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**NATIONAL STANDARD**

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

中华人民共和国国家标准

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**GB 50003-2011**

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**Code for Design of Masonry Structures**

砌体结构设计规范

Issued on: July 26, 2011

Implemented on: August 01, 2012

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of the People's Republic of China

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Announcement on Publishing the National Standard of "Code for Design of Masonry  
Structures"

"Code for Design of Masonry Structures" has been approved as a national standard with a serial number of GB 50003-2011 and shall be implemented on August 01, 2012. Therein, Articles 3.2.1, 3.2.2, 3.2.3, 6.2.1, 6.2.2, 6.4.2, 7.1.2, 7.1.3, 7.3.2 (1, 2), 9.4.8, 10.1.2, 10.1.5 and 10.1.6 are compulsory provisions and must be enforced strictly. The original "Code for Design of Masonry Structures" GB 50003-2001 shall be abolished simultaneously.

Authorized by the Standard Rating Research Institute of the Ministry of Housing and Urban-Rural Development of the People's Republic of China, this code is published and distributed by China Architecture and Building Press.

Ministry of Housing and Urban-Rural Development of the People's Republic of China  
July 26, 2011

## Foreword

According to the requirements of the document "Notice on Printing and Publishing 'Development and Revision Plan of Engineering Construction Standards and Specifications in 2007 (first batch)'" (Jian Biao [2007] No. 125) issued by the former Ministry of Construction, This code is revised by China Northeast Architecture Design and Research Institute Co., Ltd. together with organizations concerned based on "Code for Design of Masonry Structures" GB 50003-2001.

During the revision process, the drafting group considered the economic conditions and the current status of masonry structures according to the principle of "supplement, simplification and perfection", summarized new experience in the application of masonry structures in recent years, investigated the earthquake resistance hazard of masonry structures in Wenchuan and Yushu earthquake, conducted necessary test research and supplemented clauses for local new masonry materials emerging in energy conservation and emission reduction and wall material innovation environment by reference to the mature achievements of scientific research in masonry structure field, and perfected relevant content of masonry structure durability, detailing requirements, reinforced concrete masonry members, earthquake resistance design for masonry structure members, etc., meanwhile, conducted necessary simplification for adjustment coefficient of masonry strength, etc.

The revised contents extensively solicited for the comment and suggestion of relevant design, scientific research, teaching, construction, enterprise and relevant management department nationwide, and finally finalized upon review through multiple repeat discussion, modification and replenishment.

This code comprises 10 chapters and 4 appendixes, with main technical content including: general provisions, terms and symbols, materials, basic rules on design, unreinforced masonry members, detailing requirements, ring beams, lintels, wall beams and cantilever beams, reinforced brick masonry members, reinforced concrete masonry members, earthquake resistance design for masonry structure members, etc.

Main revised contents of this code: add mature and feasible new masonry materials which adapt energy conservation and emission reduction and wall material innovation requirements and propose corresponding design method; revise evaluation method of local masonry strength according to test research and simplify the adjustment coefficient of masonry strength; add the relevant requirements for increasing masonry durability; perfect detailing requirements of masonry structures; supplement measures for preventing or relieving wall cracking caused by material deformation with respect to crack problems existing in new masonry material wall; perfect and supplement detailing requirements for the design of cavity wall filled with insulation; supplement the calculation method of eccentric compression outside masonry composite wall plane; enlarge the application scope of reinforced concrete masonry structure, add design requirements for frame-supported reinforced masonry block shear wall building; perfect earthquake resistance design method for masonry structures according to earthquake resistance hazard and in combination with masonry structure characteristic, and supplement earthquake resistance design method for infilled wall in concrete frame structure.

The provisions printed in bold type are compulsory ones in this code and must be enforced strictly.

The Ministry of Housing and Urban-Rural Development of the People's Republic of China is in charge of the administration of this code and the explanation of compulsory provisions, and China Northeast Architecture Design and Research Institute Co., Ltd. is responsible for the explanation of the specific technical contents. During the process of implementing this code, all organizations are kindly requested to seriously sum up experience in combination with engineering practice, post or pass opinions and advice on to the Administrative Group of "Code for Design of Masonry Structures" of China Northeast Architecture Design and Research Institute Co., Ltd. (address: No. 65, Guangrong Street, Heping District, Shenyang City, China, 110003, Email: gaoly@masonry.cn) for future reference.

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Xi'an University of Architecture and Technology

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# 1 General Provisions

**1.0.1** This code is formulated with a view to implementing the technical and economic policies of the nation, persisting in wall material innovation, adjusting measures to local conditions, using local materials, reasonably selecting structural scheme and masonry materials, and achieving advanced technology, safety and usability, economy and rationality and quality guarantee.

