

AN OVERVIEW OF THE DAM SAFETY ACT, 2021

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ABSTRACT

Dams are critical infrastructure assets constructed with huge investments for multiple uses such as supply of water for drinking and industrial purposes, irrigation, power generation and flood moderation. India ranks third in the world, after USA and China, in terms of number of large dams. As per the National Register of Large Dams (2019) compiled by the Central Water Commission, India has 5334 operational large dams and 411 are under construction. Around 98% of these dams are owned by the State Governments while the remaining are owned by Central and State public sector utilities and private agencies. About 80% of these dams are more than 25 years of age and 227 dams are more than 100 years of age. Ensuring the safety of these dams is paramount responsibility of the dam owners as unsafe dam constitute a major public safety concern. The Parliament of India has enacted the Dam Safety Act, 2021, 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. This paper provides an insight into the salient provisions of the Act and highlights the responsibilities of the Central and State Governments and the dam owners in implementation of the various provisions of the Act.

1.0 INTRODUCTION

India ranks third in the world, after USA and China, in terms of number of large dams. As per the National Register of Large Dams (2019) compiled by the Central Water Commission, India has 5334 operational large dams and 411 are under construction. Around 98% of these dams are owned by the State Governments while the remaining are owned by Central and State public sector utilities and private agencies. About 80% of these dams are more than 25 years of age and 227 dams are more than 100 years of age. These dams have been constructed with

huge investments including substantial investments in terms of social and environmental costs. Long-term sustenance of these assets is vital for realizing the envisaged operational benefits from these assets.

Ensuring the safety of the dams in India is primarily the responsibility of the dam owners. The Central and State agencies and other organizations owning dams are involved in various aspects of the dam building from concept to commissioning including operation and maintenance. However, due to financial and institutional constraints, the States are not able to meet the requirement of proper surveillance, inspection, operation and maintenance to ensure their safe functioning and also to ensure uniform dam safety procedures. As the practices of dam safety varied from State to State and from organization to organization, the Central Government has been working over the years towards evolving unified practices of dam safety and has given its recommendations for implementation by all States and dam owners. An approach in this direction first began in 1979, when the Dam Safety Organization was established in Central Water Commission.

Keeping in view the importance of safety of dams, the Central Government constituted a Standing Committee in the year 1982, under the Chairmanship of Chairman, Central Water Commission, to review the existing practices and to evolve unified procedures for safety of dams in the country. The Standing Committee in its report dated the 10th of July, 1986, recommended for unified dam safety procedures for all the dams in the country and need for legislation on dam safety. The Standing Committee was reconstituted with a wider representation and a focused mandate in October 1987, in the name of National Committee on Dam Safety (NCDS) under the Chairmanship of Chairman, CWC. The committee had representation from Central Government and major dam owning States. It also included specialists in the field of dam safety. This committee acted as a forum for exchange of views on various issues pertaining to dam safety. NCDS worked towards devising the dam safety policies and regulations for maintaining best practices and standards of dam safety, so as to prevent any dam safety related disasters. The committee was mandated to evolve and suggest changes in the planning, specifications, construction and operation & maintenance practices by analyzing the causes of major historical dam incidents and dam failures. The Central Water Commission and NCDS have been continuously endeavoring since then to improve the safety conditions of large dams in the country. However, for want of statutory back up, these entities remained limited to advisory role with no powers to enforce their recommendations.

2.0 BACKGROUND

The Standing Committee in its report titled “*Report on Dam Safety Procedures*” in July, 1986 suggested for institutional arrangement for dam safety at the level of States and the Centre along with recommendation for enactment of Dam Safety Legislation. Accordingly, a comprehensive Draft Dam Safety Bill was prepared in 2002 and circulated to the State Governments for their views. Initial efforts for dam safety legislation were mainly directed towards enactment of appropriate legislation by respective State Governments. Accordingly, the State of Bihar enacted the Dam Safety Act, 2006. However, some of the States favoured the idea of a uniform central legislation on dam safety. The State of Andhra Pradesh and the State of West Bengal adopted resolution in their States for an Act of Parliament. Accordingly, the Dam Safety Bill,

2010 was introduced in Lok Sabha on the 30th August, 2010, which was subsequently referred to the Parliamentary Standing Committee on Water Resources for examination.

