Organisational Set up and Monitoring Systems for Sustainable Dam Safety in Maharashtra State

Presented by
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Maharashtra State has the distinction of constructing the highest number of large dams in the country.
NEED FOR MONITORING OF DAM SAFETY

- To ensure the Structural, Hydraulic & seismic adequacy of structure to serve the purpose for which they were designed.
- To verify the physical state of structure & monitor its behaviour.
- To investigate the condition that might cause distress and address it.
- To study the extent of deterioration based on which maintenance & repairs schedule can be planned.
- To ascertain the potential hazards to human life & property in downstream reaches.
- To ensure public confidence in the continued accrual of benefits on the national investment made.

Therefore, it is utmost necessary to inspect, evaluate and determine the safety of dams & allied structures.
FUNCTIONS OF DAM SAFETY ORGANISATION

- Overview the periodical inspections of specified large dams.
- Scrutinize the Inspection reports received from field officers. Significant & Important Deficiencies to be intimated to concern authorities to carry out remedial measures.
- Prepare the Annual Health Status reports.
- Monitor the Safety aspects & Remedial actions taken by field officers.
- Test Inspections of dams
- Inspection of canals of Irrigation Projects and structures thereon.
FUNCTIONS OF DAM SAFETY ORGANISATION

- Compile the documents specified by the National Committee on Dam Safety such as GOS, ROS, Data Book, O & M Manual, EAP, Record drawing & Completion Report.

- Prepare inventory of National Register of Large Dams & compile register of Small Dams.

- Prepare & update dam safety manuals.

- Keep liaison with Central Water Commission, New Delhi through National Committee on Dam Safety.

- Compile information on dam incidents in the state.

- Arrange training courses on Dam safety & Instrumentation.

- Carry out periodical inspection of Private Dams in Maharashtra & others State.
MANDATORY PRE & POST INSPECTION BY FIELD AUTHORITIES:

- The Govt. of Maharashtra has designed systematic approach for monitoring each & every Dam & allied structure periodically.

Pre-Monsoon Inspection:
- To be complete before 15th of May
- Report to be sent to DSO before 30th June of same year.

Post Monsoon Inspection:
- To be complete before 30th November
- Report to be sent to DSO before 31st December of same year.

Considering the high number of large dams in Maharashtra, the large dams have been categorised into three sub categories:

- Category-I large Dam
- Category-II large Dam
- Category-III large Dam

Special Inspection should be done:
- Before first filling by 30th April
- Immediately after a severe distressing event or accident or incident & report sent within one week
<table>
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<tr>
<th>SR No</th>
<th>Type of Dam</th>
<th>Height from general level of deepest foundation in m.</th>
<th>Impounded gross storage capacity up to FRL in M Cum</th>
<th>Spillway capacity</th>
<th>Type of spillway</th>
<th>Inspection authority</th>
<th>Inspection Reports be sent to</th>
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<tbody>
<tr>
<td>1</td>
<td>Large Dam (Category-I)</td>
<td>Above 30 m</td>
<td>Above 60 MCum</td>
<td>Above 3,000</td>
<td>Gated Spillway</td>
<td>Superintending Engineer/Administrator</td>
<td>1) Chief Engineer 2) Superintending Engineer Dam Safety Organisation.</td>
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<td>2</td>
<td>Large Dam (Category-II)</td>
<td>15 m to 30 m</td>
<td>15 to 60 MCum</td>
<td>2,000 to 3,000</td>
<td>Ungated Spillway</td>
<td>Executive Engineer</td>
<td>1) Superintending Engineer/Administrator 2) Superintending Engineer, Dam safety Organisation</td>
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<td>3</td>
<td>Large Dam (Category-III)</td>
<td>10 m to 15 m</td>
<td>1.0 to 15 MCum</td>
<td>2,000 to 3,000</td>
<td>Ungated Spillway</td>
<td>Sub-Divisional Eng./Sub Divisional Officer</td>
<td>1) Superintending Engineer/Administrator 2) Executive Engineer</td>
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**SCRUTINY OF MANDATORY PRE/POST MONSOON INSPECTION REPORTS:**

- Preparation of Annual health status report
- Significant & Serious Deficiencies intimated to concerned authorities for compliance/remedial measures
- Preparation of Scrutiny note and categorisation of the deficiencies (Category-I & II)
- Send inspection report to concerned authority (From field officers to DSO)
- Scrutiny of inspection report of Category I & II dams by DSO

**PRE/POST MONSOON**

- Inspection of Category-I & Category-II large dams by field officers.
- Filling of Questionnaires (Pro-forma of Category-I & II dams) /Preparation of Inspection report

