Bengal 02-03 January 2024	Shri Arun Kumar, Sci. 'C'
41.	NLSC meeting of NHP under the chairmanship of Secretary,DoWR	The Imperial, Janpath, Delhi 10th January 2024	Dr. R. S. Kankara, Director
42.	Panel meeting of WRD-16 sectional committee.	Online mode 19th January 2024	Shri Sachin Khupat, Sci. 'C'
43.	38th STAC meeting of CSMRS	Online mode 29th January 2024	Dr. R. S. Kankara, Director
44.	119th TAC meeting of Farakka barrage project at CWC	Online mode 30th January 2024	Dr. R. S. Kankara, Director Shri Arun Kumar, Sci. 'C'
45.	Kosi high level committee meeting	Birpur, Bihar 30th January 2024	Dr. R. G. Patil, Sci. 'E'
46.	23rd meeting of BIS- Groundwater and related investigations sectional committee WRD 03	Online mode 02nd February 2024	Shri Govind Panvalkar, Sci. 'C'
47.	Sectional committee: WRD 10 meeting for reservoirs and lakes.	Online mode 05th February 2024	Dr. V. M. Prabhakar, Sci. 'C' Shri Nishchay Malhotra, Sci. 'B'
48.	Sectional committee: WRD 29 meeting for small hydropower plants.	BIS HQ, New Delhi 27th February 2024	Shri M. K. Verma, Sci. 'D'
49.	2nd meeting of committee for Joint Flood Management Study in wake of the extensive floods in the states of Himachal Pradesh, Panjab and Uttarakhand	CWC, New Delhi 29th February 2024	Dr. R. S. Kankara, Director
50.	WRD-01 sectional committee meeting BIS.	Online mode 12th March 2024	Dr. R. S. Kankara, Director Shri B. Suresh Kumar, Sci. 'D'
51.	1st meeting of WG-2 under WRD-14 for water conductor system sectional committee.	Online mode 18th March 2024	Shri M. K. Verma, Sci. 'D' Shri M. Z. Qamar, Sci. 'C' Smt Sushma Vyas, Sci. 'C'

52.	4th committee meeting of Ganga, Padma River system.	Online mode 22nd March 2024	Dr. R. S. Kankara, Director

TRAINING PROGRAMS ATTENDED

Sl. No.	Title	Event, Place, Date	No. of Participant(s)
1.	"जलसंसाधन के विकास से संबंधित पर्यावरणीय सम्स्याएँ"	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे 20अप्रैल 2023	48
2.	"In-house Induction Training for Newly Joined employee"(Gr. B & C)	CWPRS, Pune 25-27April 2023.	60
3.	"Hydrologic Unit Model for InDia (HUMID) organized by National Remote Sensing Centre (NRSC) and IIT-Madras NRSC Regional Centre (Central), Nagpur" under NHP	NRSC Regional Centre (Central), Nagpur 9-11 May2023	2
4.	"Application of NASA SPoRT-Land Information System (SPoRT-LIS) Soil Moisture Data for Drought"	Organised by NASA-ARSET 17th ,24th and 31st May 2023	1
5.	"National workshop on instrumentation of existing dams"	Organised by CWPRS, Pune 24-26 May2023	4
6.	"Introduction to Google Earth Engine (GEE) & application of GEE in Water Resources Management"	Organized by Andhra Pradesh Surface Water (APSW) and NWA, Pune at Vijayawada, Andhra Pradesh 24-26 May 2023	2
7.	Training Program on"Remote Sensing & GIS Technologies"	Organized by NRSC, Hyderabad 05-09 June 2023	2
8.	"Fundamental of Computer, Networking & Related Applications at CWPRS" organized by TMC, CWPRS, Pune	Organized by TMC at CWPRS, Pune 06-07 June, 2023	16
9.	Training Program on "Introduction to Google Earth Science (GEE) & its application in water Resources Management" organized by National Water Academy (NWA), Pune under NHP.	NWA, Pune 12-16 June 2023	3
10.	National Workshop on "Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development" organized by Ministry of JalShakti, New Delhi.	New Delhi 19th June 2023.	4
11.	Training Course on "Operation and maintenance of RSWG system of 120m of 120m Wave Flume at CWPRS"	CWPRS, Pune 21- 22 June 2023.	26

