DRIP
Dam Rehabilitation & Improvement Project

सत्यमेव जयते
Ministry of Water Resources, River Development and Ganga Rejuvenation
Government of India

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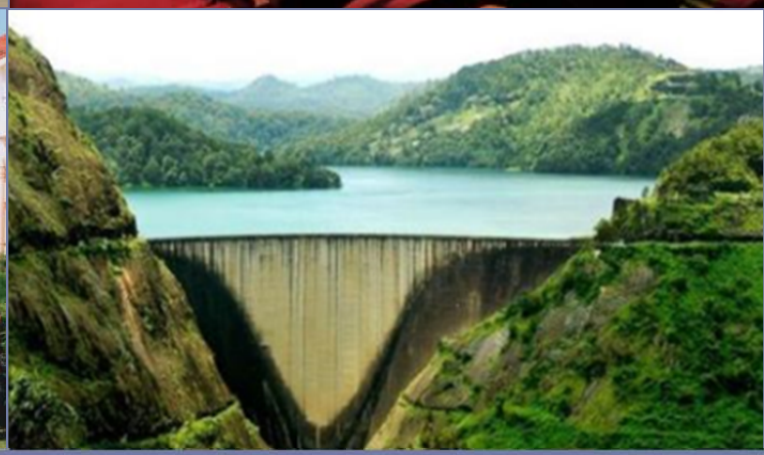


INSIDE

Improving Dam Safety across India

The **Dam Rehabilitation and Improvement Project** (DRIP) is an initiative undertaken by the Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India, with World Bank financial assistance, to improve the safety and performance of selected existing dams and associated appurtenances in a sustainable manner, and to strengthen the dam safety institutional capacity in participating Implementing Agencies across seven States as well as in the Central Water Commission.

Financial Assistance THE WORLD BANK IBRD • IDA | WORLD BANK GROUP

Technical Assistance egis

A brief overview…

DRIP

Introduction

There are 5254 large dams in operation in India and 447 are under construction. In addition, there are several thousand smaller dams. All of these dams are vital for ensuring water availability and energy security of the country in a sustainable manner and regulating floods and droughts to a certain extent.

In April 2012, the six-year Dam Rehabilitation and Improvement Project (DRIP) was launched at an estimated cost of 2100 Crore INR for assisting dam-owning agencies in rehabilitating selected dams across selected states.

DRIP project is not an initiative to provide budgetary support but to bring new initiatives in the dam safety area through technological advances, innovative rehabilitation materials, best global practices, capacity building, cross learning, technical regulations, strengthening of Dam Safety Organisations, etc.

In 2017, the project was extended by two years, until June 2020, to finish all of the programmed rehabilitation works on 223 dams in 7 states, with a proposed revised cost of 3466 Crore INR.

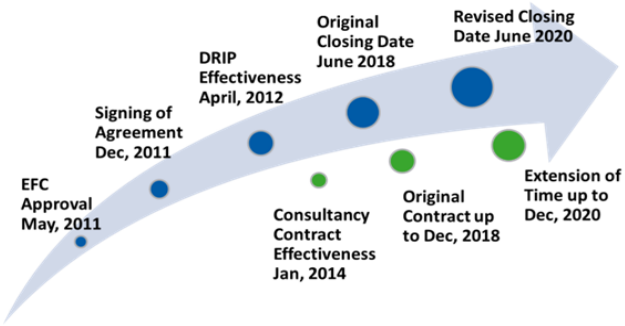


Figure 1 - DRIP Revised Timeline

DRIP Components

DRIP consists of three main components:

Component I: Rehabilitation of selected dams and their appurtenances

Component II: Institutional Strengthening activities, eg. Capacity building of selected academic institutions, national and international trainings, Emergency Action Plan (EAP), Dam Health and Rehabilitation Monitoring Application (DHARMA), Seismic Hazard Mapping, Seismic Hazard Assessment Information System (SHAISYS), Guidelines and Manuals, strengthening of Dam Safety Organisations, etc.

