

INTERNATIONAL DAM SAFETY CONFERENCE 2022
10-12 October
Jaipur, Rajasthan

AN OVERVIEW OF THE DAM SAFETY ACT, 2021

Presented by

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Ministry of Jal Shakti

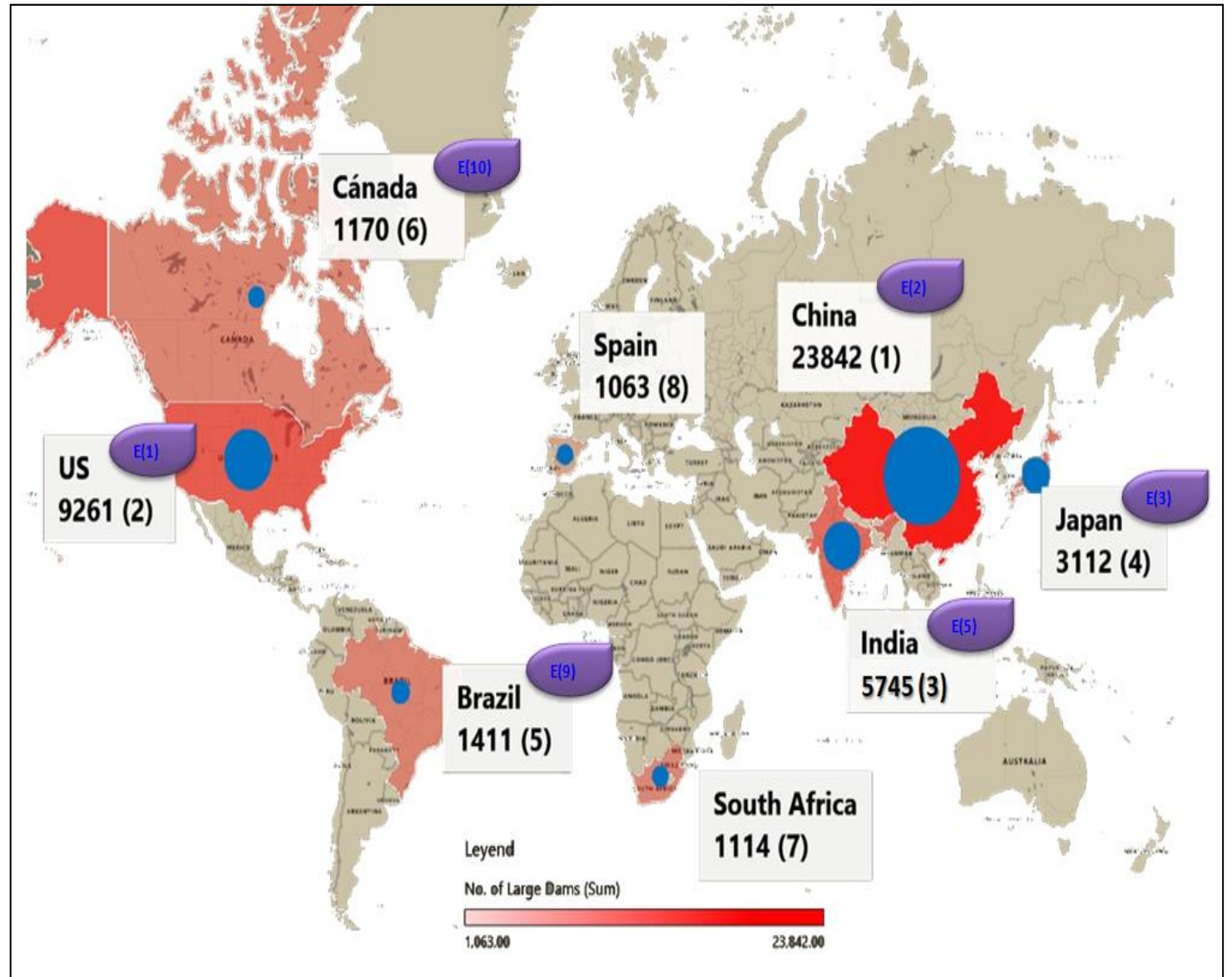
New Delhi

LARGE DAMS

As per National Register of Large dams (2019), India has....

