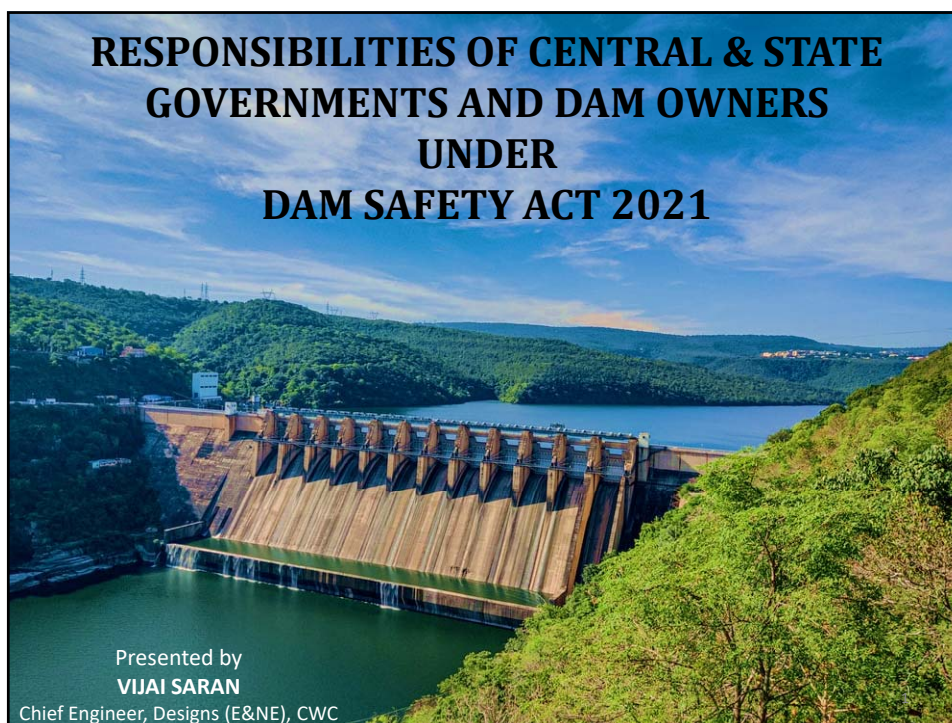




CONTENTS

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- 6 • State Dam Safety Organisation (SDSO)
- 7 • Dam Owners
- 8 • Dam Safety Inspection
- 9 • Dam Instrumentation
- 10 • Emergency action plan & disaster management
- 11 • Comprehensive Dam Safety Evaluation (CSE)

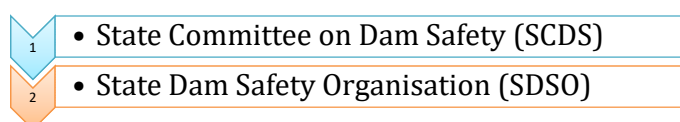
DAM SAFETY INSTITUTIONAL SETUP

CENTRAL LEVEL



Gazette Notification issued in Feb 2022.

STATE LEVEL



Deadlines for constituting SDSO/SCDS is 30th June 2022.

In such States where SDSO and SCDS had been constituted before the enactment of the DSA 2021, they are required to be reconstituted and notified afresh.

3

NATIONAL COMMITTEE ON DAM SAFETY (NCDS)

- The Committee shall be chaired by Chairman, Central Water Commission with
 - ten representatives of the Central Government not below the rank of Joint Secretary,
 - seven representatives of the State Governments of the level of Engineer-in-Chief
 - three specialists in the field of dam safety and allied fields
- Reconstitution after every three years.
- Secretarial assistance by National Dam Safety Authority (NDSA).

4

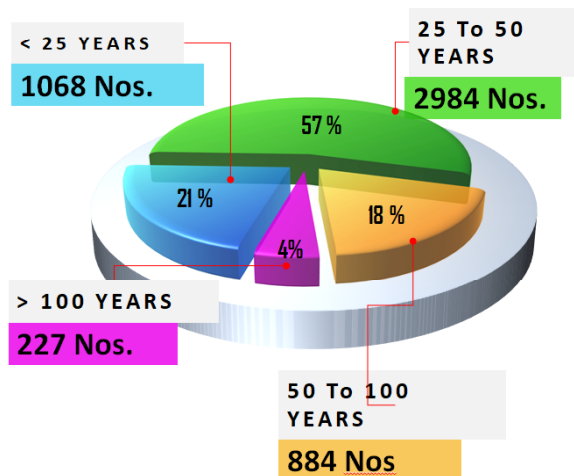
ROLE OF NCDS

- Maintaining **dam safety standards** and dam safety policies;
- **Analyse** the causes of major dam incidents and **dam failures** and **suggest** various practices to avoid recurrence of such incidents;
- Evolve comprehensive **dam safety management approach**;
- **Strategic supervision** for dam rehabilitation programmes;
- **Research and development** for dam safety;
- Make recommendations on the **integrated reservoir operation** of cascading dams;

5

ROLE OF NCDS Contd.