12.	Training Course on "MIKE -21 Shoreline Morphology"	Organized byCWPRS, Pune 27- 28 June 2023	22
13.	हिन्दी कार्यशाला	केन्द्रीय जल और विद्युत अनुसंधानशाला, खड़कवासला, पुणे 05 जुलाई 2023	25
14.	National workshop on "Challenges in selection, operation and maintenance of large pumping and hydro turbine"	Organized by CWPRS, Pune 05-06 July 2023.	5
15.	Online training course on "Hydraulic and mathematical modeling of spillway and other hydraulic structures"	Organized by CWPRS, Pune 19-20 July 2023.	8
16.	2 days webinar on "Legal and Institutional Frame wok of dam safety in India"	Organized by National Water Academy (NWA), Pune 25-26 July 2023	1
17.	Training Program on "STEP and Contract Management System"	Organized by World Bank in association with NPMU, New Delhi 21-22 August 2023	2
18.	Training Program on "SWAT Hydrological Modeling"	Organized by National Water Academy, Pune in cooperation with India-EU Water Partnership Action-Phase-2 21-26 August 2023	1
19.	Training Program on "Modern Bathymetry Techniques and Data Analysis"	Organized by CWPRS, Pune 22-24 August 2023	2
20.	Webinar Series on "Inter-Sate River Water Disputes In India"	Organized by National Water Academy, Khadakwasla Pune 10th August 2023 to 21st December 2023 (20 Weeks)	5
21.	हिन्दी कार्यशाला	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे 25 अगस्त2023	25
22.	Training Program on "Policy for Science and Science for Policies"	Organized by NIAS with support of DST, Bengaluru 11-15 September 2023	2
23.	Training Program on "Climate Risk Management: Policy and Governance"	Organized by Centre for Disaster Management- a unit of LBSNAA, Mussoorie and sponsored by DST under plan scheme-"National programme for Training of Scientists and Technologists working in Government Sector", LBSNAA, Mussoorie.	2

		11-15 September 2023	
24.	Workshop on "Rock Mechanics and Tunnelling Techniques"	Organized by Indian National Group of International Society for Rock Mechanics (ISRM-India) in association with Central Board of Irrigation & Power(CBIP), New Delhi. 14th -15th September 2023	4
25.	"Seventh International Distance learning course in Basic Hydrologic Sciences for Asian Region (WMO RA-II)"	Organized by National Water Academy (NWA), Pune in association with World Meteorological Organization 03rd October, 2023 to 17th November, 2023	3
26.	Training Program on "Global Data Processing using Python and Notebook in Geospatial Platform"	Organized National Water Academy (NWA), Pune. 25-27 October 2023	2
27.	Training Program on "Role and application of Geo Technical Instrumentation in Water Resources Projects"	Organized by CSMRS, New Delhi. 26th -27th October 2023	2
28.	Awareness Generation webinar as a part of Vigilance Awareness Week	Organized by National Water Academy (NWA), Pune. 30th October 2023 to 05th November 2023	1
29.	Training Program on "Design of Hydro-Mechanical Equipment of Water Resources Projects"	Organized by National Water Academy (NWA), Pune. 30th October 2023 to 03rd November 2023	1
30.	5 days training program on "Dam Safety and Instrumentation"	Organized by National Water Academy (NWA), Pune 06th to 10th November, 2023	2
31.	5 days training program on "Management Aquifer Recharge/Artificial Recharge to Ground Water"	Organized by Rajiv Gandhi National Ground Water Training and Research Institute (RGNGWTRI), Naya Raipur, Chhattisgarh at RGNGWTRI, Raipur under NHP. 20th to 24th November, 2023	1

32.	5 days training program on Public Procurement for Government officers	Organized by Administrative Staff College of India (ASCI), Hyderabad in their campus 27th November to 01st December, 2023	2
33.	One-week Mid-Career training programme (MCTP) Phase-I on "Management Development"	Organized by National Statistical Systems Training Academy (NSSTA) under M/o Statistical and Program Implementation at IIM, Ahmedabad. 28th November to 02nd December, 2023	1
34.	3 days training program on "Modernization of Irrigation Systems using RAP-MASSCOTE Approach"	Organized by NWA, Pune 06-08 December,2023	2
35.	In house training course on "Hands on AutoCAD"	Organized by CWPRS, Pune 07-08 December 2023	26
36.	Training course on "Repair and rehabilitation of structures of hydro power projects"	13-14 December 2023	4
37.	हिन्दी कार्यशाला	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे 20 दिसंबर 2023	25
38.	National workshop on "Risk Informed Dam Safety Management"	Organized by the Indian National Committee on Large Dams (INCOLD) in association with Central Board of Irrigation & Power (CBIP) 21-22 December 2023.	2
39.	5 days training program on "Pumped Storage Hydroelectric Projects"	Organized by NWA, Pune 08-12 January, 2024	3
40.	One day workshop on "Application of NGCM data available at NGDR Portal"	Organized by the GSI, SU: Maharashtra, Pune office 30th January 2024	2
41.	5 days training program on Operation and maintenance of RSWG system"	Kalpasar Hangar CWPRS, Pune 12-13 February, 2024	14
42.	12 days training program on "SWAT Modelling using Hydrologic Unit Model for InDia (HUMID)"	Organized by NRSC at NRSC Hyderabad 12-23 February, 2024	2
43.	5 days training program on "Introduction to Remote Sensing (RS) & Geographical Information System (GIS) using QGIS"	Organized by NWA, Pune 19-23 February, 2024	4
44.	Training course on "Remote Sensing- Basics and its Applications"	CWPRS, Pune 27-28 February, 2024	13