5334 existing large dams

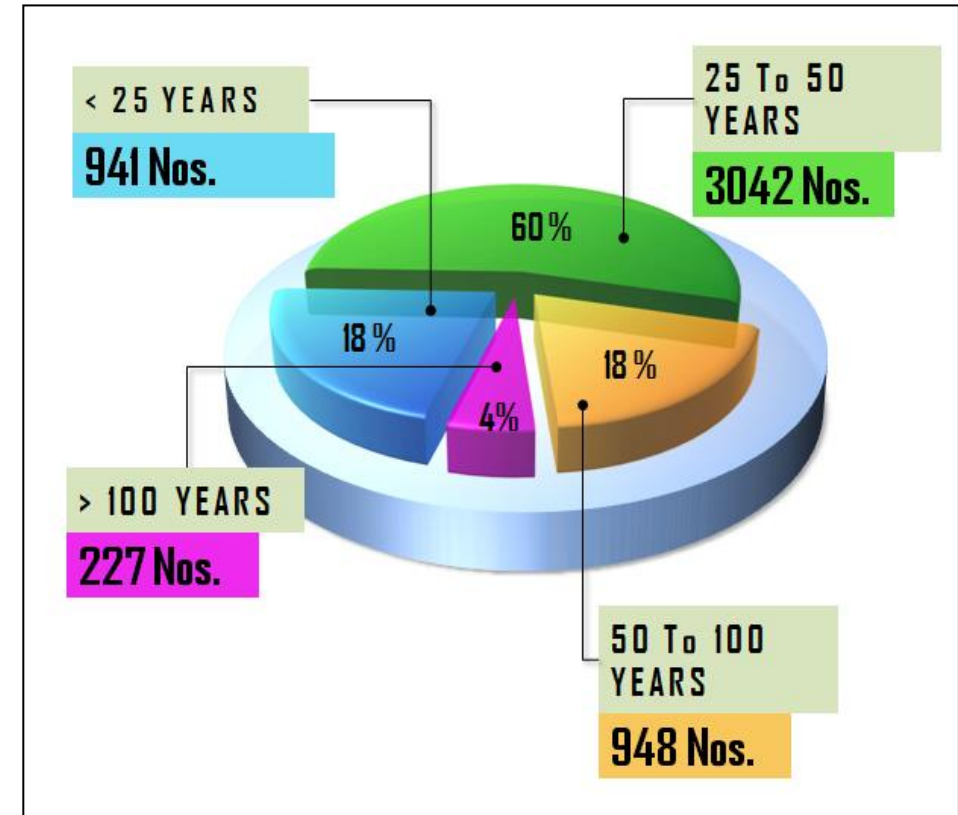
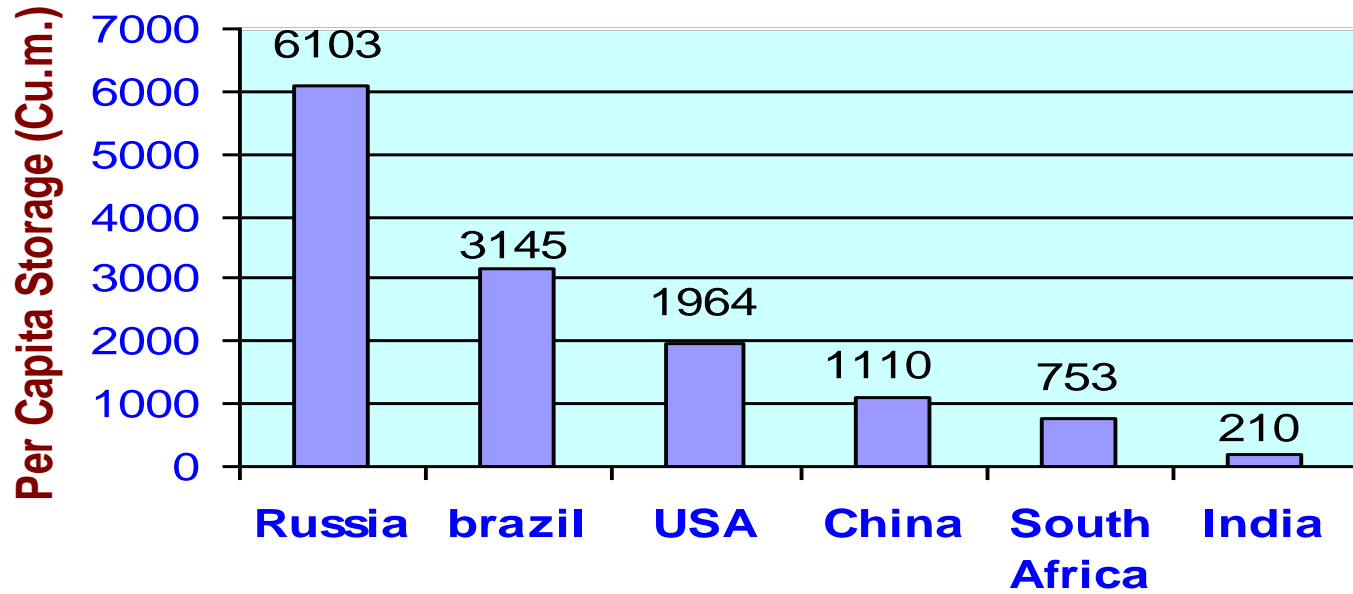
411 dams under construction



