

AI-Driven Risk Analysis in Sustainable Construction Systems: Assessment of Adobe Structures



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ABSTRACT

Nowadays, sustainability is increasingly influencing material selection and construction practices in the construction industry. In this context, adobe remains one of the most widely used traditional building materials due to its low energy consumption, local availability, and environmental compatibility. However, the performance of adobe structures varies significantly depending on environmental conditions, material composition, and construction techniques, limiting its wider use in contemporary construction practices.

This study aims a conceptual approach to assessing the risks associated with adobe structures using AI-driven methods to better understand the fundamental factors affecting adobe performance and to support a more systematic assessment of these factors in design and construction processes.

In this approach, AI is treated as a supporting tool to analyze multiple variables affecting building behavior. Environmental conditions, material properties, construction processes and etc. are evaluated together to gain a more comprehensive understanding of the risk factors in adobe construction.

The proposed approach highlights adobe not only as a traditional building material but also as a viable component of contemporary sustainable architecture when supported by modern analytical tools. In this context, AI is used to bridge the gap between traditional construction knowledge and contemporary assessment methods.

In conclusion, the study suggests that AI-driven approaches can contribute to better understanding of risk factors in adobe structures and may support more informed and conscious decision-making in sustainable construction practices.

KEY WORDS:

Adobe Structures, Sustainable Construction, Artificial Intelligence, Risk Assessment, Earth-Based Materials