



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

GB 55002-2021

Code for seismic design of buildings

建筑与市政工程抗震通用规范

(English Translation)

Issued on: April 9, 2021

Implemented on: January 1, 2022

Issued by: Ministry of Housing and Urban-Rural Development of PRC

Table of Contents

Foreword...	3
1 General...	6
2 Basic provisions...	6
2.1 Performance requirements...	6
2.2 Earthquake effects...	7
2.3 Seismic fortification classification and fortification criteria...	8
2.4 Engineering seismic system...	10
3 Seismic requirements of site and foundation...	11
3.1 Site seismic survey...	11
3.2 Earthquake resistance of base and foundation...	13
4 Seismic action and structural seismic verification...	14
4.1 General provisions...	14
4.2 Seismic action...	15
4.3 Seismic check...	18
5 Seismic measures for construction projects...	21
5.1 General provisions...	21
5.2 Concrete structure houses...	25
5.3 Steel structure house...	27
5.4 Steel-concrete composite structure house...	28
5.5 Masonry structure houses...	30
5.6 Wooden houses...	35
5.7 Earth and stone structure houses...	36
5.8 Mixed load-bearing structures...	38
6 Anti-seismic measures for municipal engineering...	40
6.1 Urban bridge...	40
6.2 Urban rural water supply & drainage and gas thermal engineering...	43
6.3 Underground engineering structure...	47

1 General

1.0.1

This Code is formulated, in order to implement the national laws and regulations on earthquake prevention and disaster reduction of buildings and municipal projects, implement the principle of prevention first, so that buildings and municipal projects can achieve the target of reducing earthquake damage, avoiding casualties, reducing economic losses after seismic fortification.

1.0.2 All kinds of newly-built, expanded, reconstructed buildings and municipal

projects, in areas which have a seismic fortification intensity of 6 degrees and above, must be seismically fortified. The survey, design, construction, use maintenance of engineering projects must comply with this Code.

1.0.3 Whether the technical methods and measures, which are adopted in the construction of the project, meet the requirements of this Code, shall be determined by the relevant responsible entities. Among them, innovative technical methods and measures shall be demonstrated to meet the performance requirements in this Code.

2.1 Performance requirements

2.1.1

For all kinds of buildings and municipal projects with seismic fortification, their seismic fortification objectives shall meet the following requirements.

2.1.2 For buildings and municipal works with seismic fortifications, the

exceedance probability level of frequent ground motions, fortified ground motions, rare ground motions shall not be lower than those specified in Table 2.1.2.

2.2 Earthquake effects

2.2.1

The seismic fortification intensity, of various buildings and municipal works, shall not be lower than the local seismic fortification intensity.

2.2.2

The earthquake impact, which is suffered by each region, shall be characterized by the design basic seismic acceleration and characteristic period, which is corresponding to the seismic fortification intensity; meanwhile it shall meet the following requirements.

2.4.3 The seismic system of urban water supply & drainage and gas-fired

thermal engineering shall meet the following requirements.

2.4.4 Structural joints, such as expansion joints, settlement joints, anti-vibration

joints, between adjacent buildings (structures) OR between different structural units of the same building, shall take effective measures, to avoid damage caused by collision or extrusion under earthquakes.

2.4.5 The special requirements of the seismic structural system, for structural

materials (including special structural equipment) and construction technology, shall be indicated on the design documents.

3.2 Earthquake resistance of base and foundation

3.2.1

The seismic check calculation of natural foundation shall be carried out, by adopting the standard combination of earthquake action effect and foundation seismic bearing capacity. The seismic bearing capacity of the foundation shall be the product of the characteristic value of the foundation bearing capacity multiplied by the adjustment coefficient of the foundation seismic bearing capacity. The adjustment coefficient of the seismic bearing capacity of the foundation shall be selected, according to the properties of the foundation soil, BUT it shall not exceed 1.5.

3.2.2 For buildings and municipal projects whose seismic fortification intensity

is not less than 7 degrees, when there is saturated sand and saturated silt, within 20 m below the ground, it shall perform liquefaction judgement. For the foundation, where there is liquefaction soil layer, it shall take corresponding anti-liquefaction measures, based on the seismic fortification category and the liquefaction grade of the foundation, in combination with the specific circumstances.

3.2.3 The reinforcement range of piles, in liquefied soil and seismically subsided

soft soil, shall be the FROM the top of the pile TO the depth of not less than 1.0 m below the bottom of the liquefied soil layer or the bottom of the seismically subsided soft soil layer. The longitudinal reinforcement shall be in line with the top of the pile. The stirrups shall be reinforced.

4.1.1 When calculating the seismic action of various buildings and municipal

projects, the design ground motion parameters shall be determined, according to the relevant provisions of Article 2.2 of this Code, based on the fortification intensity. It shall be adjusted according to the following provisions.

4.1.2 The seismic action of various types of buildings and municipal works shall be

calculated, using an analysis model, that conforms to the actual working conditions of the structure; it shall meet the following requirements.

4.2.1 The determination of horizontal seismic action of buildings and municipal works shall meet the following requirements.

4.2.2 For the value of the horizontal earthquake influence coefficient of various buildings and municipal works, it shall meet the following requirements.

4.2.3 Under frequent earthquakes, the standard value of horizontal seismic shear force, of various buildings and municipal engineering structures, shall meet the following requirements.

4.3.1 The seismic bearing capacity of the section of the structural members shall meet the requirements of the following formula.

4.3.3 The deformation check calculation of various structures, under seismic action, shall meet the following requirements.

5.1 General provisions

5.1.1

The architectural design shall clarify the regularity of the architectural form, according to the requirements of the seismic conceptual design. For irregular buildings, it shall take strengthening measures, according to requirements. For special irregular buildings, it shall be specially studied and demonstrated AND take special strengthening measures. It shall not adopt serious irregular building plans.

5.1.2 For houses with concrete structure, steel structure, steel-concrete

composite structure, wood structure, the appropriate structural system shall be selected, according to the comprehensive analysis and selection of factors, such as fortification category, fortification intensity, building height, site foundation conditions, use requirements, building shape. In concrete structure houses and steel-concrete composite structure houses, the concrete strength grade of frame-supported beams, frame pillars as well as the frame beams, columns and joint core areas, whose seismic grade is not lower than grade 2, shall not be lower than C30.

5.1.8 The structure, below the seismic isolation layer, shall be able to ensure the safe operation of the seismic isolation layer, under rare earthquakes;