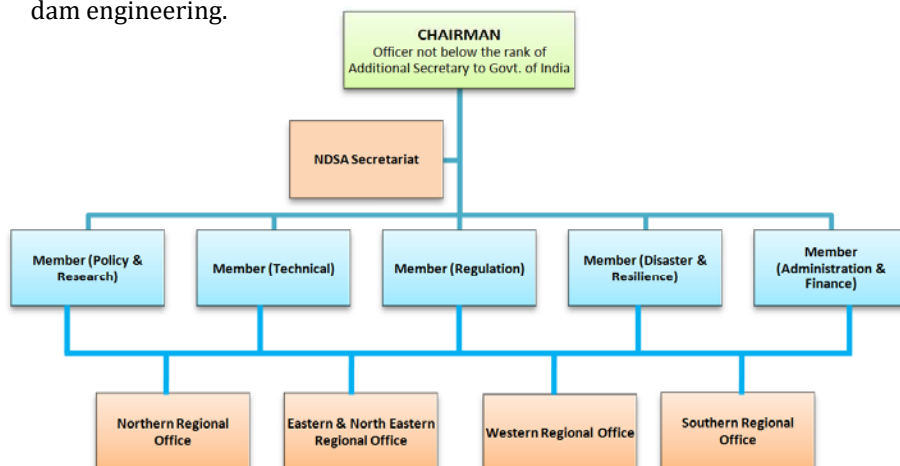
- Rehabilitation requirements of ageing dams;



6

NATIONAL DAM SAFETY AUTHORITY (NDSA)

The NDSA is to be headed by an officer not below the rank of Additional Secretary to the Government of India having knowledge and experience in dam engineering.

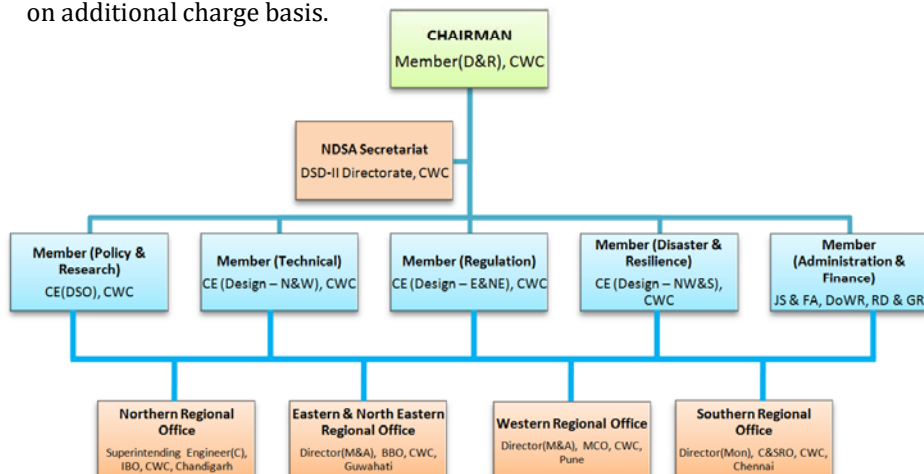


Structure of NDSA as per the Act

7

NATIONAL DAM SAFETY AUTHORITY (NDSA)

Presently, Member (D&R), CWC is heading the NDSA on additional charge basis. Further, all posts of NDSA are being manned by CWC & MoJS officers on additional charge basis.



Present Structure of NDSA

8

ROLE OF NDSA

- Implementation of the policy, guidelines and standards evolved by NCDS for surveillance, inspection and maintenance of dams.
- The NDSA will act as the SDSO in cases where a dam:
 1. is owned by one State but situated in another State,
 2. extends over multiple States, or
 3. is owned by CPSUs.
- Maintaining **dam safety standards** and prevention of dam failure related disasters;
- **Resolving issues** between the SDSOs of States or between a SDSO and any dam owner;

9

ROLE OF NDSA Contd.

