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**Standard for seismic appraisal of electrical facilities in
industrial plants
(English Translation)**

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1 General

1.0.1

This standard is formulated in order to make the existing electrical equipment of industrial enterprises (hereinafter referred to as. electrical equipment) reach the seismic fortification standard after the seismic identification and anti-seismic measures are taken, so as to reduce the earthquake damage of electrical equipment, avoid casualties, and reduce economic losses..

1.0.2

This standard applies to areas where the design basic seismic acceleration value is not greater than 0.40g (that is, the seismic fortification intensity is 9 degrees and below), and the industrial enterprises with a voltage level of 220kV and below have power transformers, reactors, circuit breakers, and lightning arresters., current (voltage) transformer, electric porcelain equipment, power capacitor bank (cabinet), battery pack (cabinet), switchgear, converter cabinet, control (protection) screen, DC screen, emergency power supply unit and combined electrical appliances and other electrical equipment Anti-seismic identification and anti-seismic measures to be taken.

This standard does not apply to the seismic identification of existing electrical equipment in industrial enterprises where the design basic seismic acceleration value is greater than 0.40g or where there are special requirements.

1.0.3

The electrical equipment that has undergone seismic identification and anti-seismic measures in accordance with this standard shall not be seriously damaged when subjected to earthquakes of the local seismic fortification intensity and below, and can continue to supply power after simple maintenance.

1.0.4

The design basic earthquake acceleration is 0.05g (that is, the seismic fortification intensity is 6 degrees) and above the electrical equipment in the area without seismic fortification. Seismic identification must be carried out and necessary seismic measures must be taken.

1.0.5

The design basic seismic acceleration value and seismic fortification intensity shall be determined according to the relevant provisions of the current national standard "Zoning Map of Earthquake Motion Parameters in China" GB 18306;, the seismic identification can be carried out according to the approved design ground motion parameters or seismic fortification intensity.

1.0.6

The seismic appraisal of electrical equipment shall not only comply with the provisions of this standard, but also comply with the provisions of the current relevant national standards.

2.1.1 Seismic measures

Seismic design content other than seismic action calculation and resistance calculation, including seismic structural measures.

2.1.2 Seismic precaution

The engineering and non-engineering defense measures taken by various engineering structures in accordance with the specified reliability requirements for the possible earthquake hazards.

2.1.3 Seismic precautionary criterion

The scale to measure the level of seismic fortification requirements is determined by the seismic fortification intensity or the design ground motion parameters and the structure's seismic fortification category.

2.1.4 Seismic precautionary intensity

The seismic intensity approved as the basis for an area's seismic fortification according to the authority stipulated by the state. Generally, the seismic intensity is taken as the probability of exceeding 10% within 50 years.

2.1.5 Seismic appraisal

By checking the design, construction quality and status quo of existing projects, and according to the specified seismic fortification requirements, evaluate their safety under earthquake action.

2.1.6 Seismic retrofit for engineering; seismic strengthening for engineering

Design and construction to make the existing engineering structure meet the requirements of seismic appraisal.

2.1.7 Earthquake action earthquake action

Structural dynamic action caused by ground motion, including horizontal earthquake action and vertical earthquake action.

2.1.8 Seismic action effect

The internal force (shear force, bending moment, axial force, torque, etc.) or deformation (linear displacement, angular displacement) of the structure generated by the earthquake.

2.1.9 Design basic acceleration of ground motion

Design value of earthquake acceleration with 10% probability of exceeding in the 50-year design base period.

2.2.1 Earthquake action and action effect

F--Earthquake action of electrical equipment (structure);

m - the mass of electrical equipment;

m_i-mass concentrated at the operating state of particle i;

M - bending moment;

T - the natural vibration period of the structure;

T_g - characteristic period;

σ--tensile (compressive) stress;

τ--shear stress;

g - acceleration due to gravity.

2.2.2 Material properties

E - modulus of elasticity of the material;

K --lateral stiffness of the system;

σ --tensile (compressive) stress;

τ --shear stress;

$[\sigma]$ - design value of allowable stress;

$[\tau]$ - design value of allowable shear stress.

2.2.3 Geometric parameters

A - cross-sectional area;

d - the inner diameter of the circular section;

D - the outer diameter of the circular section;

H - the height of the structure;

H_i --calculated height of particle i ;

I --section moment of inertia;

W - section modulus;

Z --section moment.

2.2.4 Calculation coefficients

k - unbalance coefficient;

α --seismic influence coefficient;

α_{max} --maximum value of seismic influence coefficient;

β --floor power amplification factor;

λ --stiffness reduction coefficient;

γ --mode shape participation coefficient.

3 Basic rules

3.0.1

Electrical equipment shall be divided into important electrical equipment and general