NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

中华人民共和国国家标准

GB 50267-1997

Code for Seismic Design of Nuclear Power Plants

核电厂抗震设计规范

Issued on July 31, 1997 Implemented on February 1, 1998

Issued by the Ministry of Construction (MOC) and the State Technical Supervision Bureau (STSB) of the People's Republic of China

Notice about Issuing "Code for Seismic Design of Nuclear Power Plants"

Jian Biao [1997] No.198

According to the requirements of JIZONG (1986) No.2630 File issued by the State Planning Commission, "Code for Seismic Design of Nuclear Power Plants", Formulated by China Earthquake Administration in conjunction with the departments concerned, has been jointly reviewed by the relevant departments and is now authorized to be a compulsory national standard. It will be implemented on February 1, 1998.

This standard is in the charge of China Earthquake Administration, interpreted by the Institute of Engineering Mechanics, China Earthquake Administration, published and issued by the Standard Rating Institute, Ministry of Construction.

The Ministry of Construction of the People's Republic of China
July 31, 1997

Contents

1 General Provision

1.0.1 This code is formulated with a view of carrying out such guidelines as “earthquake prevention first” and “civil nuclear facility safety first”, realizing the safe operation, high quality, state-of-the-art technologies, economic feasibility of the nuclear power plants.

1.0.2 This code is applicable to the seismic design of nuclear safety-related items in pressurized water reactor (PWR) nuclear power plants, where the peak acceleration of the ultimate safety ground motion is not larger than 0.5g.

Nuclear power plants, designed according to the provisions, shall run well when being affected by the seismic motion equal to the operational safety ground motion; they also shall ensure the reactor coolant pressure boundary intact, the reactor safely shutdown and maintain safe off-state, and the spillovers of the radioactive substances not exceed the national limitation when being affected by the ultimate safety ground motion.

Note: ① Items in this code are referred to containments, buildings, structures, underground structures, pipes, equipments and other related parts.

② G is the acceleration of gravity, with the value for 9.81m/s^2.

1.0.3 The items of the nuclear power plants shall be divided into the following three classes according to the significance of their requests for nuclear safety:

(1) Class Ⅰ items: the nuclear safety-related important items in the nuclear power plants, including items which can directly or indirectly cause accidents after damaged; items needed to ensure the reactor be able to safely shutdown and maintain off-state as well as remove the residual heat; items needed to alleviate the damages caused by the nuclear accidents during and after the earthquake, as well as other items which will endanger the above mentioned items when being damaged or de-functioned.

(2) Class Ⅱ items: nuclear safety-related items (in addition to class Ⅰ items) in the nuclear power plants and nuclear safety-irrelevant items which can endanger the above named items when being damaged or de-functioned.

(3) Class Ⅲ items: nuclear safety-irrelevant items in the nuclear power plants.

Note: class Ⅰ, Ⅱ and Ⅲ items may be divided according to the examples of Appendix A.

1.0.4 The seismic design of all the items shall be in accordance with the following seismic protection standards:

(1) Class Ⅰ items shall, simultaneously, adopt the operational safety ground motion and the ultimate safety ground motion for seismic design;

(2) Class Ⅱ items shall adopt the operational safety ground motion for seismic design;

(3) Class Ⅲ items shall be in accordance with the national current related codes for seismic design.

1.0.5 As for the seismic design of the nuclear power plant, not only the requirements stipulated in this code, but also those in the current relevant ones of the nation shall be complied with.

2 Terms and Symbols

2.1 Terms

2.1.1 Ground motion

Rock and soil motion is caused by earthquake.

2.1.2 Operational safety ground motion

Ground motion is usually the one for the normal operation of the nuclear power plants, the annual exceeding probability of which is 2‰ when designing the base period and the peak acceleration of which is not less than 0.075g.

2.1.3 Ultimate safety ground motion

Ground motion is usually the largest one the nuclear power plants may suffer, the annual exceeding probability of which is 0.1‰ in the design base period and the peak acceleration of which is not less than 0.15g.

2.1.4 Capable fault

Fault is likely to generate the relative displacement on or near the earth's surface.

2.1.5 Seismo-active (seismo-tectonic) fault

Fault is probable to cause destructive earthquake.

2.1.6 Faulting segment

One segment is of the same active state and characteristic in the active fault.

2.1.7 Attenuation law

Such phenomena refer that the regional or building ground motion intensity reduces with the increase of the hypo-central distance.

2.1.8 Hybrid probabilistic method

Probabilistic method takes comprehensive consideration of architectonic factors and seismic spatial and temporal heterogeneity.

2.1.9 Test response spectrum

The response spectrum is corresponding to the shock excitation acceleration time course adopted in the seismic test.

2.1.10 Accidental load

The load is generated under severe deviation from the normal operation of the nuclear power plants.

2.2 Symbols

2.2.1 Earthquake and ground motion

I - is the seismic intensity;

M_O - is the threshold magnitude;

M_{MAX} - is the maximum magnitude;

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