- Providing the state-of-the-art **technical and managerial assistance** to the SDSOs;
- Maintaining a **national level database** of all specified dams in the country;
- Laying down the uniform **criteria for vulnerability and hazard classification** of the specified dams;
- Give directions regarding requirements of instrumentation, hydro-meteorological stations, seismological stations, etc.
- Lay down guidelines for **review of design floods** and **site specific seismic parameter** of the specified dams;

10

STATE COMMITTEE ON DAM SAFETY (SCDS)

COMPOSITION :

Chairperson	Engineer-in-Chief/ equiv. officer
Technical/ scientific officials Not exceeding six	Officials of CE rank
Representative of u/s States in case reservoir area of any dam extends to that State	Officer of CE rank
Representative of d/s States in case reservoir area of any dam extends to that State	Officer of CE rank
Representative of CWC	Officer of Director rank
Representative of CEA	Officer of Director rank
Experts (Not exceeding three)	From Engineering Institutes

- Reconstitution after every three years.
- Secretarial assistance by State Dam Safety Organization (SDSO).
- **So far, 9 States have constituted the SCDS, others are in process of formation.**

11

ROLE OF SCDS

- Shall be assisted by sub committees and the secretarial assistant shall be provided by the concerned SDSO.
- Review work done by SDSO.
- Establish priorities for investigations.
- Assess implication of reservoir filling on the u/s State and that of dam failure on the d/s State.
- Recommend provision of funds.

12

ROLE OF SCDS Contd.

- Recommend appropriate remedial measures for distress condition.



13

STATE DAM SAFETY ORGANIZATION (SDSO)

- To be established in Water Resources/ Irrigation Department or the Department dealing with dam safety.
- For States having **more than 30 specified dams**, SDSO is to be headed by officer **not below CE rank**, in other cases by officer **not below SE rank**.
- Suitable number of officers (with sufficient experience in the field of dam safety) to be provided by the State Government.
- Organisational structure, functions, powers and terms & conditions of the service to be prescribed by the State Government.

14

ROLE OF SDSO

- **SDSO shall:**
 - keep perpetual surveillance;
 - carry out inspections; and
 - monitor the operation and maintenance.
- **Classify** dams as per vulnerability and hazard classification criteria laid down by NDSA.
- Maintain a **log book** or **data-base** for each dam recording all activities related to surveillance and inspection.
- Render advice on the **safety & remedial measures** to dam owners.

15

ROLE OF SDSO Contd.

- Enter any part of dam/ site, and apply necessary investigation methods.
- Suggest remedial measures on operational parameters as in case of endangered dams.
- Carry out safety inspection before initial filling through its own engineers or an independent panel of experts.

16

DAM OWNERS

- In India, by and large, dams are owned, constructed and maintained by the State Governments.
- State Governments operate their dams primarily through their Irrigation Department, State Electricity Boards, State Power Corporations, and Municipal Corporations.
- A few Central PSUs like BBMB, DVC, NHPC Ltd, NTPC Ltd, SJVNL Ltd, THDC Ltd., NEEPCO. etc., also own dams and operate them.
- Few dams are under private ownership also.

17

ROLE OF DAM OWNERS

- **Dam owner to earmark sufficient funds for maintenance & repairs, and to implement the recommendations of SDSO.**
- Compile all technical documentations related to dam safety.
- Construction or alteration of dam to be taken up subject to investigation, design and construction by **agencies** accredited by the NDSA/SDSO.

18

ROLE OF DAM OWNERS Contd.

- Such accredited agencies shall
 - Use the relevant standard codes and guidelines of the BIS.
 - Demonstrate the safety of design, operational parameters and policies to NDSA/SDSO for obtaining approval.
 - Undertake such quality control measures, as specified by NDSA.
 - Prepare the filling criteria & initial filling plan before initial filling of the reservoir.
- Ensure establishment of O&M setup.
- Ensure a well documented O&M Manual.

19

DAM SAFETY INSPECTION

- Dam owner to undertake, through dam safety unit, **pre-monsoon & post-monsoon inspections** of dam.
- These periodic inspections to be carried out as per the guidelines & check-list specified by the NDSA.
- Till NDSA formulates the standard checklist, the “Guidelines for Safety Inspection of Dams (2018)” of CWC shall be followed.



20

DAM SAFETY INSPECTION – CONTD.