LARGE DAMS : WORLDWIDE

1	Storages already created	253.388 BCM
2	Projects under construction	50.959 BCM

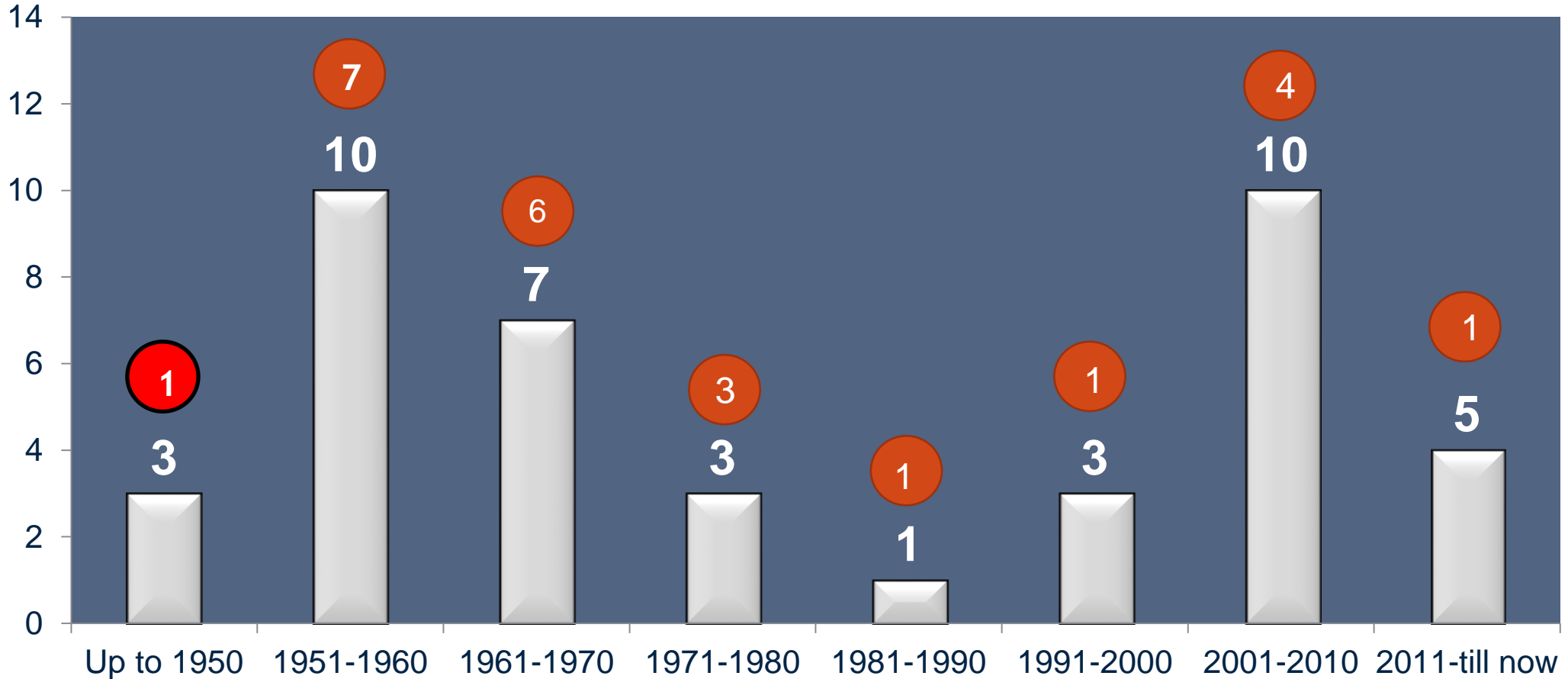
Per capita storage



 Failed within 10 years

42 reported dam failures in the last 100 years
Numerous dam incidents

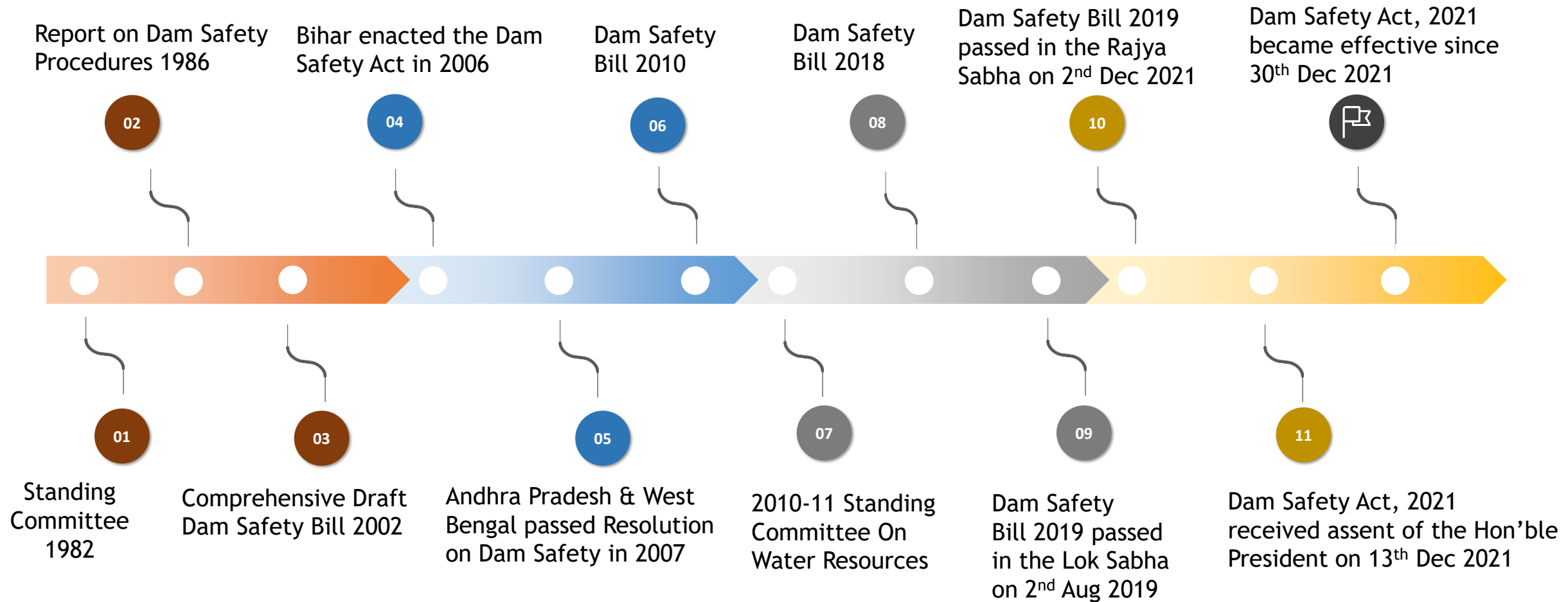
Decade-wise number of dam failures in India



Institutional Mechanism

Uniform dam safety procedures across the country


Journey of legislation on Dam Safety



Preamble

An Act to provide for surveillance, inspection, operation and maintenance of the specified dam for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.

