

DEVELOPMENT OF SANDWICH ROOF PANELS: A REVIEW

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Sandwich panels (modular panels) promote optimal solutions to some major issues prevailing in the construction industry such as increased energy consumption by building elements, excessive disposal of construction waste and unproductive time spent during construction. Hence the inclination towards sandwich elements has been increased vastly deviating from conventional building construction materials and methods. However, the potential of using locally available natural materials for the development of sandwich panels is a salient sustainable approach that needs to be addressed. The research methodology was composed of a detailed literature review followed by a series of thermal simulations using a commercially available finite element analysis programme. The potential materials used in modular panels and key properties of sandwich panels which include mechanical, thermal and sound insulation properties were identified. Moreover, various test methods followed, and standards specified to investigate the mechanical, thermal, and acoustic insulation properties were also discussed. Secondly, the possibility of using coconut fibre as a locally available natural alternative core material to polyurethane core of sandwich panels has been evaluated using the aforesaid thermal simulation software based on the material properties obtained from literature. The study identifies coconut fibre as a potential alternative core material for sandwich roof panels which reflects similar thermal behaviour to polyurethane. However, these results can be further validated, and panels can be optimized structurally by performing further experimental studies based on the test methods and standards identified in the study.

Keywords: roofing materials; sandwich panels; thermal insulation; coconut fiber

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