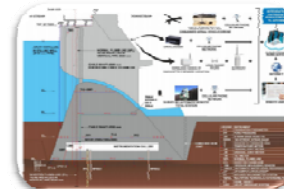
- Dam owner to undertake, through dam safety unit, special inspections during & after floods, after earthquake, on sign of distress/ unusual behaviour.
- Engineers to be stationed at dam site throughout monsoon period, and during period of emergency following earth-quake/ hazard.



21

DAM INSTRUMENTATION

- Dam owner to ensure a minimum number of dam instrumentations installed for performance monitoring;
- Establishment of hydro-meteorological station at each dam site.
- Seismological station to be established for dams higher than 30m or falling under such seismic zone as may be specified.
- Owner to collect, compile, process and store instrumentation data and forward analysis of such readings to SDSO.



22

EMERGENCY ACTION PLAN & DISASTER MANAGEMENT

➤ **Every dam owner shall —**

- Establish hydro-meteorological network/ inflow forecasting system;
- Establish an emergency flood warning system;
- Test periodically for the aptness of above systems;
- Make available information on anticipated inflows, outflows, flood warnings & adverse impacts to authorities and public domain;
- Render cooperation to NDSA in running of early warning system.
- Carry out risk assessment study at interval as specified by NDSA. First such study **within five years**;
- Prepare emergency action plan **within 5 years**; and for new dams, before the initial filling.

23

EMERGENCY ACTION PLAN & DISASTER MANAGEMENT Contd.

➤ **Emergency Action Plan shall include —**

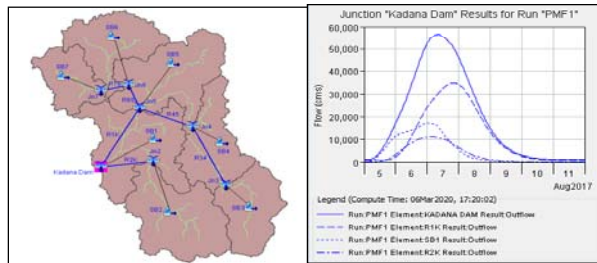
- Type of emergencies likely to occur;
- Likely flood in the event of dam failure, along with probable areas, population, structures and installations likely to be affected;
- Warning procedures, inundation maps and advance preparations for handling adverse situations to avoid loss of human life.

➤ **Consultation/ cooperation with disaster management agencies.**

24

COMPREHENSIVE DAM SAFETY EVALUATION

- Comprehensive Safety Evaluation (CSE) by experts. First CSE within 5 years, and thereafter at regular intervals specified by NDSA.
- CSE shall consists of, but not be limited to,—
 - Review and analysis of data;
 - General assessment of hydrologic and hydraulic conditions with mandatory review of design floods in certain cases;



25

COMPREHENSIVE DAM SAFETY EVALUATION Contd.

- General assessment of seismic safety of dam with mandatory site specific seismic parameters study in certain cases;
- Evaluation of operation, maintenance and inspection procedures;
- Evaluation of any other hazardous condition .
- CSE compulsory in case of,—
 - Major modification to structure or design criteria;
 - Discovery of unusual condition at dam or reservoir rim;
 - An extreme hydrological or seismic event.

26

Thank You

27

SUPPORTING SLIDES

28

SCHEDULE-I: FUNCTIONS OF NCDS

1. For the purposes of maintaining standards of dam safety and prevention of dam failure related disasters, evolve dam safety policies and recommend necessary regulations as may be required;
2. act as a forum for exchange of views on techniques to be adopted for remedial measures to relieve distress conditions in specified dams and appurtenant structures;
3. analyse the causes of major dam incidents and dam failures and suggest changes in the planning, specifications, construction, operation and maintenance practices in order to avoid recurrence of such incidents and failures;
4. evolve comprehensive dam safety management approach as an integration of dam safety evaluation, risk assessment and risk management for the desired level of safety assurance; and also explore compensations, by means of insurance coverage for the people affected by dam failures;
5. render advice on any specific matter relating to dam safety which may be referred to it by the Central Government or the State Government, as the case may be;
6. make recommendations on a request by the Central Government on safety measures in respect of dams located outside the territory of India;
7. make recommendations on the rehabilitation requirements of ageing dams;
8. provide strategic supervision for such dam rehabilitation programmes that are executed in States through central or externally aided funding;
9. identify areas of research and development for dam safety and recommend for provision of funds;
10. make recommendations on the coordinated reservoir operations of cascading dams; and
11. any other specific matter relating to dam safety which may be referred to it by the Central Government.