TRAININGS / CONFERENCES / SEMINARS ORGANIZED

Sr. No.	Title
1.	जल संसाधन के विकास से संबंधित पर्यावरणीय सम्स्याएँ" विषय पर केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 20 अप्रैल 2023 हिंदी संगोष्ठी का आयोजन किया गया|
2.	In-house Induction Training for Newly Joined (Gr. B & C) employeeorganized by TMC at CWPRS, Pune from 25th to 27th April 2023.
3.	National workshop on instrumentation of existing dams. 24-26 May2023.
4.	Fundamental of Computer, Networking & Related Applications at CWPRS organized by TMC at CWPRS, Pune on 06-07 June, 2023.
5.	Training Course on "Operation and maintenance of RSWG system" at 120 m wave flume organized at CWPRS, Pune on 21-22 June 2023.
6.	Training Course on "MIKE -21 Shoreline Morphology" organized at CWPRS, Pune on 27-28 June 2023.
7.	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 05 जुलाई 2023 को हिन्दी कार्यशाला का आयोजन किया गया |
8.	National workshop on "Challenges in selection, operation and maintenance of largepumping and hydro turbine" organized at CWPRS, Pune 05-06 July 2023.
9.	Online training course on "Hydraulic and mathematical modeling of spillway and other hydraulic structures" organized at CWPRS, Pune during 19-20 July 2023.
10.	Training Program on "Modern Bathymetry Techniques and Data Analysis" organized by CWPRS, Pune during 22-24 August 2023-24.
11.	केन्द्रीय जल और विद्युत अनुसंधान शाला, खड़कवासला, पुणे में 25 अगस्त 2023 का हिन्दी कार्यशाला का आयोजन किया गया |
12.	"Training course on Coastal Engineering Aspects and CMIS Activities" organized by CWPRS during 04-08 September 2023.
13.	Online training programme on "Review of Safety of Hydro Power Projects" organized by CWPRS during 04th & 05th October2023
14.	Training course on "Testing & Calibration of AWS Sensors, AWLP, SCADA and Data Validation" under NHP during 01-03 November 2023.
15.	Training course on "Coastal erosion & sustainable protection measures" under NHP during 07th and 08th November 2023
16.	Training course on "Repair and rehabilitation of structures of hydro power projects" during 13-14 December 2023.
17.	In house training course on "Hands on AutoCAD" during 07-08 December 2023.
18.	"हिन्दी कार्यशाला "का आयोजन 20 दिसंबर 2023 को किया गया |
19.	Online training programme on "Real time monitoring network for groundwater level, its installation, Maintenance and testing" on 12th January, 2024.

20.	Online training programme on “Role of Hydraulic Modeling in River Engineering” during 16-17 January, 2024.
21.	Training programme on “Calibration/Testing facilities at CWPRS for various hydrological parameters” under NHP during 18-19 January, 2024
22.	“Customized training programme for officials deputed by CBIP” during 17-30 January, 2024.
23.	Training course on “Hydraulic model studies & design of breakwater for fisheries harbour ”during 14-16 February, 2024.
24.	Training course on “Dam structural health monitoring using Dam Instrumentation“for TNWRD officials during 20-23 February, 2024
25.	Training course on "Operation and maintenance of RSWG system" at Kalpasar Hangar during 12-13 February, 2024.
26.	Training course on “Remote Sensing- Basics and its Applications” during 27-28 February 2024.
27.	Two days online National Training Course on ‘Hydromet& Real Time Monitoring Network – Equipment & its Installation’ during 6-7 March, 2024.

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