**1.0.2** This code is applicable to the design of the following masonry structures in building engineering, and the design for special conditions or with specific requirements shall be carried out according to special requirements:

1 Brick masonry: including unreinforced and reinforced masonry of fired common brick, fired perforated brick, autoclaved sand-lime brick, autoclaved flyash-lime brick, common concrete brick and perforated concrete brick;

2 Block masonry: including unreinforced and reinforced masonry of concrete block and light aggregate concrete block;

3 Stone masonry: including masonry of various squared stones and rubbles.

**1.0.3** This code is established according to the principle specified in the current national standard "Unified Standard Reliability Design of Building Structures" GB 50068. The design terms and symbols are adopted according to the requirements of the current national standard "Standard for Terminology and Symbols Used in Design of Building Structures" GB/T 50083.

**1.0.4** For design according to this code, the load shall comply with the current national standard "Load Code for the Design of Building Structures" GB 50009; the selection and application of wall materials shall comply with the current national standard "Uniform Technical Code for Wall Material used in Buildings" GB 50574; the selection of concrete materials shall meet the requirements of the current national standard "Code for Design of Concrete Structures" GB 50010; the construction quality control shall meet the requirements of the current national standards "Code for Acceptance of Constructional Quality of Masonry Structures" GB 50203 and "Code for Acceptance of Constructional Quality of Concrete Structures" GB 50204; and the structural earthquake resistance design shall meet the relevant requirements of the current national standard "Code for Seismic Design of Buildings" GB 50011.

**1.0.5** The masonry structure design shall not only comply with this code, but also those in the current relevant ones of the nation.

## 2 Terms and Symbols

### 2.1 Terms

#### 2.1.1 Masonry structure

Structure that wall and column built with block and mortar are used as the main loaded members of the building. It is the general term of brick masonry, block masonry and stone masonry structure.



### **2.1.2 Reinforced masonry structure**

Structure that the reinforced masonry is used as the main loaded member of the building. It is the general term of mesh-reinforced masonry column, horizontal reinforced masonry wall, brick masonry and reinforced concrete layer or composite masonry column (wall) of reinforced mortar layer, composite wall of brick masonry and structural reinforced concrete column and reinforced concrete masonry shear wall structure.

### **2.1.3 Reinforced concrete masonry shear wall structure**

Building structure composed of reinforced concrete masonry shear wall bearing vertical and horizontal action and concrete floor and roof.

### **2.1.4 Fired common brick**

Roasted solid brick which takes coal gangue, shale, flyash or clay as the major raw materials, including fired coal gangue brick, fired shale brick, fired flyash brick, fired clay brick, etc.

### **2.1.5 Fired perforated brick**

Fired brick that takes coal gangue, shale, flyash or clay as the major raw materials, with void ratio not greater than 35%, with small and more holes, and is mainly used for bearing position.

### **2.1.6 Autoclaved sand-lime brick**

Solid brick which takes limy materials such as lime and siliceous materials such as sand as the major raw materials and is formed through blank preparation, pressing exhaust forming and autoclave curing.

### **2.1.7 Autoclaved flyash-lime brick**

Solid brick which takes limy materials such as lime, slaked lime (carbide slag) or cement and siliceous materials such as flyash as well as aggregates (sand, etc.) as the major raw materials, adds an adequate amount of gypsum, and is formed through blank preparation, pressing exhaust forming and autoclave curing.

### **2.1.8 Concrete small hollow block**

Hollow block which is made of ordinary concrete or light aggregate concrete, with a main dimension of 390mm×190mm×190mm and hollow ratio of 25%~50%, referred to as concrete block or masonry block.

### **2.1.9 Concrete brick**

A perforated concrete half blind hole brick or solid brick which takes cement as cementitious material and sand, stone, etc. as the main aggregates and is made through mixing with water, forming and curing. The main dimensions of perforated bricks are 240mm×115mm×90mm, 240mm×190mm×90mm, 190mm×190mm×90mm, etc.; the main dimensions of solid bricks are 240mm×115mm×53mm, 240mm×115mm×90mm, etc.

### **2.1.10 Mortar for concrete small hollow block**

Masonry mortar which is made by mechanically mixing such compositions as cement, sand, water and admixtures and additives added as required according to a certain proportion and is exclusively used for building concrete block, referred to as mortar for masonry block.

### **2.1.11 Grout for concrete small hollow block**

Concrete which is made by mechanically mixing such compositions as cement, aggregate, water and admixtures and additives added as required according to a certain proportion and is used for concreting block masonry core column or other holes to be filled,



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