SCHEDULE-II: FUNCTIONS OF NDSA

1. For the purpose of maintaining standards of dam safety and prevention of dam failure related disasters, discharge such functions as related to implementation of the policies made by the National Committee including making regulations on the recommendations of the National Committee;
2. resolve any issue between the State Dam Safety Organisations of States or between a State Dam Safety Organisation and any owner of a specified dam in that State;
3. provide the state-of-the-art technical and managerial assistance to the State Dam Safety Organisations;
4. maintain a national level database of all specified dams in the country, including serious distress conditions, if any, noticed therein;
5. maintain liaison with the State Dam Safety Organisations and the owners of the specified dams for standardisation of dam safety related data and practices, and related technical or managerial assistance;
6. lay down guidelines and check-lists for the routine inspection and detailed investigation of the specified dams and appurtenant structures;
7. maintain the records of major dam failures in the country;
8. examine, as and when necessary, either through its own engineers or through a panel of experts, the cause of any major dam failure, and submit its report to the National Committee;
9. examine whenever required, either through its own engineers or through a panel of experts, the cause of any major public safety concern in respect of any specified dam, and issue appropriate instructions relating to further investigations, operational parameters or remedial measures;
10. lay down the uniform criteria for vulnerability and hazard classification of the specified dams in the country, and review such criteria as and when necessary;
11. give directions regarding maintenance of log books or database;
12. give directions regarding qualifications and experience requirements of individuals responsible for safety of the specified dams;
13. accord accreditations to the agencies that may be entrusted with the investigation, design, construction and alteration of the specified dams;
14. disqualify any agency for taking up investigation, design, construction or alteration of the specified dams, if it violates any of the regulations made under this Act;



SCHEDULE-II: FUNCTIONS OF NDSA – CONTD.

15. give directions regarding qualification and experience requirements of individuals responsible for investigation, design and construction of the specified dams;
 16. give directions regarding quality control measures to be undertaken during construction of the specified dams;
 17. lay down guidelines for preventive measures in the areas vulnerable to landslides in the vicinity of a specified dam under construction;
 18. give directions regarding competent levels of engineers in the dam safety units of the specified dams on the basis of vulnerability and hazard classification of such dams;
 19. give directions regarding instrumentation requirements and manner of their installation for monitoring the performance of the specified dams;
 20. give directions regarding data requirements of hydro-meteorological stations in the vicinity of the specified dams;
 21. give directions regarding data requirements of seismological stations in the vicinity of the specified dams;
 22. give directions regarding time interval for the risk assessment studies of the specified dams on the basis of vulnerability and hazard classification of such dams;
 23. give directions regarding time interval for updating the emergency action plans of the specified dams on the basis of vulnerability and hazard classification of such dams;
 24. give directions regarding constitution of independent panel of experts for comprehensive dam safety evaluation of the specified dams;
 25. give directions regarding time interval for the comprehensive safety evaluation of the specified dams on the basis of vulnerability and hazard classification of such dams;
 26. lay down guidelines for review of design floods of existing the specified dams;
 27. lay down guidelines for review of site specific seismic parameter studies of the specified dams;
 28. establishment of an early warning system incorporating appropriate framework for the exchange of real time hydrological and meteorological data and information related to operation of reservoirs by the owner of a dam;
 29. promote general education and awareness in relation to dam safety;
 30. provide secretarial assistance to the National Committee and its sub-committees;
 31. provide coordination and overall supervision of dam rehabilitation programmes that are executed in States through central or externally aided funding; and
 32. any other specific matter relating to dam safety which may be referred to it by the Central Government.
- 

SCHEDULE-III: FUNCTIONS OF SCDS

- 1 Review work done by State Dam Safety Organisation.
 - 2 Establish priorities for investigations.
 - 3 Order further investigations & use of non-departmental Resources.
 - 4 Recommend appropriate measures for distress condition.
 - 5 Establish priorities for projects of remedial works.
 - 6 Review progress on measures recommended.
 - 7 Assess implication/ coordinate mitigation with u/s State.
 - 8 Assess implication/ coordinate mitigation with d/s State.
 - 9 Assess probability of cascading dam failures, and coordinate mitigation measures with all concerned.
 - 10 Recommend provision of funds.
 - 11 Provide strategic supervision for such dam rehabilitation programs that are executed through State funding.
 - 12 Any other specific matter referred by the State Government.
- 