The Parliamentary Standing Committee submitted its recommendations on the Dam Safety Bill, 2010. Owing to significant changes/modifications entailed in the Bill while complying with the recommendations of the Parliamentary Standing Committee, the Ministry of Water Resources decided to withdraw the Bill and to introduce the modified Bill in the Parliament.

The Dam Safety Bill, 2018 was prepared for coverage across whole of India incorporating the recommendations of the Parliamentary Standing Committee on the Dam Safety Bill, 2010 and was introduced in Lok Sabha. However, with dissolution of the 16th Lok Sabha, the Dam Safety Bill, 2018 lapsed. The Dam Safety Bill, 2019 was passed by Lok Sabha on August 2, 2019 and by Rajya Sabha on 2nd Dec 2021. The Dam Safety Act, 2021 (No. 41 of 2021) of Parliament received the assent of the President on the 13th December, 2021 and has been notified in the Gazette dated 14th Dec 2021. The Act and its provisions have come into force with effect from 30th December, 2021. The roadmap of enactment of Dam Safety Act is shown in Fig. 1.

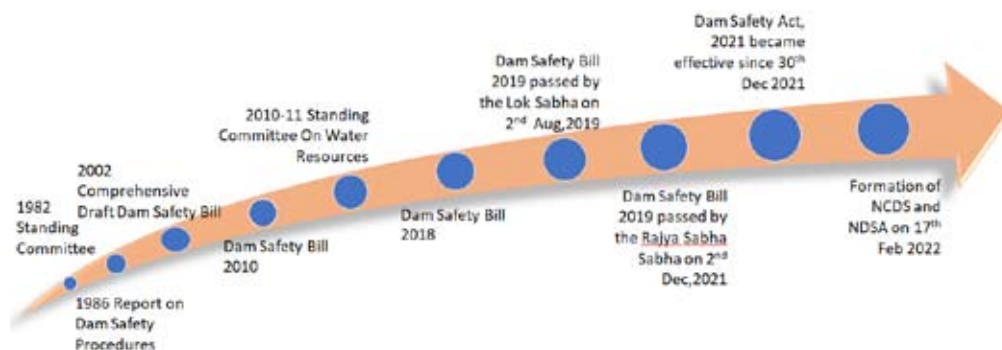


Fig. 1 : Dam Safety Act enactment roadmap

As per the preamble, the Act provides 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. The Act extends to the whole of India. It has a provision for an institutional mechanism at both Central and State Government levels to ensure the safe functioning of dams.

3.0 SALIENT PROVISIONS OF THE ACT

The Dam Safety Act, 2021 contains 11 Chapters, 56 Sections and 3 Schedules. The Act applies to the owner of every specified dam, 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, as the case may be, and being an undertaking or company or institution or a body other than those owned or controlled by the State Government or the Central Government, as the case may be. Under Chapter I, some of the terms used in the Act have been defined which inter alia include; dam, appurtenant structure, specified dam, owner of specified dam, distress condition, dam incident, dam failure, dam safety unit, documentation, inspection and investigation.

3.1 Specified Dam

As per the Act, “*specified dam*” means a dam constructed before or after the commencement of this Act, which is;

- (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;

3.2 Institutional Mechanism

The Dam Safety Act, 2021 provides for:

- (i) constitution of the *National Committee on Dam Safety (NCDS)* headed by Chairman, Central Water Commission and to discharge such functions as specified in the First Schedule of the Act as may be necessary to prevent dam failure related disasters and to maintain standards of dam safety. The constitution, functions and functioning of the National Committee on Dam Safety are provided in Chapter II of the Act.
- (ii) establishment of the *National Dam Safety Authority (NDSA)* to discharge such functions as specified in the Second Schedule of the Act as may be necessary to implement the policy, guidelines and standards evolved by the National Committee for proper surveillance, inspection and maintenance of specified dams. The establishment, functions and functioning of the National Dam Safety Authority are provided in Chapter III of the Act.
- (iii) constitution of the *State Committee on Dam Safety (SCDS)* by the State Governments to discharge such functions as specified in the Third Schedule as may be necessary to prevent dam failure related disasters under this Act as per guidelines, standards and other directions issued by the Authority. The constitution, functions and functioning of the State Committee on Dam Safety are provided in Chapter IV of the Act.
- (iv) establishment of the *State Dam Safety Organisation (SDSO)* by the State Governments having specified dams which will be manned by officers with adequate experience in the various fields related to safety of dams. The details of the State Dam Safety Organisation are provided in Chapter V of the Act.

