



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

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**Code for seismic design of special structures
(English Translation)**

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1 General Provisions

1.0.1

This code is formulated with a view to implementing the national laws and regulations on the seismic protection and disaster mitigation and the prevention-first policy so that the special structures can relieve seismic damage after seismic fortification to avoid casualties or complete loss of use function and minimize economic loss.

1.0.2

This code is applicable to seismic design of special structures at the area with Intensity 6 ~ Intensity 9 seismic precautionary intensity.

1.0.3

The seismic precautionary objective for the special structures, subjected to the seismic design according to this code, within 50-year design service life. the main structure shall not be damaged or not required to be repaired and may continue in service in case of being suffered from the frequent earthquakes below seismic precautionary intensity of this area; the damaged structure may continue in service after general repair in case of being suffered from precautionary earthquake equivalent to seismic precautionary intensity of this area; the integral collapse shall be avoided in case of being suffered from the rare earthquake higher than seismic precautionary intensity of this area.

1.0.4

The special structures with Intensity 6 or above seismic precautionary intensity must be subjected to seismic design.

1.0.5

The seismic precautionary intensity and the design parameters of ground motion must be determined according to the documents (graphic documents) approved and issued by the national authority and adopted according to the approval documents.

1.0.6

The seismic precautionary intensity shall adopt the basic seismic intensity in the current national standard "Seismic Ground Motion Parameter Zonation Map of China" GB 18306 or the intensity corresponding to the design basic acceleration value of ground motion in this code. The engineering site subjected to the seismic safety evaluation should be subjected to seismic fortification according to approved seismic precautionary intensity or the design parameters of ground motion.

1.0.7

The seismic design of special structures shall meet not only the requirements stipulated in this code, but also the provisions of the related current national standards.

2.1.1 Basic seismic intensity

The seismic intensity that may be met at general site conditions with a probability over 10% within a term of 50 years, which is equivalent to the seismic intensity once in 475 years.

2.1.2 Seismic precautionary intensity

The seismic intensity approved by national authority as the seismic precautionary basis of an area, generally using basic seismic intensity.

2.2.1 Action and action effect

FEk and FEvk -- Characteristic value for total horizontal and vertical earthquake action of the structure;

2.2.2 Material properties and resistance

K -- Stiffness of structure (component);

R -- Bearing capacity of structural component;

f, fk, fE -- Design value, characteristic value and seismic design value of various material strength (including the bearing capacity of soil) respectively;

E -- Elasticity modulus of the material;

[theta] -- Displacement angle limit of structural layers.

2.2.3 Geometric parameters

A -- Sectional area of component;

As -- Sectional area of rebar;

B -- Total width of structure;

H -- Total height of structure, or the column height;

L -- Total length of structure (unit);

a -- Distance;

3.3 Site and Base

3.3.1

In the selection of special structures site, the favourable section, ordinary section, unfavorable section and hazardous section shall be evaluated comprehensively according to the project planning, seismic activity and the relevant material for engineering geology and seismic geology. The unfavorable section shall be avoided; active seismic measures

shall be taken if it is impossible to be avoided.

3.3.2

It is forbidden to construct Class A and Class B special structures on the hazardous section determined by the comprehensive evaluation. The Class C special structures shall not be constructed thereon.

3.4 Structural System and Seismic Design Requirements

3.4.1

The design of special structures shall make the plan, elevation and vertical profile regular. The irregular special structures shall be provided with the strengthening measures as required; the extremely irregular special structures shall be subjected to special research and demonstration and then be provided with particular strengthening measures; the severely irregular structural design scheme shall not be adopted.

4.1 Site

4.1.1

In the selection of special structures site, the division of favorable, ordinary, unfavorable and hazardous sections for protection of the special structures against the earthquake shall be in accordance with those specified in Table 4.1.1.

4.1.4

The cover layer thickness at the special structures site shall be determined according to the following requirements.

4.1.5

The equivalent shear-wave velocity of soil layer shall be calculated according to the following formulae.

4.2 Foundations on Soil

4.2.1

For the following special structures, the seismic capacity checking of foundations on soil may not be carried out.

4.4 Seismic Subsidence of Soft Soil

4.4.1

The special structures on the soft soil in Intensities 6 and 7, when the soil and foundation meet the relevant requirements of the current national standard "Code for Building Foundation" GB 50007, may not consider the influence of seismic subsidence of the soil.