



# The Peerian Journal

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## «Improvement Of Building Norms and Rules for the Construction of Buildings from Clay Soils»

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**Annotation;** Despite the fact that residential and administrative buildings are being built in cities and villages from modern materials of concrete, reinforced concrete, steel and brick, more than 60% of the population of Central Asia, including Uzbekistan, still builds dwellings from local efficient and environmentally friendly clay material. In such developed countries as Germany, the USA, Great Britain, etc., priority is also given to environmentally friendly clay materials.

**Keywords;** concrete, reinforced concrete, became, brick, clay material, building materials, building construction, clay soils, clay building.

### Introduction

Normative documents of the so-called "high-tech" building materials (steel, concrete, brick, etc.) are reviewed and supplemented every five years. Currently, the theory and practice of building buildings from various materials is receiving a high level of development, and it is in standards and norms that all the latest achievements of science, technology, and production are concentrated. Therefore, this approach should be for local materials, including clay materials.

However, the increasing volume of housing and agricultural construction requires more and more attention to the development of new building materials and new design solutions for buildings and structures. In the 1980s, modifications of loess and loam with increased strength and water resistance began to be widely used in modern construction abroad and in the former Soviet Union. Thus, the construction of buildings using loess-like soils on an industrial basis was started in Kyrgyzstan, Uzbekistan, Tajikistan, and in connection with this, the following recommendations and regulatory documents were published: -Frunze, 1982; Construction of residential low-rise buildings from soil-cement concrete. RSN-2-84.-Frunze, 1984; The use of soil-cement concrete in rural construction // Stroitelnye konstruktsii. – M.: VNIIS, -1986.- No. 4.-60 p.

Now consider the official regulatory documents of some foreign countries regarding the construction of clay soils.

### Europe

The Enterprise Development Center in Brussels has published many European standards for the use of clay soils:

“Compressed Earth Blocks – production equipment”, “Compressed Earth blocks – standards”, “Compressed Earth Blocks – Testing Procedures”. The standard deals with the production of pressed soil blocks, equipment used for this production and test methods.



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## Germany

The first German standard for the construction of houses from clay soil was adopted in 1944 by the “Reichslehmbauordnung”, which is regularly improved. After the 2nd World War, some regional authorities in Germany developed their own recommendations for clay construction, but this was in the GDR, which had an intensive development of the construction of buildings from clay soil. The GDR included clay construction in many standards, but in 1971 they were not included in some regulations. The thermal characteristics of clay walls are still partly preserved in the standards: DIN 4108, 1981. In 1998, the German highest state building authority established a new technical document for clay construction. German Association for Clay Construction, Dachverband Lehm e. V.” developed approval documents that covered all clay construction methods. This was submitted for approval to sixteen government representatives who manage and supervise the construction of buildings, twelve of which approved the following documents: Lehmbau Regeln - Begriffe, Baustoffe, Bauteile.

## Switzerland

There are three building codes in use in Switzerland for clay soil construction: SIA-Documentationen (SIA = Schweizerischer Ingenieur- u. Architekten-Verein) D 077: Bauen mit Lehm, CH-8039 Zürich, 1991, SIA-Documentationen D 0111: Regeln zum Bauen mit Lehm, Zürich, 1994, SIA-Documentationen D 0112: Lehmbau-Atlas, Zürich, 1994. The standard provides information on types of clay buildings, properties of clay soils, construction methods, building techniques and examples of clay construction in Switzerland.

## USA

American clay building codes (standards) have been issued since 1939, and the clay building practice is now consolidated into many national building codes and standards: Uniform Building Code Standards - Section 24-15, 2403 Unburned Clay Masonry Units and Standards. Methods for sampling and testing. Unburned Clay Masonry Units, 1973. Some US states including Arizona, New Mexico, California, Nevada, Utah, Colorado, Texas in 1983 issued instructions for the construction of buildings from clay soils, thereby improving national codes. In 1991, New Mexico issued a code covering the construction of mud-brick buildings and solid clay construction: CID-GCB-NMBC-91-1. The standard specifies the physical and mechanical characteristics of materials, stabilizers and test methods. Chapter 9704 of this standard consists of recommendations for the construction of clay buildings (structural elements of buildings, methods of strengthening walls, finishing and fire safety assessment).

## International codes and standards

International standards organizations state that international building standards must take into account different climatic or regional conditions, and the special skills available at different stages of technical and economic development. In recent years, new building materials of increased strength and water resistance, soil blocks from raw soils have been introduced into construction practice. Therefore, in 1987, the International Union of Testers and Research Laboratories for Building Materials and Construction (RILEM) and the International Building Research Council



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(CIB) published recommendations for the construction of buildings from compressed earth blocks (RILEM / CIB: TIC 153-W90 'Compressed Earth Block Technology'). Also, the technical committee TC 164-EBM RILEM issued a regulatory document: Mechanics of Earth as a building material, which ran 1994-2000 and has not yet published its findings, which sets out data on the mechanical properties of clay materials.

From scientific sources of recent years, other countries are also known, such as Algeria, Cameroon, Chad, Ethiopia, Ghana, Madakascar, Mali, Moldova, Nigeria, Tunisia, Turkey, Zimbabwe, etc. other than those listed above that have published official standards (KMK, SNiP, codes) or are in the process of developing standards for the construction of clay soil buildings. In addition, some states have made amendments to regulations to recognize other methods of building clay soil walls.

Thus, studying the world experience in improving regulatory documents for the construction of buildings from clay soils, we can conclude that in foreign countries the technology of housing construction from clay soils is now developing faster than ever before, because some building materials are becoming scarce, and to reduce the cost of construction it is necessary to invent and use new materials, products and industrial methods. For the rational and economical use of all types of resources, reducing their losses in construction, it is necessary to accelerate the transition to resource-saving technologies.

1. It is advisable to develop technical regulations and specifications for new types of clay materials for our republic.

2. It is necessary to supplement the current building codes and regulations on new types of clay materials with a dictionary, classification, characteristics and construction technology.

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