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Mechanical Properties of Adobe blocks used in Building Construction in Huambo Province - Angola

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Despite significant advances in building technologies with the use of conventional construction materials (as concrete and steel), which significantly have driven the construction industry, earth construction have demonstrated its importance and relevance, as well as it has matched in an efficient and eco-friendly manner the social housing concerns. The diversity of earth construction techniques allowed this material to adapt to different climatic, cultural and social contexts until the present time. However, in Angola, the construction with earth is still associated with population fringes of weak economic resources, for which, given the impossibility of being able to acquire modern construction materials (steel, cement, brick, among others), they resort to the use of available natural materials. Furthermore, the lack of scientific and technical knowledge justifies the negative appreciation of traditional building techniques, and the derogatory way how are considered the earth constructions in Angolan territory.

Given the country's current development status, and taking into account the environmental requirements and the real socio-economic sustainability of Angola, it is considered that one of the viable and adequate options, could be the recovering and upgrading of the ancestral techniques of earth construction. The purpose of this research is to develop the technical and scientific knowledge in order to improve and optimize these construction solutions, responding to the real problems of housing quality as well as to the current social, economic and environmental sustainability requirements.

In this paper, a description of the physical and mechanical characteristics of the adobes typically used in the construction of traditional houses in some localities of Huambo, province in Angola, is carried out. The methodology was based on mechanical in-situ testing in adobe blocks manufactured with traditional procedures: i) tensile strength evaluated with the bending test and compressive strength test on earth blocks specimens; and, ii) durability and erodibility test by Geelong method adopting the New Zealand standard (NZS) procedures (4297: 1998; 4297: 1998 and 4297: 1999).

The results allow the characterization of the materials used in the construction of raw earth in the Huambo region, contributing to the development of knowledge of these sustainable and traditional housing constructive solutions with a strong presence in Angola [1, 2]. This study is part of a larger project in the area of Earth Construction [3], which aims to produce knowledge which can stimulate the use of environmental friendly construction materials and contribute to develop constructive solutions with improved performance, durability, comfort, safety and sustainability.

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