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सत्यमेव जयते

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-१४१२२०२१-२३१८५८
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असाधारण
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PUBLISHED BY AUTHORITY

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No. 58] NEW DELHI, TUESDAY, DECEMBER 14, 2021/AGRAHAYANA 23, 1943 (SAKA)

इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।
Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE
(Legislative Department)

New Delhi, the 14th December, 2021/Agrahayana 23, 1943 (Saka)

The following Act of Parliament received the assent of the President on the 13th December, 2021, and is hereby published for general information:—

THE DAM SAFETY ACT, 2021
No. 41 OF 2021

[13th December, 2021.]

An Act to provide for surveillance, inspection, operation and maintenance of the specified dam for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto.

DAM SAFETY ACT 2021



11 Chapters



56 Clauses



Preliminary

- ❑ **Extent-** It extends to the whole of India.
- ❑ **Applicability-** Applies to the owner of every specified dam:
 - a) *being a public sector undertaking or institution or a body owned or controlled by the Central Government or a State Government or jointly by one or more Governments*
 - b) *being an undertaking or company or institution or a body other than those owned or controlled by the State Government or the Central Government*
- ❑ **Definitions** of dam, appurtenant structure, distress condition, dam incident, dam failure, dam safety unit etc.
- ❑ **Specified dam:**
 - i. **above fifteen metres in height**, measured from the lowest portion of the general foundation area to the top of dam; or
 - ii. **between ten metres to fifteen metres in height** and satisfies at least one of the following, namely:—
 - a) the length of crest is not less than five hundred metres; or
 - b) the capacity of the reservoir formed by the dam is not less than one million cubic metres; or
 - c) the maximum flood discharge dealt with by the dam is not less than two thousand cubic metres per second; or
 - d) the dam has specially difficult foundation problems; or
 - e) the dam is of unusual design;

Institutional Mechanism

- ❑ The Act has provided for National Level as well as State Level Mechanisms



National Committee on Dam Safety (NCDS)

- As per the provision of the Dam Safety Act 2021, Central Government on 17th February 2022, notified constitution of NCDS.
- **Functions in the First Schedule of the Act.**
- Reconstitution after every 3 years

Composition of NCDS

1. Chairman, CWC
2. Chairman, NDSA
3. Member, D&R, CWC
4. Member, Hydro, CEA
5. Representative of DoWR, RD&GR (not below the rank of Joint Secretary)
6. Representative of NDMA (not below the rank of JS)
7. Representative of MoEF &CC (not below the rank of JS)
8. Director General, IMD
9. Director General, GSI
10. Director, National Remote Sensing Centre
11. Director, National Geophysical Research Institute
12. Seven (7) representatives of the State Government of the level of Engineer-in-chief or equivalent by rotation
13. Three (3) specialists in the field of dam safety
14. Member (Policy and Research), NDSA – Member Secretary