Component III: Project Management

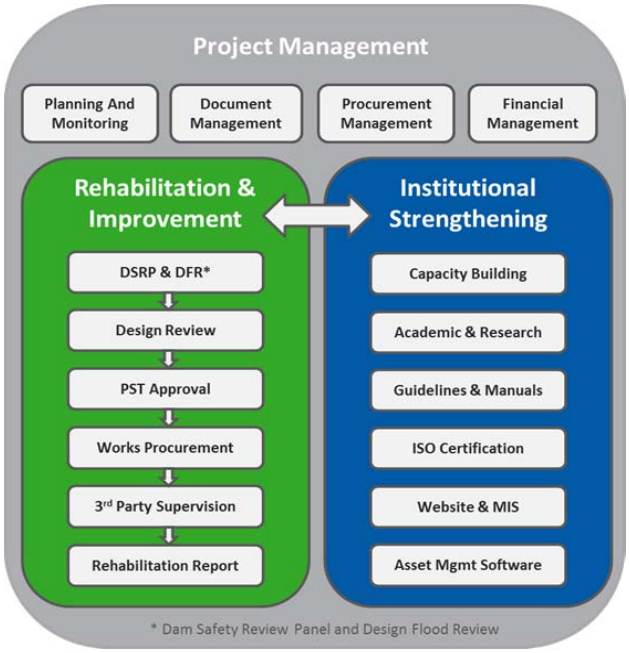


Figure 2 - Components and activities of DRIP CPMU

Implementing Agencies

There are currently ten Implementing Agencies (IAs) participating in DRIP; CWC along with nine dam-owning agencies from seven states: Madhya Pradesh (MPWRD), Odisha (OWRD), Tamil Nadu (TNWRD and TANGEDCO), and Kerala (KWRD and KSEB) have been involved since the beginning of the project, and Karnataka (KaWRD), Uttarakhand (UJVNL) and DVC joined later.

CPMU Team

The DRIP CPMU team consists of approximately 50 members and comprises the core CWC management group, several international and national specialists, and support staff. Most of the team is based in the New Delhi DRIP office. Additionally, five sub-unit offices are located in the capitals of Madhya Pradesh, Odisha, Tamil Nadu, Kerala and Karnataka.

Keeping track of the workflow…

Project Management

Introduction

Project Management encompasses all activities that enable the CPMU to implement the project in an effective and prompt manner. Some of these services are summarised below:

Project Planning and Monitoring

Each DRIP dam passes through a workflow of several stages, from inspection by Dam Safety Review Panel, Design Flood review, finalisation of Project Screening Templates (PSTs), Financial review, NIT and tender process through to completion. In order to capture the technical, procurement and financial information needed to effectively track the progress for each of the 223 dams and more than 1,000 associated work packages (for goods, works and services), a comprehensive Management and Information System (MIS) has been developed (MIS diagram on next two pages); The MIS is accessible to project stakeholders through the DRIP website and is updated weekly.

Document Management

One of the components of the MIS is a document management and dissemination system. To maintain this system, two Egis in-house software packages were adapted: i) *Sioux* for ensuring that quality standards for accuracy and presentation are met on each document, and ii) *Comanche* for ensuring that all queries and responses are classified according to task and/or project components.

In parallel to the above, the CPMU designs, develops and continues to revise and update various templates (documents, maps, presentations, and so on) to ensure clear and consistent reporting across the project. Key documents include Construction Supervision and Quality Assurance manual, Procurement manual, all standard World Bank documents, Project Screening Templates (PSTs), which have been prepared by the IAs for all DRIP dams, OK Cards, Technical Specitications for Instrumentation and Site Visit Reports. CPMU has also prepared 15 Project Rehabilitation Reports for dams where works have been completed.

Procurement Management

CPMU's procurement management responsibilities include reviewing annual Procurement and Post-Procurement Plans as well as all bidding documents for packages pertaining to its financial threshold. The bidding documents are prepared by each State Project Monitoring Units (SPMUs), using the World Bank's Standard Bidding Documents (SBD). Several workshops and training courses have been conducted to familiarize the SPMU staff with the proper understanding and application of World Bank's procurement regulations and the use of the SBDs. So far 985 contracts have been awarded, with further 235 contracts being prepared for award.

Financial Management

Financial management responsibilities include monthly reporting of project expenditure, quarterly consolidation of 'Interim Unaudited Financial Reports' and annual audits for each IA. The financial commitment and expenditure is reviewed on a quarterly basis by the Technical committee and twice a year during World Bank Review Missions. The National Level Steering Committee reviews and monitors overall policy issues of DRIP twice a year.

Figure 3 - Technical Committee visit to Tawa Dam, MPWRD, September 2017

Figure 4 - Inauguration of WB Review Mission, Mysore, October 2017

DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP) MANAGEMENT INFORMATION SYSTEM (MIS)

What is DRIP?

The Dam Rehabilitation and Improvement Project (DRIP) is being undertaken by the Central Water Commission (CWC), Government of India with World Bank loan assistance, **to improve the safety and performance of dams and strengthen the dam safety institutional setup** in participating agencies:

- **2012-2020** (8 years)
- **3466 Cr. INR** (550 Million USD)*under revision
- **223 Dams** (out of >5000 large dams in India)

Rehabilitation & Improvement

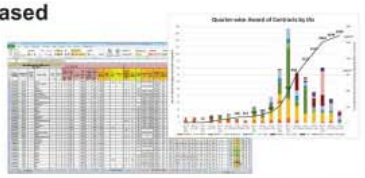
Institutional Strengthening

Project Management

MIS Tools as BIM 7D

Sioux & Comanche (EDMS by Egis)

MS Excel-based Master Sheet



Implementing Agencies and Example Dams

Uttarakhand
5 dams

Ichari Dam :
Type : Concrete Gravity
Commissioned : 1975
Dam height : 59m
Dam length: 155m
Gross storage : 8 MCM

Madhya Pradesh
25 dams

Sanjay Sagar Dam :
Type : Earthfill Embankment
Commissioned : 1985
Dam height : 41m
Dam length: 630m
Gross storage : 38 MCM

