



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

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**Technical standards for geotechnical engineering of tailings
accumulation dams**

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1 General

1.0.1 This standard is formulated in order to standardize the geotechnical engineering work of tailings accumulation dams, achieve advanced technology, ensure quality, protect the environment, and ensure the safety of people's lives and property.

1.0.2 This standard applies to the survey, evaluation, monitoring and treatment of tailings accumulation dams.

1.0.3 Geotechnical investigation should be carried out for the operation, expansion and reconstruction of the tailings accumulation dam, closure and back mining.

1.0.4 The investigation, evaluation, monitoring and treatment of tailings accumulation dams shall not only comply with the provisions of this standard, but also comply with the provisions of the relevant current national standards.

2.0.1 tailings

Waste products produced during the beneficiation process that can be described by the characteristics of the soil.

2.0.2 tailings pond

It is used to store metal and non-metal mines for ore sorting and discharge tailings.

2.0.3 tailings dam

Outer structures of tailings ponds that block tailings and water.

2.0.4 starter dam

It is a dam built with soil and stone materials as a drainage or support for tailings accumulation dams.

2.0.5 tailings embankment

In the tailings production process, the dam is formed by stacking tailings above the crest of the initial dam.

2.0.6 Whole storage capacity

The volume of the space enclosed by the elevation plane of the dam crest and the slope below the tailings accumulation body and above the bottom of the reservoir, excluding the volume of the dam body constructed without tailings.

2.0.7 total storage capacity

Full storage capacity at design end state.

2.0.8 deposited beach

The surface layer of the sediment body formed by the alluvial formation of the tailings discharged by hydraulic transportation is divided into two parts above water and below water according to the water surface of the catchment area in the reservoir.

2.0.9 beach crest

The intersection line between the sediment beach surface and the external slope of the dam.

2.0.10 beach width

The horizontal distance from the water edge in the library to the top of the beach.

2.0.11 phreatic line

The position of the free surface of seepage water in the dam body, which is a curve on the cross section.

3 basic rules

3.0.1 The tailings pond grade should be determined according to the total storage capacity and total dam height of the tailings pond according to Table 3.0.1-1, and the dam height shall be determined according to Table 3.0.1-1, and the tailings reservoir auxiliary dam shall be graded according to Table 3.0.1-1 according to the dam height and corresponding storage capacity. The grade of the tailings accumulation dam shall be determined according to Table 3.0.1-2 according to the grade of the tailings pond.

Table 3. Grades of 0.1-1 tailings ponds

Grade Full storage capacity V ($\times 10^6 \text{ m}^3$) Dam height H (m)

One $V \geq 500$ $H \geq 200$ Two $100 \leq V < 500$ $100 \leq H < 200$ Three $10 \leq V < 100$ $60 \leq H < 100$ Four $1 \leq V < 10$ $30 \leq H < 60$

5 $V < 1$ $H < 30$

Note. 1 When the indicators of total storage capacity and total dam height belong to different grades, they should be determined according to the higher grade;

2 The total dam height of the dry tailings pond is the height difference between the highest point of the tailings dam top and the lowest point of the dam foot. The height difference between the highest point of the top of the mine dam and the axis of the initial dam crest or the axis of the dam crest of the sand control dam; for the wet tailings pond built with upstream dams, the total dam height is the height between the dam crest of the tailings accumulation dam and the initial stage The height difference of the original ground at the axis of the dam; for wet tailings ponds built with midline and downstream dams, the total dam height is the height difference between the crest of the tailings accumulation dam and the original ground at the axis of the dam crest.

3 In addition to the first-class reservoir, when there are towns, industrial and mining enterprises, railways or expressways with a railway grade of I in the downstream of the tailings reservoir, the grade should be increased by one grade after demonstration.

Table 3.0.1-2 tailings accumulation dam level

3.0.2 The investigation level of the tailings accumulation dam shall be determined according to the level of the tailings accumulation dam, and shall comply with the following regulations.

1 The investigation level of tailings accumulation dams from grade I to grade III should be set as grade A;

2 For grade IV and grade V tailings accumulation dams, if the site is a complex site and there are residential areas, industrial and mining enterprises, bazaars, leisure fitness and

entertainment squares, railways, highways and other important facilities within 1km downstream, the survey grade should be set as A Level; the investigation level of the remaining IV and V tailings accumulation dams shall be set as B;

3 The special survey should determine the survey level according to the actual situation;

4 The division of site complexity shall comply with the relevant provisions of the current national standard "Code for Geotechnical Engineering Investigation" GB 50021.

3.0.3 The investigation categories of tailings accumulation dams shall be divided into operation period investigation, expansion and reconstruction investigation, closed reservoir investigation and special investigation, and shall meet the following requirements.

1 When the third-grade and lower tailings ponds are piled up to $1/2 \sim 2/3$ of the total dam height, the second-grade tailings ponds are piled up to $1/3 \sim 1/2$ and $1/2 \sim 2/3$ of the total dam height When the first-class tailings pond is stacked to $1/3 \sim 1/2$ and $1/2 \sim 2/3$ of the total dam height, when the operation reaches the first-class level, and when the dam height increases by 20m after the first-class level, it should be carried out Survey during operation;

2 The tailings pond should be expanded and reconstructed before being expanded and reconstructed;

3. For the tailings ponds that have reached the design final accumulation height or have not reached the design final accumulation height and have been stopped in advance, a closed reservoir survey should be carried out before closing the reservoir;

4 For tailings accumulation dams that require tailings recovery, special mining surveys should be carried out; for tailings accumulation dams that do not have an online monitoring system or when the existing online monitoring system needs to be adjusted, special online monitoring investigations should be carried out; tailings accumulation When there is an abnormal situation during the operation of the dam and endangers the safety of the tailings pond, a special survey for hidden danger control should be carried out.

3.0.4 Geotechnical analysis and evaluation of tailings accumulation dam should include qualitative analysis and quantitative analysis, and quantitative analysis should be carried out on the basis of qualitative analysis.

3.0.5 Tailings can be divided into sandy tailings, powdery tailings and viscous tailings according to particle size composition and plasticity index. The classification and naming of tailings shall comply with the regulations in Table 3.0.5.

Table 3.0.5 Classification and naming of tailings

Note. 1. When naming, it should be determined according to the particle gradation from large to small, whichever meets the first one.

2 The plasticity index should be calculated from the liquid limit measured when the 76g cone is sunk into the soil at a depth of 10mm.