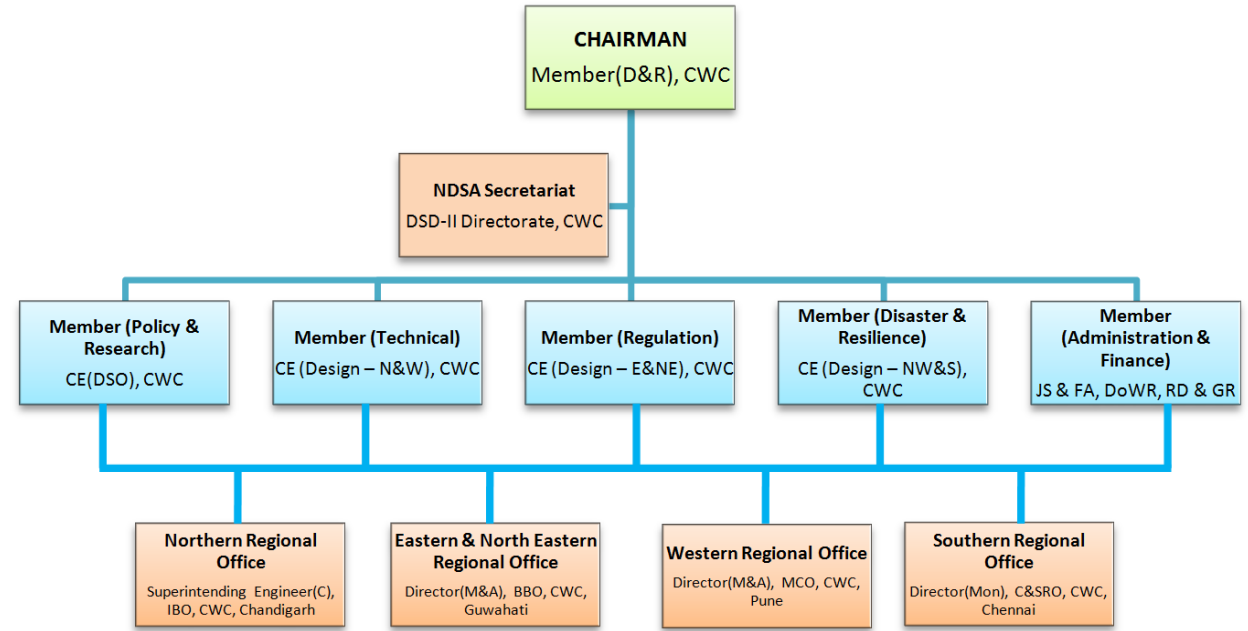
National Committee on Dam Safety

❑ Select Functions of NCDS (Schedule 1 of the Act)

- evolve dam safety policies and recommend necessary regulations
- act as a forum for exchange of views .
- analyze the causes of major dam incidents and dam failures and suggest changes in the planning, specifications, construction, operation and maintenance practices.
- evolve comprehensive dam safety management approach
- make recommendations on the rehabilitation requirements of ageing dams;
- provide strategic supervision for such dam rehabilitation programmes that are executed in States through central or externally aided funding;
- identify areas of research and development for dam safety and recommend for provision of funds;
- make recommendations on the coordinated reservoir operations of cascading dams.

NATIONAL DAM SAFETY AUTHORITY (NDSA)

- As per the provision of the Dam Safety Act 2021, Central Government on 17th February 2022, notified the establishment of National Dam Safety Authority (NDSA).
- Functions in the second schedule of the Act.



S. No.	Regional Office	Name of States/ Union Territories
1	Northern Region	Jammu & Kashmir, Ladakh, Chandigarh, Delhi, Uttar Pradesh, Punjab, Haryana, Uttarakhand and Himachal Pradesh.
2	Eastern & North Eastern Region	Bihar, Jharkhand, West Bengal, Chhattisgarh, Odisha, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura.
3	Western Region	Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Dadra and Nagar Haveli and Daman & Diu and Goa.
4	Southern Region	Telangana, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry, Lakshadweep and Andaman & Nicobar Island.

NDSA will function with the above broad structure on additional charge basis, till such time the Recruitment Rules are finalized and regular staff are posted.

National Dam Safety Authority

□ Select Functions of NDSA (Schedule II of the Act)

- implementation of the policies made by the NCDS.
- resolve any issue between the SDSO of States or between a SDSO and any owner of a specified dam.
- provide the state-of-the-art technical and managerial assistance to the SDSOs.
- maintain a national level database and records of major dam failures.
- maintain liaison with the SDSO and the owners of the specified dams for standardisation of dam safety.
- lay down guidelines and check-lists for the routine inspection and detailed investigation.
- examine the cause of any major dam failure.
- examine whenever required the cause of any major public safety concern in respect of any specified dam.
- lay down the uniform criteria for vulnerability and hazard classification
- provide secretarial assistance to the National Committee and its sub-committees.
- lay down guidelines for review of design floods and site specific seismic parameter studies
- establishment of an early warning system
- provide coordination and overall supervision of dam rehabilitation programmes that are executed in States through central or externally aided funding.

State Committee on Dam Safety

- ❑ Constitution of SCDS by the State Govt. with following composition:

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

- ❑ Reconstitution after every three years.
- ❑ Secretarial assistance by State Dam Safety Organization (SDSO).

