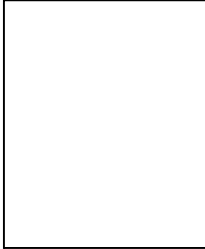


IMPROVING THE LOAD-BEARING ABILITY OF EARTH WALLS



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Abstract

An analysis of major earthquakes over the last 50 years reveals the preponderance of structural damage, building collapse, and fatalities to have occurred in individual buildings of the residential sector. This highlights a serious problem in the rural districts of Central Asia, where more than 65 percent of residential construction uses earth-based materials. For these reasons, researchers at Tashkent Architectural-Building Institute in Uzbekistan are currently developing new ways, based on the old time-honored techniques, to improve the strength and durability of earth as a building material so that locally constructed houses are better able to withstand seismic effects. As part of our attempt to understand and improve upon traditional technologies, and to increase clay's ability to withstand seismic forces, we have experimented with a variety of methods.

One successful method is the reinforcement of earth with short fibers, such as the waste from textile and carpet weaving. The physical-mechanical properties of a new material are determined. As a result of updating is achieved increase of its durability on 50-60 %. Besides, water and frost resistance, as well as deformation of shrinkage in air of new material is investigated. With the aim to control this influences methods and actions were worked out. By experimental researches is intense - are deformed statuses of walls of a nature building at dynamic and static loadings.

The second method for improving the bearing strength of earth walls involves thermoprocessing. According to information passed down through countless generations, when fortress walls were built from earth, longitudinal channels were left in each layer, and fire was kindled in these channels for several days. Seeking to emulate our ancestors' experience, we experimented with similar thermoprocessing techniques using both individual brick samples and test-sized earth walls. In this case the reinforced walls proved to be 28 percent stronger than non-heat-treated walls that were made of earth alone.

The inclusion of a tree practiced earth walls for amortization of sharp impacts of earthquakes in Central Asia by the ancient master at construction of buildings. But the wood for such regions is considered as deficiency and consequently with the purpose to do cheaply construction of walls it is offered to establish ferro-concrete cores for strengthening walls a place of wooden racks (skeleton).

These experiments suggest some promising possibilities for a revival and renewal of traditional building techniques using a clean, plentiful, and inexpensive material.