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A Review on the Strengthening of Adobe Structures with Timber

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ABSTRACT

Adobe structures are among the most significant examples of traditional architectural heritage all around the world. They are low-cost because they are produced using local soil, water, and fibrous materials (such as straw and plant fibers) and offer excellent thermal and acoustic insulation thanks to their porous structure. However, factors such as the relatively high weight of adobe material, its brittle behavior under load, and its loss of strength over time due to environmental effects can lead to structural damage in adobe buildings. At this point, it is necessary to repair the damage occurring on traditional adobe structures and reinforce the building where necessary. In this context, restoration and reinforcement efforts play a significant role in preserving the original materials and construction techniques of adobe structures with minimal intervention. This study examines environmental and sustainable intervention methods to be implemented for the preservation, restoration, and strengthening of traditional adobe architectural structures using wooden materials. In this context, the physical properties of adobe, its behavior under load, the causes of deterioration observed in adobe, and sustainable intervention techniques applied using wooden materials are discussed. Within this scope, the findings of scientific studies published in the literature in recent years have been examined, and the results of these studies have been presented through a comprehensive comparative analysis. By addressing both traditional and innovative architectural and engineering techniques applicable to restoration projects using wooden materials in traditional adobe architecture, this study serves as a reference for future research.

KEY WORDS:
Adobe structures, timber, damage, repair, strengthening