3.3 Duties and Functions in Relation to Dam Safety

The duties and functions in relation to dam safety are brought out under various sections

in Chapter VI of the Act. Select duties and functions of dam owner and State Dam Safety Organisation are brought out here.

- (i) Every SDSO shall keep perpetual surveillance, carry out inspections and monitor the operation and maintenance, of all specified dams falling under their jurisdiction to ensure continued safety of such specified dams and take such measures as may be necessary to address safety concerns that are noticed with a view to achieve satisfactory level of dam safety assurance as per such guidelines, standards and other directions on dam safety as may be specified by the regulations.
- (ii) The SDSO shall classify each dam under their jurisdiction as per such vulnerability and hazard classification criteria as may be specified by the regulations.
- (iii) Every SDSO shall maintain a log book or database for each specified dam under their jurisdiction recording therein all activities related to the surveillance and inspection and all important events related to dam safety and with such details and in such form as may be specified by the regulations. As and when required by NDSA, the SDSO shall furnish all such information.
- (iv) Every SDSO shall report the event of any dam failure under their jurisdiction to NDSA, and furnish any information as and when required by them. Every SDSO shall maintain the records of major dam incidents of each specified dams under their jurisdiction, and furnish all such information to NDSA as and when required by them.
- (v) Every SDSO shall 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. Every owner of the specified dam shall comply with the instructions issued by the SDSO.
- (vi) Every owner of the specified dam shall earmark sufficient and specific funds for maintenance and repairs of the specified dam and to implement the recommendations of the SDSO.
- (vii) Every owner of the specified dam shall compile all technical documentations concerning hydrology, dam foundation, structural engineering of dam, watershed upstream of dam, and nature or use of land downstream of dam along with information on all resources or facilities of economic, logistic or environmental importance which are likely to be affected due to dam failure. Every owner of the specified dam shall furnish all such information to SDSO and NDSA as and when required by them.
- (viii) Every individual responsible for safety of specified dams and all activities related thereto shall possess such qualifications and experience and shall undergo such training as may be specified by the regulations.
- (ix) Without prejudice to the provisions of this Act, 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.
- (x) All the costs to be incurred by NDSA or SDSO on any form of investigation done including payment given to any consultant or expert, shall be borne by the owner of the specified dam.
- (xi) Any construction or alteration of a specified dam shall be undertaken subject to investigation, design and construction being done by such agencies as may be accredited by NDSA or the State Government, as the case may be. Provided that NDSA may disqualify any agency which violates any of the provisions of the Act or the rules or regulations made thereunder.
- (xii) Before initial filling of any reservoir of a specified dam, the agency responsible for its design shall draw the filling criteria and prepare an initial filling plan, with adequate time for monitoring and evaluating the performance of the dam and its appurtenant structures. Before initial filling of the reservoir is taken up, the SDSO shall inspect or cause to be inspected the specified dam either through its own engineers or by an independent panel of experts, who shall also examine the initial filling programme and prepare a detailed report thereof duly certifying the fitness of dam for filling.
- (xiii) Every owner of the specified dam shall provide operation and maintenance establishment for the specified dam, and shall ensure that sufficient number of trained operation and maintenance engineers or technical persons are posted at each such dam. Every owner of the specified dam shall ensure that a well-documented operation and maintenance manual is kept at each of the specified dams and are followed at all times.
- (xiv) 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.

3.4 Safety, Inspection and Data Collection

Chapter VII of the Act contains the provisions related to safety, inspection and data collection. Select provisions therein are brought out here.