Jharkhand
3 dams

Maithon Dam :
Type : Composite (CE)
Commissioned : 1957
Dam height : 56m
Dam length: 4430m
Gross storage : 1094 MCM

Odisha
26 dams

Hirakud Dam :
Type : Composite (CEM)
Commissioned : 1957
Dam height : 61m
Dam length: 26 000m
Gross storage : 5 900 MCM

Karnataka
22 dams

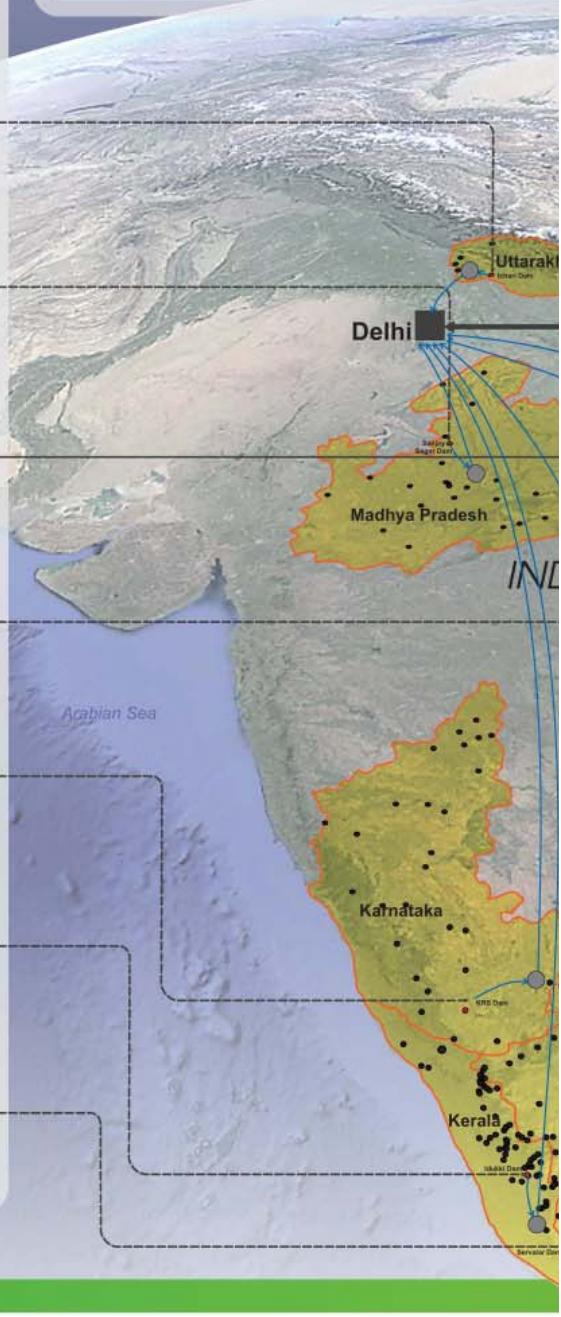
KRS Dam :
Type : Masonry Gravity
Commissioned : 1932
Dam height : 40m
Dam length: 2 620m
Gross storage : 1 400 MCM

Kerala
53 dams

Idukki Dam :
Type : Concrete Arch
Commissioned : 1974
Dam height : 170m
Dam length: 366m
Gross storage : 2 000 MCM

Tamil Nadu
89 dams

Servalar Dam :
Type : Masonry Gravity
Commissioned : 1986
Dam height : 57m
Dam length: 465m
Gross storage : 35 MCM



Overall Project Management: Central Water Commission

Financial assistance: THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Technical assistance: egis

Online MIS & DRIP Website

DHARMA Asset Management Software

DRIP MIS Stakeholders

- Government of India (सत्यमेव जयते)
- State Governments
- DRIP Agencies
- DRIP Project Director
- DRIP Suppliers
- General Public

DRIP Management Information System

Collection:

- **Sioux & Comanche** (Documentation & Correspondence)
- **MIS Update Forms** (Technical, Financial & Procurement Data)

Processing:

Master Sheet (Processing of Project Technical, Procurement & Financial Data)

Reporting:

- Progress Reports
- Online MIS & Website https://damsafety.in/
- DHARMA Dam Health And Rehabilitation Monitoring Application https://damsafety.in/dharma

Central (CPMU)

CPMU — Doc Controller — MIS Specialist — Procurement & Financial Experts

State (SPMU)

SPMU — Computer Operator — Test Lab — Construction Management Expert — Quality Control (QC) Expert

Dam Sites

Site Engineer — Dam Safety Expert

Assessing the Health of India's large dams…

Dam Safety

Introduction

The CPMU's dam safety efforts started at the project preparation phase with the review of design flood, rehabilitation design drawings and Project Screening Templates (PSTs) prepared by the IAs. They continued throughout the Component I workflow with the preparation of bid documents, publishing of NIT and award of contracts, Construction Management & Quality Assurance, and finishing with the completion of rehabilitation works.

Structural Safety

Once a dam has proved itself capable of holding back a water reservoir, its structure and component parts are subjects to ageing.

The unique nature of each dam is that every structure will age at a different rate in a different way. Some dams may remain safe for several hundred years, others may start to crack and leak after less than a decade.

