

Using Adobe as an Insulation Material in Walls



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ABSTRACT

Adobe is a traditional building material composed of clay, sand, water, and natural fibers. In recent years, it has gained renewed attention within the context of sustainable architecture and energy-efficient building design. It is considered an environmentally friendly material due to its low embodied energy, the use of locally available resources, and its recyclability. When applied in wall systems, adobe's high thermal mass plays a significant role in regulating indoor temperatures and reducing overall energy consumption in buildings. The thermal storage capacity of adobe walls enables them to absorb heat from solar radiation and the surrounding environment during the day and release it gradually over time. This behavior reduces temperature fluctuations, preventing overheating in hot climates and contributing to thermal stability during colder periods. As a result, adobe supports passive climate control strategies and improves indoor thermal comfort without additional energy input. Another important characteristic of adobe is its hygroscopic nature. The material can absorb and release moisture depending on ambient conditions, thereby helping to maintain indoor relative humidity within a comfortable range. This property enhances indoor environmental quality while reducing the risk of condensation and mold formation. However, adobe is vulnerable to water exposure, which necessitates appropriate construction detailing and protective design measures. Recent research indicates that the addition of natural fibers and stabilized soil mixtures can significantly improve both the mechanical strength and thermal performance of adobe-based building components. This study examines the use of adobe in wall construction through a literature review, focusing on its role as both a structural and insulation material. The aim is to highlight its multifunctional performance and encourage its wider application in sustainable construction practices. In conclusion, adobe represents a valuable material for contemporary sustainable architecture, offering energy efficiency, moisture regulation, and low environmental impact, while supporting passive thermal comfort in wall systems.

KEY WORDS: Adobe, Adobe construction, Various uses of Adobe, Adobe in wall construction.