- (i) For each specified dam, the owner shall, within the operation and maintenance establishment, provide a dam safety unit consisting of such competent levels of engineers as may be specified by the regulations.
- (ii) Every owner of a specified dam shall undertake every year, through their dam safety unit, a pre-monsoon and post-monsoon inspections in respect of each such dam. Without prejudice to this, every owner of a specified dam shall inspect or cause to be inspected every specified dam by the dam safety unit, during and after every flood, earthquake or any other natural or man-made calamities, or if any sign of distress or unusual behaviour is noticed in the dam.

- (iii) Every owner of a specified dam shall have a minimum number of such instrumentations at each specified dam, and installed in such manner as may be specified by the regulations for monitoring the performance of such dam.
- (iv) Every owner of a specified dam shall establish a hydro-meteorological station in the vicinity of each specified dam capable of recording such data as may be specified by the regulations.
- (v) In the case of every specified dam, having a height of thirty metres or above or falling under such seismic zone, as may be specified by the regulations, the owner of the specified dam shall establish a seismological station in the vicinity of each such dam for recording micro and strong motion earthquakes and such other data as may be specified by the regulations. Every owner of a specified dam shall collect, compile, process and store data at such suitable location and in such manner as may be specified by the regulations.

3.5 Emergency Action Plan and Disaster Management

Chapter VIII of the Act contains the provisions related to emergency action plan and disaster management. Select provisions therein are brought out here.

- (i) Every owner of a specified dam, in respect of each specified dam, shall establish well designed hydro-meteorological network and an inflow forecasting system and shall establish an emergency flood warning system for the probable flood affected areas downstream of the dam.
- (ii) Every owner of a specified dam, for each of its dam shall, carry out risk assessment studies at such interval as may be specified by the regulations and the first such study shall be made within five years from the date of commencement of the Act.
- (iii) Every owner of a specified dam, in respect of each of specified dam, shall,
 - (a) prepare emergency action plan before allowing the initial filling of the reservoir and thereafter update such plans at regular intervals;
 - (b) in respect of the dam which is constructed and filled before the commencement of the Act, prepare emergency action plan within five years from the date of commencement of the Act and thereafter update such plans at regular intervals as may be specified by the regulations.
- (iv) Without prejudice to the provisions of this Act or liability of the owner of the specified dam and other organisations and authorities under this Act, every owner, organisation and authority shall render necessary assistance, if so required by any authority under any law for the time being in force to meet or mitigate any disaster or emergency arising out of the specified dams.

3.6 Comprehensive Dam Safety Evaluation

Chapter IX of the Act contains the provisions related to comprehensive dam safety evaluation. Select provisions therein are brought out here.

- (i) The owner of a specified dam shall make or cause to be made comprehensive dam safety evaluation of each specified dam through an independent panel of experts constituted as

per regulations for the purpose of determining the conditions of the specified dam and its reservoir. Provided that *the first comprehensive dam safety evaluation for each existing specified dam shall be conducted within five years from the date of commencement of the Act*, and thereafter the comprehensive dam safety evaluation of each such dam shall be carried out at regular intervals as may be specified by the regulations.

- (ii) The comprehensive dam safety evaluation shall consist of, but not be limited to;
 - (a) review and analysis of available data on the design, construction, operation, maintenance and performance of the structure;
 - (b) general assessment of hydrologic and hydraulic conditions with mandatory review of design floods as specified by the regulations;
 - (c) general assessment of seismic safety of specified dam with mandatory site specific seismic parameters study in certain cases as specified by the regulations;
 - (d) evaluation of the operation, maintenance and inspection procedures; and
 - (e) evaluation of any other conditions which constitute a hazard to the integrity of the structure
- (iii) The said comprehensive dam safety evaluation shall be compulsory in the case of ;
 - (a) major modification to the original structure or design criteria;
 - (b) discovery of an unusual condition at the dam or reservoir rim; and
 - (c) an extreme hydrological or seismic event.
- (iv) The owner of a specified dam shall report the results of the said dam safety evaluation undertaken to the SDSO as mentioned in the Act. The SDSO shall pursue with the owner of the specified dam to ensure that remedial measures are carried out in time, for which owner shall provide adequate funds.

3.7 Offences and Penalties

Chapter X of the Act contains the provisions related to offences and penalties. Select provisions therein are brought out here.

