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Consideration of Improving Earthquake Resistant Capacity of Earth Buildings

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Consideration of Improving Earthquake Resistant Capacity of Earth Buildings

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Key words: Rammed earth wall, Ecological property, Construction specialty, Earthquake disaster prevention and reduction.

Abstract. Earth building is one kind of residential buildings with typical characteristics of materials used locally, natural existence, reasonable construction and low cost in Hanzhong country, and it includes wisdom of working people, and contains plentiful ecological concept, previous architecture experience. The major defect is its low anti-seismic performance, suggestions improving the earthquake resistant capacity of raw-soil structures are put forward from the aspects of enhancing strength and connection, and the preferences for the socialist new rural construction after seismic disasters are provided in the end.

Introduction

Counties of Hanzhong region, such as Ningqiang, Lueyang, Zhenba, are located on mountain-based area whose economy is limited by poor natural conditions. For this reason, rammed earth constructions are popularly adopted in Hanzhong region. For example, in Taiyangling and Cangshe of Ningqiang County, rammed earth constructions take up more than 90% in local dwellings, and it becomes the major choice for rebuilding even after the Massive Wenchuan Earthquake [1]. The existent value of this kind of building was analyzed from the aspects of ecological property, building material and construction specialty. Aiming at its anti-seismic performance, the improvement suggestions were put forward, which established the foundation to inherit and develop Hanzhong local buildings.

Value Discussion of the soil buildings

Ecological property of the soil buildings.

(1)Assimilating into Nature: Hanzhong has beautiful landscape and a fairly vast territory with Qinling Mountains sheltering in the north and Bashan Mountain in the south. The climate in Hanzhong region is mild and has a clear distinction between the four seasons, and was awarded by United Nations Population Organization (UNPO) as the most suitable place for human beings to live in. In many residential mountain areas, the local architectures are built in a natural way which makes the perfect combination of architecture and environment and creates a harmonious visual effect without destroying environment. Additionally, raw-soil buildings benefit the environment protection and ecological balance, illustrating the co-existence characteristic of human beings and nature.

(2)Energy conservation: disadvantages of solid clay bricks used in brick-concrete buildings are high energy consumption and high clay consumption, and its thermal performance is inferior; though thermal performance of hollow bricks has been improved, it still has disadvantages like high energy consumption, high clay consumption, and recycling and reusing hardly. As data illustrated, there are almost 80,000 bricks manufacture enterprises with over 26.67 million acres, they use soil about 1.2 billion in brick manufacture equivalent to the destruction of 7 million acres land. However, the materials used for raw-soil architectures are not only easily obtained, but also consumed low energy.

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