For compliance
Annual Health Status Reports

- DSO prepares the region wise Annual Health Status Reports & sends it to all field CEs, SEs & EEs.
- Annual consolidated HSR of Cat-I & II Dams is also prepared for the state & submitted to CWC & Govt. of Maharashtra.
- This Health Status Report gives a summary of dams according to deficiency category.
- This helps Government to prioritise the allocation of funds to dam requiring immediate attention.
- The annual health status report of Category III dams is prepared /compiled by regional Chief Engineer and sent to Government & DSO annually.
Annual Consolidated Health Status Report of Identified Large Dams

- **Part-I** - Action Taken Report: This part covers the remedial action taken for the deficiencies pointed out in previous HSR

- **Part-II** - Annual Health Status Report Of Identified Large Dams: Deficiencies reported & noticed during the course of inspections for the current year & remedial actions suggested for Cat-I & Cat-II Dams are covered in this part.

- **Part-III** - Annual Report of performance of dam instruments installed on identified large dams

- **Part IV** - Annual Report of performance of Meteorological instruments installed on identified large dams

The periodical inspections of the dam under their control become a routine and mundane affair for the field engineers.

To keep a check on the inspections carried out at field level, test inspections are carried out by DSO as a third party inspection.

During the DSO inspection, several deficiencies pointed out by field officers in their Pre/Post Monsoon Reports are cross checked.

The DSO also advises field officers on the remedial actions to be taken for rectifying deficiencies.

Apart from the mandatory pre & post monsoon inspections carried out by field officers for 1231 large dams, DSO carries out Test inspections of selected large dams every year.

The annual dam inspection programme is prepared by taking into consideration the following criteria,

- Dams suggested by Regional Chief Engineers.
- 100 Years old Dams (once in three Years)
- Dams which are not inspected in last 10 year by DSO
- Private Dams on consultancy Basis: (Twice in a year, Pre/Post monsoon)
- National Importance Dams: Once every year. (Koyna, Isapur, Pench, Ujjani, Jaikwadi, Goshikhurd, Middle Vaitarna.)
INSPECTION OF PRIVATE DAMS:

- In Maharashtra apart from government owned dams, many dams are owned by private owners like TATA Power, Sahara etc. and by urban local bodies like Municipal corporations of Mumbai, Nagpur etc. & Power generation companies like Mahagenco etc.

- There are about 45 private dams in Maharashtra which are operated and maintained by them.

- Due to lack of sufficiently trained and expert staff with owner organisation for carrying out dam safety inspection, DSO carries out these inspections on consultancy basis.

- DSO also carries out Inspection of Nathpa Jhakri Dam (Himachal Pradesh) every year on consultancy basis since 2006.
INSPECTION OF CENTURY OLD DAMS:

- There are 35 Century old large dams.

- **Health Status Report of century old dams** prepared separately once in three years.

- Prepared as per guidelines received from Dam Safety Monitoring unit of Central Water Commission, New Delhi.

- On the same lines as that of Annual Health Status Report of Identified large dams.
Canals serve as important carrier of benefits and facilities to the region downstream. However such canals also form a potential source of hazard in the event of any mishap or failure of the canals.

Considering the hazard potential and loss of facility in event of failure of canals or structures, DSO is entrusted the work of Inspection of Canals & Structures there on.

DSO prepares & publishes Annual Consolidated Health Status Report based on inspections carried out by field officers as well as test inspections carried out by Dam Safety Organisation, Nashik.
The Inspection of dam is an elaborate process which requires high level of technical knowledge of all aspects of dam & its allied structures.

Safety and proper custodial care of dams can be achieved only through:
- Awareness and acceptance of responsibilities
- Availability of competent well trained Engineers, technicians and operators.

Awareness and expertise best attained and maintained by effective training in dam safety technology as well as operation & maintenance of dams.

DSO carries out classroom and onsite trainings in assistance with Maharashtra Engineering Training Academy, Nashik for In service Engineers & Direct recruits and Non technical personnel deployed on Dams.
## OTHER ACTIVITIES BY DSO

- Preparation of Dam Safety Bill (Draft)
- Preparation of Flood Zoning Bill (Draft)
- Safety Review of Large Dams
- Preparation of Canal Safety Manual
Water Resources Department, Government of Maharashtra has embarked on an e-governance program for Integrated Computerised Information System (ICIS) called as E-Jalseva.


Out of 34 modules covering various aspects of Water Resources Department. Module M-12 is related to Dam Safety.

Preparation of module to enable online submission of Pre/Post Monsoon Inspection Reports.

Facility of uploading pictures and videos of any deficiency noted.

Online submission would help in preparing scrutiny reports and H.S.R. online.
PREVENTION IS BETTER THAN CURE

“Regular Inspections along with safe maintenance and operation of dams and spillways thereof, assumes vital importance to avoid probable danger to life and property on the downstream.”

THANKS

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