State Committee on Dam Safety

❑ **Select Functions of SCDS (Schedule III of the Act)**

- discharge such functions as may be necessary as per the guidelines, standards and other directions issued by the NDSA.
- review the work done by the State Dam Safety Organisation.
- establish priorities for investigations in case of specified dams under distress condition.
- recommend the appropriate measures to be taken in relation to the safety of the specified dam which is under distress condition.
- establish priorities among projects requiring remedial safety works.
- Assess implication of reservoir filling on the u/s State and that of dam failure on the d/s State.
- assess probability of cascading dam failure, and coordinate mitigation measures with all concerned, including bordering States;
- recommend provision of funds for the purpose of planned and appropriately phased rehabilitation of ageing dams in the State;
- provide strategic supervision for such dam improvement and rehabilitation programmes that are executed through State funding

State Dam Safety Organisation

- ❑ Establishment of SDSO by the State Govt. in the Department dealing with dam safety.
 - ❑ Organisational structure, functions, powers and terms & conditions of the service to be prescribed by the State Government.
 - ❑ 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.
- i) All specified dams, shall fall under the jurisdiction of the SDSO of the State in which such dam is situated in matters relating to dam inspections, analysis of information, investigation reports or recommendations regarding safety status, and remedial measures to be undertaken to improve dam safety; and in all such matters, full co-operation shall be extended by the owner of the specified dam:
- a) Provided that where a specified dam is owned by a Central Public Sector Undertaking or where a specified dam is extended over two or more States, or where the specified dam in one State is owned by another State, then NDSA shall be construed as the SDSO for the purposes of the Act:
 - b) Provided further that in all such dams where NDSA takes up the role of SDSO, the Governments of the States within the jurisdiction of which such dams are located shall have access to all information relating to these specified dams as available with NDSA.

State Dam Safety Organisation

□ Select Functions of SDSO

Item	Section	Duties and Functions
Surveillance and inspection	16	keep perpetual surveillance , carry out inspections and monitor the O&M
Vulnerability and hazard classification of dams	17	classify each dam under their jurisdiction as per such vulnerability and hazard classification criteria
Maintenance of log books	18	maintain a log book or database for recording therein all activities related to the surveillance and inspection and all important events
Records of dam failures and dam incidents	19	report the event of any dam failure to the NDSA , maintain the records of major dam incidents and furnish any information as and when required by NDSA.
Instructions on safety of specified dams	20	render its instructions to the owner of a specified dam on the safety or the remedial measures required to be taken with respect to it.
Initial filling of reservoirs	27	inspect or cause to be inspected the specified dam either through its own engineers or by an independent panel of experts before initial filling of the reservoir is taken up

Dam Owners

❑ Select functions of Dam Owners

Item	Section	Duties and Function
Instructions on safety of specified dams.	20	comply with the instructions issued by the SDSO with regard to safety or remedial measures
Funds for maintenance and repairs	21	 earmark sufficient and specific funds for maintenance and repairs of the specified dam and to implement the recommendations of the SDSO
Technical documentation.	22	compile all technical documentations, furnish all such information to the SDSO and NDSA as and when required and equip with the state-of-the-art information technology tools to store, retrieve, and distribute the data related to the dam safety and dam performance
Operation and maintenance (O&M)	28	provide O&M establishment for the specified dam & shall ensure that sufficient number of trained operation and maintenance engineers or technical persons are posted at each such dam and ensure that a well-documented operation and maintenance manual is kept at each of the specified dams and are followed at all times.

Dam Owners

Item	Section	Duties and functions
Responsibility of owner of specified dam	29	Nothing contained in this Act shall be construed to absolve an owner of a specified dam of the duties, obligations or liabilities incidental to the construction, operation, maintenance and supervision of the dam or reservoir.
Dam Safety Unit	30	For each specified dam within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers.
Inspection	31	<ul style="list-style-type: none">• undertake every year, through their dam safety unit, a pre-monsoon and post-monsoon inspections in respect of each such dam• carry out all inspections in accordance with the guidelines and check-lists as may be specified by the regulations;• forward the inspection report by the dam safety unit to the SDSO, which shall analyse the report and submit comments on the deficiency and remedial measures, if any, to the owner of the specified dam.

