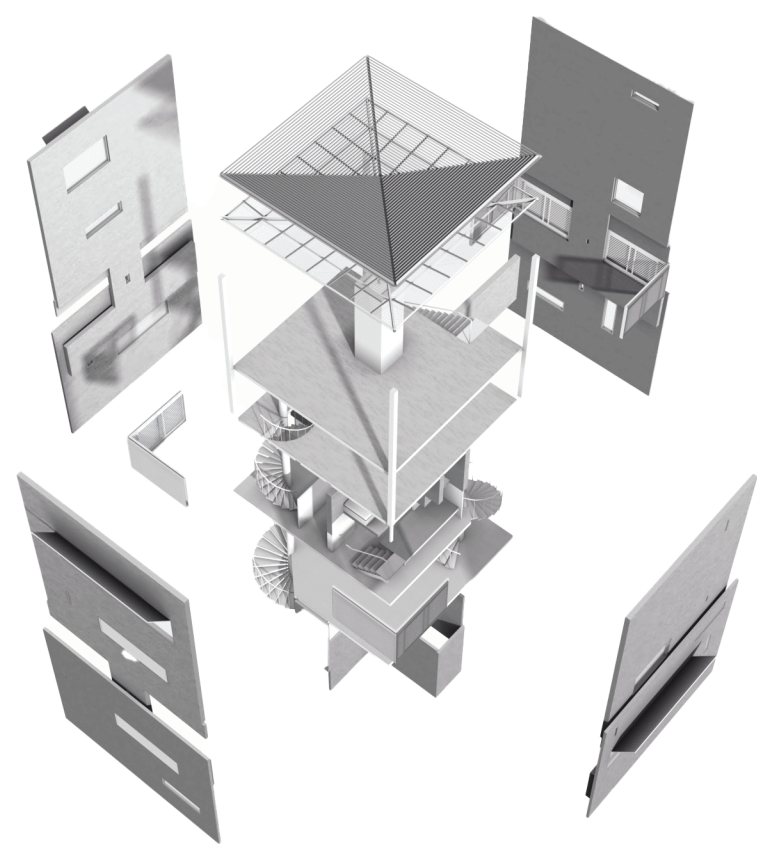




Modular SKICabin(s)



Modular Assembly



Concept

The integration of innovative materials like Vacuum Insulated Panels (VIPs) and recycled-content glulam beams into modular construction represents a continuation and evolution of principles championed by early 20th-century architects such as Le Corbusier and Walter Gropius. Both architects were pioneers in modern architecture and modular design, advocating for efficiency, functionality, and the use of industrial methods in building. This analysis explores how their principles and works laid the groundwork for contemporary sustainable modular design practices.

The construction industry is increasingly focused on improving energy efficiency and sustainability, especially in extreme climates. Modular construction, known for its rapid assembly and cost-effectiveness, is an area ripe for innovation through the use of advanced materials. This thesis explores the integration of Vacuum Insulated Panels (VIPs) and recycled-content glulam beams into modular construction to enhance thermal performance, structural integrity, and sustainability.

VIPs offer exceptional thermal insulation, significantly reducing heat transfer and energy consumption. Glulam beams, made by gluing together layers of lumber, provide strong, sustainable structural support, especially when incorporating recycled content. This research includes a detailed analysis of these materials' properties, case studies, and empirical data to evaluate their performance. The findings demonstrate that using VIPs and recycled-content glulam beams reduces the carbon footprint and promotes sustainable building practices, contributing valuable insights for industry adoption.

Through a detailed analysis of the thermal properties of VIPs, structural capabilities of glulam beams with recycled content, and case studies of their implementation in modular projects, this thesis explores the synergy between these advanced materials. Experimental data and simulations are used to evaluate energy consumption, thermal performance, and structural efficiency. The findings reveal that the combined use of VIPs and recycled-content glulam beams not only reduces the carbon footprint but also promotes the development of more sustainable, resilient, and efficient building practices.

Telescopic Structural Assembly