The CPMU continues to review and advise on issues of structural safety across all DRIP dams. Typical issues are highlighted below:

Concrete/masonry issues:

- concrete swelling due to chemical reaction
- concrete shrinkage, creep and contraction
- loss of strength from repeated stresses
- low resistance due to freezing and thawing
- deterioration of contraction and lift joints
- degradation of upstream facings

Earthfill/rockfill issues:

- consolidation/settlement of embankment
- loss of strength and slope instability
- pore pressure increase
- internal erosion and piping,
- degradation by seepage
- vegetation on embankments

Other structural safety issues regularly investigated include those relating to dam foundations (deformation, uplift pressures, erosion) and appurtenant works.

Figure 5 - Excessive vegetation at Derjang Dam, OWRD

Figure 6 - Surface erosion of d/s face at Balaskumpa Dam, OWRD

Figure 7 - Clogged drain at Barna Dam, MPWRD

Figure 8 – Abrasion of spillway at Maneri dam, UJVNL

Hydro-mechanical Review

The CPMU also reviews dam safety issues relating to the hydro-mechanical components of DRIP dams (including gates, valves, hoists and associated mechanisms) and advises accordingly on suitable repair or replacement and future operation and maintenance requirements. Examples include assessments at the following dams:

- Hirakud Dam, OWRD
  H-M design aspects for Additional Spillway
- Krishna Raja Sagar (KRS) Dam, KaWRD
  Replacement of 136 gates
- Maithon, Konar and Panchet Dams, DVC
  Strengthening and rehabilitation of gates and hoists

Dam Instrumentation

Dam instrumentation is one of the important activities under DRIP for monitoring dam health and taking corrective actions timely. CPMU has completed a detailed survey of DRIP dams to determine the availability and condition of instrumentation, and the need for repairs, replacement, and additional equipment at each site.

The IAs are being given technical assistance on the Hydrometeorological, Geodetic, Geotechnical and Seismic instruments to ensure adequate instrumentation is being installed at DRIP dams. In this respect, a typical bidding document has also been shared by CPMU with all IAs. The Guidelines on Instrumentation of Large Dams have been formulated for guidance of dam professionals on a nationwide scale.

The National Geophysical Research Institute (NGRI), Hyderabad, Central Water and Power Research Station (CWPRS), Pune and Indian Institute of Technology Roorkee (IITR) are being involved for providing requisite support related to seismic instrumentation of all large DRIP dams. These three premier institutes shall support the IAs as per the scope of work given in the signed Memorendum of Understanding.

Efforts are being made to implement the automation of data logging and transmission of Instrumentation data instantly to State Headquarters for further processing and issue of warnings to all stakeholders in case of any impending dangers.

Figure 9- Satellite transmission of data from the dam site

Figure 10 - Seismograph for monitoring dynamic response of dam and uplift pressure measurement

Comprehensive Risk Assessment Studies

Major dams should be systematically analysed using widely accepted international methods for dam portfolio risk assessment.

Risk profiles of dams can be deduced according to their safety deficiencies in order to reduce risk and help ensure sustainability and full operational capacity of these dams.Work on scoping necessary activities has been completed in association with leading global agencies. A detailed proposal received from Alpiq, Switzerland for strengthening the ability of Implementing Agencies to undertake such studies is under consideration. It includes Comprehensive Risk Assessment study for 4 large dams of India, the development of a Manual, training of officials, issuance of licence of two software programs for the future implementation of risk assessment studies.

Ensuring quality of works and environmental and social compliance…

Construction Supervision & Quality Assurance

Introduction

One of the key objectives of DRIP project is to ensure state-of-the-art practices and full environmental and social compliance during rehabilitation works.

For all rehabilitation and improvement works undertaken by participating States under DRIP, quality assurance of the works is ensured through a three tier mechanism from quality management plans of contractors themselves, day-to-day construction supervision and quality control by the field units of concerned State implementing agency unit, and third-party supervision of the construction and quality control by the CPMU.

Periodical Site Inspections

CPMU Specialists visit each dam site where works are ongoing at least once a quarter; more visits are organized to dams with particularly complicated designs and important rehabilitation works on need basis.

Site Visit Reports

For each construction supervision visit conducted, a construction report is prepared summarizing aspects including the scope, progress and quality of works; availability of equipment, manpower and documentation on site; financial progress; effective management of environmental and social issues; and provisions for testing and quality control. A list of non-compliances, observations, and recommended actions is also prepared.

Once reviewed and approved internally, each report is submitted to the Central Water Commission along with a transmittal sheet summarizing the key issues. The report and transmittal are then forwarded to the concerned IA for further action. CPMU Specialists have so far carried out more than 800 such visits to over 200 dams.

