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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 21075-2007

Replacing GB/T 21075-2007

Reservoir-induced earthquake hazard assessment

水库诱发地震危险性评价

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 21075-2007 "Evaluation of Seismic Hazard Induced by Reservoirs". Compared with GB/T 21075-2007, except for the structure...

Aside from adjustments and editorial changes, the main technical changes are as follows.

- a) The definition of the reservoir-induced earthquake influence zone has been changed (see 3.4, 2007 version 3.4);
- b) The definition of seismic induction factors has been added (see 3.5);
- c) The scope and scope of application for reservoir-induced earthquake hazard assessment have been changed (see Chapter 4, Chapter 4 of the 2007 edition);
- d) The regulations for map scales have been changed (see 4.3, 5.2 and 6.1 in the 2007 edition);
- e) The regulations regarding the labeling content of reservoir-induced earthquake hazard assessment maps have been revised (see 4.3, 5.1 of the 2007 edition);

- f) The requirements for collecting and organizing background data on seismic activity have been revised (see 6.1, 6.3, and 7.2 in the 2007 edition);
- g) The requirements for library segmentation have been changed (see 7.1, 8.1 in the 2007 version);
- h) The rules for collecting probability assessment data have been changed (see 8.1, 9.1 in the 2007 version);
- i) The representation of induced seismic hazard in the comprehensive assessment has been changed (see 9.3, 10.2 in the 2007 edition);
- j) Table A.1 regarding the geostress environment has been added to Appendix A (see Appendix A);
- k) The indices for the state of induced earthquake factors in reservoir-induced earthquakes have been modified (see Appendix C, Appendix C of the 2007 edition);
- l) The attenuation relationship has been modified (see Appendix D, Appendix D of the 2007 edition).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Earthquake Administration.

This document is under the jurisdiction of the National Earthquake Standardization Technical Committee (SAC/TC225).

Introduction

There are differing opinions in the academic community regarding the formation mechanism of reservoir-induced earthquakes, but this document does not address the controversy surrounding the causes; it only regulates the assessment of hazard.

Evaluation methods. Reservoir-induced seismic hazard assessment is an important part of the safety assessment of water conservancy and hydropower projects.

The price needs to be determined before construction based on seismic geological conditions, predicting the likelihood of earthquakes, potential reservoir sections, and maximum magnitude. It is worth noting that GB 17741 does not...

While it covers all aspects of the project, its technical specifications are insufficient to comprehensively guide this type of evaluation.

my country is one of the countries with a high incidence of reservoir-induced earthquakes, with over 60 known examples originating from reservoirs. The 1962 Xinfengjiang Reservoir earthquake was a magnitude 6.1 event.

Earthquakes cause severe disasters, which prompts related departments such as earthquake, water conservancy, and power to carry out systematic research, resulting in a series of important achievements.

Since its implementation, GB/T 21075-2007 has provided corresponding technical support for the safety of national energy strategic projects and disaster prevention and control. However, with...

With the intensive construction of high arch dam projects in the western earthquake-prone areas, the increasing spatial overlap between reservoir areas and densely populated areas, coupled with the expansion of the case database and the deepening of disciplinary understanding, the existing standards in GB/T 21075-2007 are no longer sufficient to address the risks of new engineering disasters and the sensitivity to social disasters in terms of seismic induced models and evaluation methods.

The challenges of upgrading.

This revision of GB/T 21075-2007 focuses on redefining the scope of the reservoir-induced earthquake influence zone and its application in the assessment process.

The applicable conditions in the work, the new requirements for special evaluation of expansion projects, the optimization of the state classification index of seismic induction factors, the improvement of map compilation requirements and adjustments the revised document includes the structure of risk assessment indicators, etc. It will help standardize reservoir-induced earthquake risk assessment work and enhance water conservancy...

Strengthening safety management awareness in hydropower projects will promote the healthy development of reservoir-induced earthquake hazard assessment.

Reservoir-induced earthquake hazard assessment

1 Scope

This document specifies the general requirements for reservoir-induced earthquake hazard assessment, including geological surveys of reservoir areas and seismic activity assessments in reservoir-induced earthquake-affected areas.

Technical requirements for dynamic background and geostress field investigation, as well as deterministic evaluation, probabilistic evaluation and comprehensive evaluation of seismic hazard.

This document applies to the assessment of reservoir-induced seismic hazard for newly built, renovated, and expanded reservoirs with a capacity of $1 \times 10^8 \text{ m}^3$ or more.

This method is applicable to the assessment of reservoir-induced seismic hazard in existing reservoirs or newly built, renovated, and expanded reservoirs with a capacity of less than $1 \times 10^8 \text{ m}^3$.

4.1 Basic Provisions

4.1.1

The induced seismic hazard assessment for newly built, renovated, and expanded reservoirs shall meet the following requirements.

a) When the reservoir capacity reaches or exceeds $5 \times 10^8 \text{ m}^3$, or the dam height reaches or exceeds 100 m, the reservoir-induced earthquake hazard assessment should be conducted.

evaluate;

b) When the reservoir capacity is between $1 \times 10^8 \text{ m}^3$ and $5 \times 10^8 \text{ m}^3$, the reservoir-induced earthquake hazard should be demonstrated and considered.

evaluate;

c) When the reservoir capacity is less than $1 \times 10^8 \text{ m}^3$, this document can be consulted to determine whether to conduct an evaluation after fully demonstrating its necessity.

4.1.2

For existing reservoirs, based on their reservoir capacity, dam height, and actual needs, it is advisable to conduct a feasibility study and determine the implementation of reservoir-induced earthquake hazard assessment in accordance with the provisions of 4.1.1.

The necessity of sexual evaluation.

4.1.3

The spatial extent of the reservoir-induced earthquake influence zone should be defined based on the reservoir shoreline corresponding to the normal water level, extending towards the reservoir shoreline.

The horizontal distance extends for no less than 15km.

4.2 Content Requirements

The reservoir-induced earthquake hazard assessment should include the following tasks.

a) Geological survey of the reservoir area;

b) Investigation of seismic activity background and geostress field in the reservoir-induced earthquake-affected area;

c) Deterministic evaluation;

d) Probability evaluation;

e) Overall evaluation.