

Achieving Integration between Wooden Claddings and Architecture to Enhance the Interior Environment of Buildings

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Abstract:

Integrating wooden cladding effectively into modern architectural design remains a challenge, despite the historical and cultural importance of wood in traditional building practices. This research examines the methods and strategies for successfully integrating wooden cladding elements within contemporary buildings to enhance the quality of the Interior environment. The study begins by reviewing the significance of wooden cladding in architecture, the evolution of natural and manufactured wood cladding techniques, and their functional and aesthetic roles in traditional architecture across diverse cultural contexts. It then identifies the performance requirements for integrating wooden cladding in modern architectural design, including thermal and acoustic properties, and principles of sustainable design. Through an in-depth study of natural and manufactured wood cladding types, the research extracts key lessons, including the appropriate selection of timber species and cladding systems, the integration of wooden elements within the overall architectural composition, and the enhancement of indoor environmental standards such as thermal comfort, air quality. The findings of this study provide a comprehensive framework for designers to successfully integrate wooden cladding with contemporary architecture, thereby enhancing the indoor environmental quality and overall sustainability of buildings. The research offers valuable insights and design guidelines that can benefit both academic discourse and professional practice in this field. Residential and commercial buildings are the places where we spend most of our daily time. Therefore, improving the efficiency of the indoor environment of these buildings has become crucial to enhance the comfort, health, and productivity of the occupants. One of the most important architectural elements that can contribute to achieving this is the use of wooden cladding in the design of building facades, ceilings, and interior. Wooden cladding is characterized by unique properties such as thermal and acoustic insulation, and distinctive aesthetic appeal, making it an effective solution for improving the environmental comfort of the occupants. However, there is still a lack of holistic understanding of how to effectively design and integrate these claddings within the building design process. The necessary design criteria and strategies will be identified to maximize the performance of these claddings in improving thermal and visual comfort, as well as reducing energy consumption. Wood is characterized by unique properties such as natural beauty, strength, and formability, making it a popular choice for various architectural and design applications. In recent years, there has been a growing interest in exploring innovative wooden claddings to enhance the functional and aesthetic performance of interior spaces.

Statement of the problem: The role of the designer in improving the efficiency of the indoor environment of buildings has become of utmost importance in enhancing the comfort, health, and productivity of users by developing an integrated framework that links the design of wood cladding and architectural design to maximize the benefits of their use in improving the efficiency of the indoor environment of buildings. Through this, the research problem is limited to the shortcomings in the utilization of designers of wood cladding in architectural designs and the extent of the designer's familiarity with the physical and mechanical characteristics of the cladding required within the building design process, due to the scarcity of exploratory research that introduces the designer to the latest methods of manufacturing and installing wood cladding, and the lack of innovation in developing new methods to incorporate creative additions to employ the cladding in a way that provides comfort, attractiveness, and sustainability for buildings.

Objective: In light of the changing environmental conditions inside and outside buildings, this research aims to develop an integrated framework that links the design of wood cladding and architectural design to maximize the benefits of their use in improving the efficiency of the indoor environment of buildings. The functional and environmental characteristics of wood cladding, their types, manufacturing and installation methods, and how to integrate them in a comprehensive manner into architectural elements such as facades, ceilings, and interior

walls of buildings will be explored.

Significance: The importance of this research lies in studying the characteristics and technical advantages of wood cladding and how to effectively integrate them into architectural design to enhance thermal and visual comfort, as well as to rationalize energy consumption. It also addresses the identification of the necessary criteria and methodologies to achieve successful integration between these two complementary fields, exploring the technical, design, organizational, and economic solutions to enhance the use of wood cladding in architecture, and exploring the latest developments in the field of wood cladding, including the materials and techniques used in manufacturing, the adhesives used, the installation methods, and the challenges associated with their use.

Methodology: The research adopted the inductive and applied research methodologies.

Results: • The use of wooden cladding in an integrated manner with the architectural design can reduce energy consumption, improve air quality and thermal insulation, and enhance the overall health and well-being of the building occupants. • The integration of wooden cladding and architecture enhances the structural integrity and extends the lifespan of buildings, contributing to sustainability and cost savings in maintenance. • Wooden cladding adds aesthetic and environmental value to buildings, as it provides a sense of warmth and a connection to nature. • There are technological developments in the manufacturing of wooden cladding, enabling its application in complex engineering configurations, which expands the scope of its architectural applications. • The use of wooden cladding reinforces the local identity and responds to the cultural and environmental context of architectural projects, creating an integrated and rejuvenated urban environment. • The use of wooden cladding helps to strengthen the connection between nature and the architectural structure. • Embracing principles of urban design and using sustainable materials achieves a balance between modernity and tradition in architecture.

Keywords :

Wooden Cladding, Architecture, Digital Manufacturing, Environmental Sustainability, Plastic Cladding, Interior Environment of Buildings

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