Figure 11 - Placing of geo-membrane, Servalar Dam, TANGEDCO

Assessing ESMF Compliances

The CPMU also assesses the quality of Environmental and Social Management Framework (ESMF) and compliances by the state IAs. This task involves screening of dam activities, preparation of Environmental Management Plan (EMP), wherever needed, implementation and monitoring of EMP to ensure that actions agreed to minimize environmental impact are being implemented. Areas of ESMF focus under DRIP include:

- air, noise, water and soil pollution
- landscape degradation and quarry sites
- waste and debris management
- labour standards, worker and public safety

Assessing Supervision and QC system

CPMU Specialists periodically assess the quality control mechanism and system of the state IAs and suggest possible improvements. The CPMU conducts limited third party sample & testing using the services of several NABL accredited laboratories during the on-going works.

The Laboratory testing undertaken by the CPMU is typically focused on collecting required construction material samples from the construction sites, testing them to meet minimum standard specifications and sharing the results with the Implementing Agencies for corrective actions accordingly.

State	Laboratory
Kerala	M/s Civil-Aid
Tamil Nadu	M/s Civil-Aid
Odisha	M/s Orbit
Madhya Pradesh	M/s. Krishna Digital Laboratories
Karnataka	M/s Karnataka Test house
Jharkhand	M/s Suntech
Uttarakhand	M/s Balaji, Ballabhgarh

Table 1. List of Laboratories for each DRIP state

CPMU Specialists are also carrying out non-Destructive Testing on-site using (Schmidt) rebound hammer to estimate the strength of certain structures (for example. parapet and kerb walls) as well as slump tests and sand replacement test (Figure 15) to ensure the quality of work implemented.

Figure 12 – Rip-rap work at Maithon Dam, DVC, Jharkhand

Figure 13 - Managing Hydro-mechanical issues on site

Figure 14 - On-Site Quality Control Testing, TNWRD

Figure 15 - Slump test at Sanamachhakandana, OWRD and Sand Replacement Test at Maithon Dam, DVC

From Unsat to Sat: Steady progress forward…

Before DRIP After DRIP

Repair of spill channel fall at Ari Dam, MPWRD

Rehabilitation Works of Talsara Dam, OWRD

Rip-Rap, toe drain and parapet wall repairs at Kelavarapalli Dam, TNWRD

Strengthening the leadership in Dam Safety Organisations…

Institutional Strengthening

Overview

The CPMU provides a range of services for dam safety institutional strengthening in the IAs and select premier academic and research institutes (Figure 16). Some of the main efforts are highlighted below:

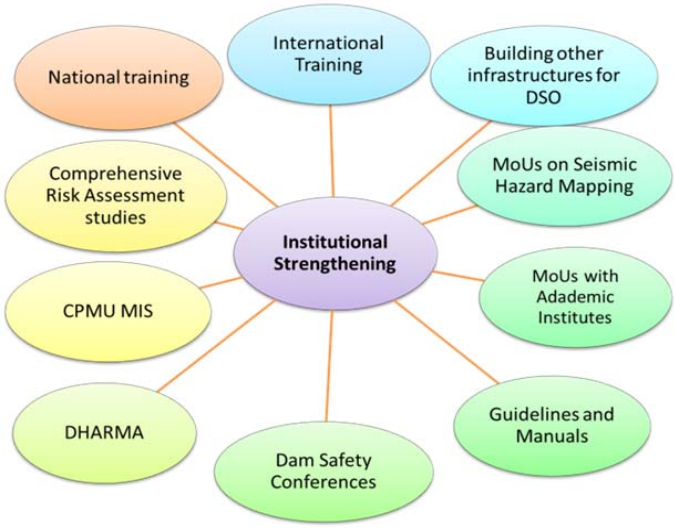


Figure 16 -Summary of Institutional Strengthening activities

Capacity Building

The principal institutional strengthening task under DRIP is to facilitate organization of national dam safety training programmes and international study tours. To date, the CPMU has designed and conducted over 88 national training programmes on various subjects covering disciplines including technical, project management, procurement and finance. The total attendance for these training programmes comes to over 3,000 delegates.

Several international study tours organized under DRIP were made to the US Bureau of Reclamation (USBR) in the United States and to the Deltares Research Institute in the Netherlands. Official collaborations are in place with other leading global dam safety institutions such as Entura Hydro Tasmania and the Japan Water Agency.

Additionnally, a training programme was conducted by experts of the Japan Water Authority (JWA) for DRIP Officials to participate in an earthquake disaster management situation at Ichari Dam, Uttarakhand. JWA has prepared an Inspection manual for Dam Field Engineers after Seismic Events for Ichari Dam and is currently completing another one for Maithon Dam, DVC.

Dam Safety Conferences

Another main achievement of DRIP has been the organization of yearly National Dam Safety Conferences to promote awareness and sharing of knowledge and experience on issues related to dam safety.

Figure 17 - 3rd National Dam Safety Conference, Roorkee

Under the aegis of DRIP, three National Dam Safety Conferences have been held to date, respectively in Chennai in March 2015, Bangalore in January 2016, and Roorkee in February 2017. The overwhelming response in terms of professional participation, technical papers contributed and participation by Indian and overseas organisations in the exhibition has led CWC to prepare an International Dam Safety Conference (IDSC) on the 23rd and 24th January 2018 in Kovalam, Thiruvananthapuram . The event is being organised in collaboration with the IAs of Kerala WRD, Kerala SEB and premier academic institutions of NIT Calicut and College of Engineering Trivandrum.

