# NATIONAL STANDARD OF THE

# PEOPLE'S REPUBLIC OF CHINA



# GB 50068-2018

## Unified standard for reliability design of building structures

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### 1.0.1 This standard is hereby formulated, in order to unify the basic principles, basic

requirements, basic methods of the reliability design of building structures of various materials, so that the structure meets the requirements of sustainable development, as well as the requirements of safety, reliability, economic reasonableness, advanced technology, quality assurance.

### 1.0.2 This standard is applicable to the design of the entire structure, the components

that make up the structure, and the foundation. It is applicable to the design of the construction stage and use stage of the structure. It is applicable to the reliability assessment of existing structures. The reliability assessment of existing structures can be carried out, in accordance with the provisions of Appendix A of this standard.

**1.0.3 This standard is formulated, based on the principles of the current national**

standard "Unified standard for reliability design of engineering structures" GB 50153.

It is the basic requirement for the reliability design of building structures.

**1.0.4 The design of building structures should adopt the limit state design method, based**

on probability theory and expressed by partial factors. When there is a lack of statistical data, the design of building structures can be based on reliable engineering experience or necessary experimental research, OR it can be carried out, using the empirical methods such as allowable stress or single safety factor.

**1.0.5 When formulating load standards for building structures, structural design**

standards for various materials, and other related standards, it shall comply with the basic criteria, which are stipulated in this standard; meanwhile formulate corresponding specific provisions.

**1.0.6 In addition to complying with the provisions of this standard, the building**

structure design shall also comply with the provisions of the relevant national standards, which are currently in force.

**2.1.1 Structure**

A system, which is composed of connected parts, can withstand the action, has appropriate stiffness.

**2.1.2 Structural member**

The physically distinguishable parts of a structure.

**2.1.3 Structural system**

All the load-bearing components in a structure and the way they work together.

**2.2.1 Uppercase Latin letters.**

Ad - Design value for accidental actions;

C - Design corresponding limits for deformation, cracks, etc.;

Fd - Design value of action;

Fr - Representative value of action;

Gk - Standard value of permanent action;

P - Relevant representative value of prestressing action;

### 2.2.2 Lowercase Latin letters.

ad - Design value of geometric parameters;

ak - Standard values of geometric parameters;

fd - Design value of material property.

fk - Standard value of material property.

pf - Calculated value of failure probability of a structural member.

### 2.2.3 Capital Greek letters.

delta alpha - Additional quantity of geometric parameters.

### 3.1.1 The design, construction, and maintenance of the structure shall ensure that the

structure meets the specified functional requirements with the specified reliability, within the specified design service life.

### 3.1.2 The structure shall meet the following functional requirements.

the following requirements, to prevent or reduce possible damage to the structure.

### 3.1.4 The following measures should be taken, to meet the basic requirements for the

structure.

### 3.2 Class of safety and reliability

3.2.1 When designing building structures, different safety classes shall be adopted, based on the possible consequences of structural damage, that is, endangering human lives, causing economic losses, the severity of affecting society or the environment. The division of safety classes of building structures shall comply with the provisions of Table 3.2.1.

### 3.3.2 When designing the building structure, it shall specify the design service life

of the structure.

**3.4.1 In order to ensure that the building structure has the specified reliability level, in**

addition to design calculations, it shall control the material properties, construction, quality, use and maintenance of the structure accordingly. Specific control measures shall comply with Appendix D of this standard, as well as the special provisions of relevant standards for survey, design, construction, maintenance.

**3.4.2 The design of building structures must be undertaken by technicians, that have**

appropriate qualifications.

**3.4.3 The design of the building structure shall comply with the current national**

regulations on load, earthquake resistance, foundation, structural design standards of various materials.

**4.1 Limit states**

4.1.1 The limit state can be divided into ultimate limit state, serviceability limit state, durability limit state. The limit state shall meet the following requirements.

**4.1.3 During structural design, different limit states of the structure shall be calculated**

or checked separately; when the calculation or checking of a certain limit state plays a controlling role, only this limit state can be calculated or checked.

**4.3.2 When carrying out the ultimate limit state design, the following action**

combinations shall be adopted, according to different design situations.

**4.3.4 For each action combination, the design of the building structure shall be carried**

out, using the most adverse effect design value.

**4.3.5 The limit state of the structure can be described, by the following limit state**

equation.

**4.3.9 Structural members should be designed, according to the specified reliability**

index, using limit state design expressions, which consist of representative values of action,