Dam Owners

Item	Section	Duties and functions
Instrumentations to be installed in every specified dam.	32	<ul style="list-style-type: none">• shall have a minimum number of such instrumentations and installed as per the regulations• maintain a record of readings of the instrumentations and forward the analysis of such readings to the SDSO
Establishment of hydro-meteorological station	33	<ul style="list-style-type: none">• establish a hydro-meteorological station in the vicinity of each specified dam capable of recording such data as per the regulations.• collect, compile, process and store data at a suitable location
Installations of seismological station	34	<ul style="list-style-type: none">• establish a seismological in the case of every specified dam, having a height of thirty metres or above or falling under such seismic zone• collect, compile, process and store data at such suitable location and in such manner as may be specified by the regulations.

Emergency Action Plan and 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 from the date of commencement of the Act.**
- **Prepare emergency action plan within 5 years from the date of commencement of the Act; and for new dams, before the initial filling.**

□ 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.

Comprehensive Dam Safety Evaluation

- ❑ Comprehensive Dam Safety Evaluation by panel of experts. First such evaluation within 5 years from the date of commencement of the Act, and thereafter at regular intervals as specified by the regulations.

- ❑ Comprehensive Dam Safety Evaluation 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;
 - 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 .

- ❑ Comprehensive Dam Safety Evaluation 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.

Offences and Penalties

❑ **Whoever, without reasonable cause-**

- obstructs any officer or employee of the Central Government or the State Government, or a person authorised by the NCDS/NDSA/SCDS/SDSO
- refuses to comply with any direction given by or on behalf of the Central Government or the State Government or the NCDS/NDSA/SCDS/SDSO

shall be punishable with **imprisonment for a term which may extend to one year or with fine, or with both**, and if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, shall be punishable with imprisonment for a **term which may extend to two years**.

❑ **Cognizance of offences**

- No court shall take cognizance of any offence punishable under this Act, except on a complaint made by the Central Government or the State Government or a person authorised in this behalf by the NCDS/NDSA/SCDS/SDSO
- No court inferior to that of a Metropolitan Magistrate or a Judicial Magistrate of the first class shall try any offence punishable under this Act.

Miscellaneous

❑ Annual report of safety status of specified dam

- Every SDSO shall prepare annual report, within three months of the expiry of the preceding financial year, of its activities and safety status of specified dams in the State and such report shall be forwarded to the Authority and State Government and that Government shall cause the same to be laid before each House of the State Legislature, where it consists of two Houses or where such Legislature consists of one House, before that House.
- NDSA shall prepare a consolidated annual report of the dam safety activities in the country and submit the same to the Central Government within six months of the expiry of the preceding financial year and that Government shall cause the same to be laid before each House of Parliament.

❑ Regulations

- NDSA on the recommendations of the National Committee may make regulations consistent with the Act and the rules made thereunder to carry out the provisions of the Act.

List of Published Guidelines/Manuals

1. Guidelines for Developing Emergency Action Plans for Dams
2. Manual for Rehabilitation of Large Dams
3. Guidelines for Instrumentation of Large Dams
4. Guidelines for Preparing Operations and Maintenance Manuals for Dams
5. Guidelines for Mapping Flood Risks Associated with Dams
6. Guidelines for Safety Inspections of Dams
7. Guidelines for Assessing and Managing Reservoir Sedimentation
8. Guidelines for Assessing and Managing Risks Associated with Dams
9. Guidelines for Operation Procedures for Assessing and Managing Environmental Impacts in Existing Dam Projects
10. Guidelines for Classifying the Hazard Potential of Dams
11. Manual for Assessing Structural Safety of Existing Dams
12. Manual for Assessing the Hydraulic Safety of Dams
13. Guidelines for Selecting and Accommodating Inflow Design Floods for Dams

Concluding Remarks

- **Uniform Dam Safety Procedures across the country**

- **Institutional Setup and strengthening**
- **Well defined roles/responsibilities of all stakeholders**

- **Regular inspection and health monitoring of dams**
- **Ensuring sufficient funds allocation for repair and maintenance of dams**

- **Risk based portfolio management and emergency preparedness**

- **State of the Art Technology, Capacity building and developing robust dam safety culture**



Thanks for the attention