DRIP Website

The DRIP website (www.damsafety.in) was launched in January 2015 for dissemination of national level dam safety information for general public, along with provision for password linked membership of professionals for more detailed dam safety information. As of January 2018, the DRIP website has been visited more than one million times.

Quality Management Systems

Under DRIP, Quality Management Systems (QMS) conforming to ISO 9001 have been developed and implemented in the Central Dam Safety Organisation (CDSO). CDSO's QMS was certified by the Bureau of Indian Standards for conformity with ISO 9001: 2008 in October 2015. The CPMU also offers support to State Dam Safety Organizations (SDSOs) to develop QMS and pursue certification themselves.

Academic Institutes

The CPMU also facilitates in-house capacity building in select premier academic and research institutes so that their expertise could be utilized by IAs and other dam owners in their dam safety rehabilitation efforts. In 2017, 6 Memorandums of Understandings (MoUs) were signed between CWC and the following academic institutions: NIT Calicut, NIT Rourkela, IIT Roorkee, IIT Madras, IISc Bangalore and MNIT Allahabad. Moreover, a total of 8 MoUs have been signed between 8 IAs and NGRI Hyderabad, IIT Roorkee and CWPRS Pune to establish seismic instrumentation in selected dams.

Figure 18 - Signing of MoU between CWC and NIT Calicut

Guidelines and Manuals

The CPMU is working on the publication of 16 guidelines covering various topics of dam safety. The first of them on Developing Emergency Action Plans (EAP) for Dams was released in February 2016, as part of a workshop on lessons learnt from DRIP attended by Honorable Minister of Water Resources, Government of India, Sushri Uma Bharti.

Following Guidelines & Manuals are proposed to be published during the International Dam Safety Conference:

- *'Guidelines for Preparing Operation and Maintenance Manuals for Dams'*
- *'Guidelines for Mapping Flood Risks Associated with Dams'*
- *'Guidelines for Safety Inspection of Dams'*
- *'Guidelines for Instrumentation of Large Dams'*
- *Manual for Rehabilitating Existing Dams*

Further guidelines will cover subjects including assessing and managing reservoir sedimentation, evaluating geological conditions and classifying hazard potential of dams, guidelines for risk assessment, etc..

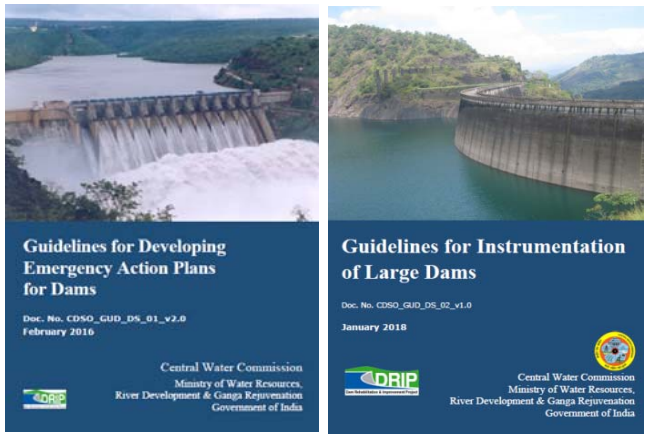


Figure 19 - EAP and Instrumentation Guidelines

Seismic Hazard Mapping

The seismic study for peninsular India is being conducted by IIT Roorkee through an MoU with DRIP CPMU. A second MoU has recently been signed with CWPRS, Pune for seismic hazard mapping of the rest of India while integrating the work done by IIT Roorkee. The SHAISYS is being developped for preparing the country to address the seismic hazard, especially in the field of water resources.

Ensuring the Safety of citizens who live and work in the shadow of the dam…

DBA and EAP

Introduction

Generally speaking, all large dams are associated with certain risk hazards. The risks are minimized through a three tier mechanism, from the sound planning, design and construction, the proper operation and maintenance and disaster management protocols. Implementing Emergency Action Plans (EAPs) for all DRIP dams is one of these protocols. Given the limited capacity of most IAs to undertake Dam Break Analysis (DBA) themselves, the CPMU is undertaking DBA and preparing the inundation maps for DRIP dams so that the IAs can then use these maps to prepare EAPs in order to achieve the most important goal: save lives in case of an emergency.

Dam Break Modeling and Inundation Mapping

More than 100 dam break analyses have been carried out to date using state of the art methodologies. The resulting flood hazard inundation maps reveal the potential consequences of a failure in terms of depth, velocities, severity, arrival time, total affected area, population at risk in any downstream location.