- (i) Whoever, without reasonable cause, obstructs any officer or employee of the Central Government or the State Government, or a person authorised by the National Committee or NDSA or the State Committee or the SDSO in the discharge of his functions under the Act; or refuses to comply with any direction given by or on behalf of the Central Government or the State Government or the National Committee or NDSA or the State Committee or the SDSO under the Act, 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.
- (ii) The Act contains provisions regarding the offence committed by a Department of the Government or by a company or body corporate.
- (iii) No court shall take cognizance of any offence punishable under the Act, except on a complaint made by the Central Government or the State Government or a person authorized

in this behalf by the National Committee or NDSA or the State Committee or the SDSO, as the case may be. No court inferior to that of a Metropolitan Magistrate or a Judicial Magistrate of the first class shall try any offence punishable under the Act.

3.8 Miscellaneous

Chapter XI of the Act inter alia contains the provisions related to preparation of annual report, safety measures in respect of dams other than specified dams as well as dams located outside the territory of India, powers of Central Government and State Governments to make rules and powers to make regulations by NDSA. Select provisions therein are brought out here.

- (i) 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 NDSA 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. The 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.
- (ii) Every owner of the dam other than specified dams shall undertake such measures as may be necessary to ensure dam safety and shall comply with such measures as may be specified by the regulations.
- (iii) 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.
- (iv) The Central Government may give such directions, as it may consider necessary, to the State Government where that Government is the owner of the specified dam and to the owner of a specified dam in any other case for the effective implementation of the provisions of this Act.

4.0 CONCLUDING REMARKS

Ministry of Jal Shakti, vide Gazette Notification S.O. 757(E) dated 17.02.2022, has constituted the National Committee on Dam Safety headed by Chairman, CWC. Vide Gazette Notification S.O. 758(E) dated 17.02.2022, Ministry has notified establishment of the National Dam Safety Authority. Ministry of Jal Shakti, vide Gazette Notification G.S.R. 134 (E) dated 17.02.2022 notified the “National Committee on Dam Safety (Procedures, Allowance and other Expenditure) Rules, 2022” and vide Gazette Notification G.S.R. 135 (E) dated 17.02.2022 notified the “National Dam Safety Authority (Functions and Powers) Rules, 2022”.

Till such time a regular organizational structure of NDSA is created, NDSA has been set up by Ministry of Jal Shakti in April 2022, on additional charge basis, under the chairmanship of Member (Design & Research), CWC, assisted by 5 Members i.e. Member (Technical), Member (Policy and Research), Member (Regulation), Member (Disaster and Resilience) and Member (Administration and Finance). The additional charge of four of the members of NDSA have been assigned to four Chief Engineers of CWC and Joint Secretary & Financial Advisor,

Ministry of Jal Shakti is assigned the additional charge of Member (Admin and Finance). To support the activities of NDSA at Headquarter, four regional offices headed by Director, CWC, on additional charge basis, have been set up at Chandigarh, Coimbatore, Guwahati and Pune.

This being the first year of implementation of the Dam Safety Act 2021, all the Central and State Governments, Central/State public sector utilities, local authority and companies, that own, control, operate and maintain a specified dam, were sensitised through a National Workshop on “*Dam Safety Act, 2021 for Dam Safety Governance in India*” organized by CWC and Ministry of Jal Shakti on the 16th of June 2022. In this direction, NDSA is conducting regional meeting-cum workshop in the four regions in the country to sensitize and emphasis upon the States to accelerate the desired activities towards implementation of the various provisions of the Act. The meeting for Southern Zone was held on 3rd September 2022 at Coimbatore and for Northern Zone was held on 10th September 2022 at Chandigarh where in officers from SCDS & SDSO, Central/State PSUs and dam owners participated.

The Dam Safety Act, 2021 is a landmark legislation that brings a paradigm shift in the way we manage, operate and maintain our dams in India. The Act strives to bring in unified dam safety procedures, prevent dam failure related disasters and lay emphasis on creating multi-tier institutional mechanism and capacity building for comprehensive dam safety management in the country.

Note : *This paper discusses only select provisions of the Dam Safety Act 2021. The reader may refer the Government of India, Gazette Notification on Dam Safety Act 2021 (No 41 of 2021) dated 14th December 2021 for original full text.*

REFERENCES

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