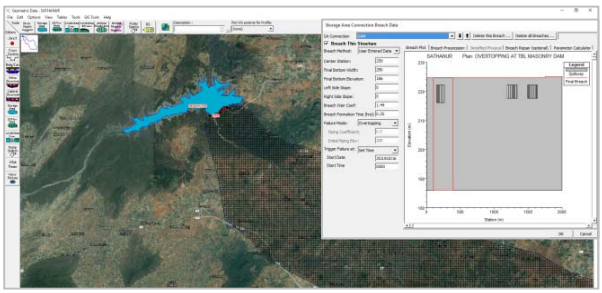


Figure 20 - DBA modeling process with HECRAS 2DH v5.0.3

Flooding is being modeled for three cases at each DRIP dam:

- a dam breach caused by *overtopping*,
- a dam-breach produced by a non-flood failure (also called a "*fair-weather failure*") resulting from piping with the reservoir at full-supply level, and
- flooding produced by a *large controlled release* from the reservoir, for which the peak discharge is usually taken as the published spillway capacity.

The mapping process is carried out using Geographic Information System (GIS) software, for each dam. In each case, four inundation maps are produced:

- i) maximum water surface elevation
- ii) maximum water depth
- iii) maximum velocity
- iv) flood wave arrival time from breach initiation (only for overtopping and non-flood failures).

This mapping of the 2-dimensional modeling allows for accurate estimation of both flood hazard areas including associated loss of life and property damage.

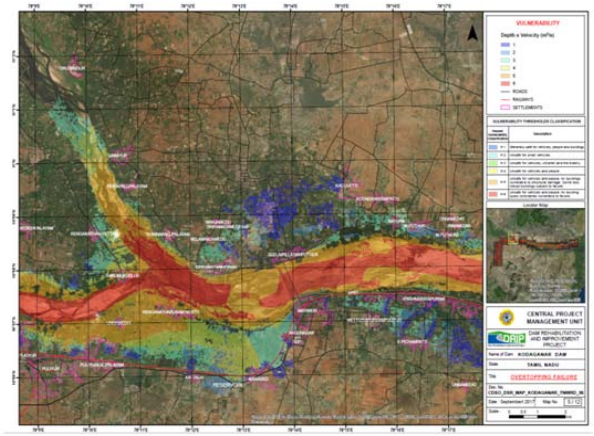


Figure 21 - An Inundation Map of Kodaganar Dam

Emergency Action Plans

Each of these inundation maps have been shared with all the involved implementing agencies for the "in-house" production of the EAP. The CPMU is providing a series of workshops to help all IA engineers/officials on this task. Six-day workshops have been successfully carried out in the states of Karnataka, Tamil Nadu and Odisha where nearly 100 officials have benefited from these programs.

The CPMU has also prepared a model EAP for Hirakud Dam, Odisha for others to use as a template for their own dams.

A new management tool for Dam Safety…

DHARMA
Dam Health and Rehabilitation Monitoring Application

Introduction

*The **D**am **H**ealth **A**nd **R**ehabilitation **M**onitoring **A**pplication* is a web-based asset management software to support the effective collection and management of authentic asset and health data for all large dams in India and address key dam safety challenges of i) ensuring completeness of information, ii) bringing stakeholders together, iii) effectively managing asset inventory, iv) assess soundness of dam health.

Design and Development

DHARMA software consists of seven modules: i) Project Features, ii) Project Portfolio, iii) Engineering Features, iv) Asset Health, v) Asset Rehabilitation, vi) Stakeholders and vii) Document Library.

The first three modules (i to iii) consist of static information about dams ranging from the highest level data such as location, access or spillway capacity to the more detailed technical data (installed power, gate type…). Modules iv) and v) are dynamic and require regular updates of inspection reports, investigations, instrumentation and rehabilitation works. Finally, modules vi) and vii) contain respectively the contact details of different dam stakeholders and important dam documents.

The first complete version of DHARMA was launched during the 18th TC Meeting at Bhopal, in September 2017. A DHARMA version 1.2 is under development with enhanced functionalities for assessing the health of each component of the dam and uploading Instrumentation, O&M and EAP data. It is planned for official nationwide launch at the 2018 International Dam Safety Conference in Thiruvananthapuram.

DHARMA Implementation

To facilitate design and implementation of DHARMA, two groups namely DHARMA Design and Development Group (D3G) and DHARMA Implementation Group (D.I.G.) were constituted. To date, 488 Application Users have been trained who have started uploading data for the 223 DRIP dams, in all nine DRIP Implementing Agencies, across seven States.

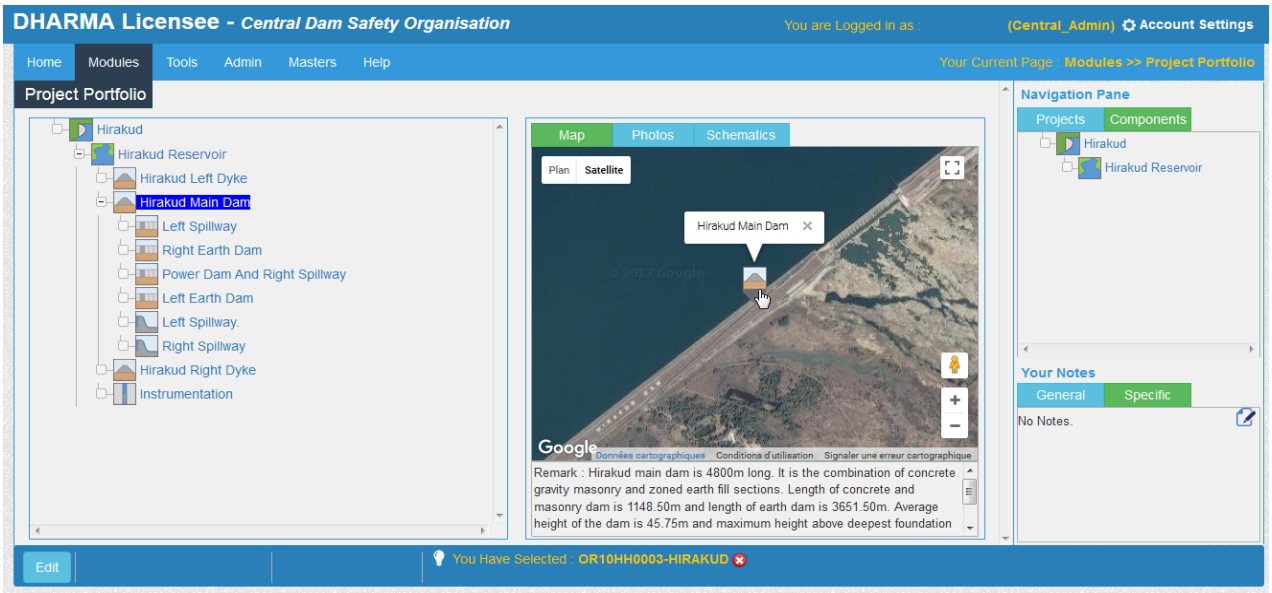


Figure 22 - Project Portfolio Module

The Future of Dam Safety in India…

DRIP II and other initiatives

Overview

With more than 80% of India's 5000 large dams over 25 years of age, many are developing deficiencies and require rehabilitation due to various reasons.

During DRIP, 198 dam projects involving 223 dams under 9 Implementing Agencies across 7 states were targeted for rehabilitation and are under advance stage of completion. DRIP has been successful in bringing greater awareness of dam safety issues and addressing the serious problems by introducing novel solutions and technologies in a comprehensive way. The project covers only about 4% of large dams in India, and several other dams are facing serious dam safety challenges. They are in need of urgent attention and rehabilitation.

DRIP II Proposal

In order to build on the significant progress of DRIP in promoting sustainable operation and maintenance of major dams and ensuring the safety of populations downstream, the Ministry of Water Resources, RD&GR initiated activities for a new DRIP in February 2017 by inviting proposals from major States. The objective is that the new DRIP should have some overlap period in order to maintain the focus and keep intact the gained momentum in dam safety activity.

While full details are yet to be determined, the current proposal for the second phase of the project will cover approximately 600 large dams in 18 States along with 2 Central Agencies at an estimated cost of over Rs. 9,000 Crore. DRIP II shall be effective by January 2020, so as to utilize the experience gained in the current project, and an overlapping of six months with ongoing DRIP.

Figure 23 - World Bank Project Cycle

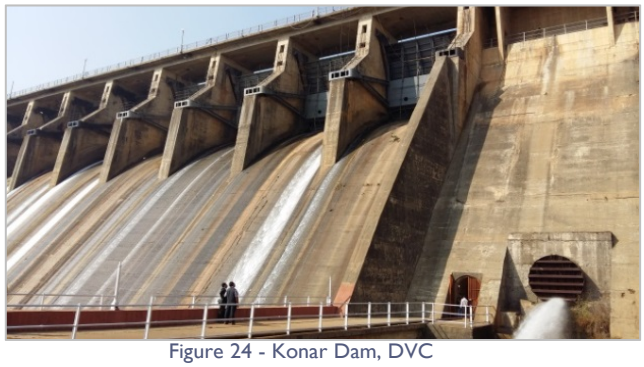


Figure 24 - Konar Dam, DVC

Figure 25 - Ichari Dam, UJVNL

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Central Water Commission
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Central Dam Safety Organisation
Central Water Commission

Vision

To remain as a premier organisation with best technical and managerial expertise for providing advisory services on matters relating to dam safety.

Mission

To provide expert services to State Dam Safety Organisations, dam owners, dam operating agencies and others concerned for ensuring safe functioning of dams with a view to protect human life, property and the environment.

Values

Integrity: Act with integrity and honesty in all our actions and practices.

Commitment: Ensure good working conditions for employees and encourage professional excellence.

Transparency: Ensure clear, accurate and complete information in communications with stakeholders and take all decisions openly based on reliable information.

Quality of service: Provide state-of-the-art technical and managerial services within agreed time frame.

Striving towards excellence: Promote continual improvement as an integral part of our working and strive towards excellence in all our endeavours.

Quality Policy

We provide technical and managerial assistance to dam owners and State Dam Safety Organisations for proper surveillance, inspection, operation and maintenance of all dams and appurtenant works in India to ensure safe functioning of dams and protecting human life, property and the environment.

We develop and nurture competent manpower and equip ourselves with state of the art technical infrastructure to provide expert services to all stakeholders.

We continually improve our systems, processes and services to ensure satisfaction of our customers.

DRIP
Dam Rehabilitation & Improvement Project