

Exploring a New Approach to Sustainable Building Construction using Agro-Waste Materials

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Abstract:

With the rise of concern regarding resource depletion, environmental impact and waste production, the theoretical concept of expanding service life of goods and redeeming them into a circular economy came to light. Agro-waste has gained much attention because of the tremendous amount produced globally. The destiny of such waste is either landfilling, indiscriminate burning, composting or biological transformation. Such disposal scenarios result in toxic emissions and thus with environmental implications. On the other hand, valorizing and upcycling is said to result in materials and products with lower health risks because of the lower CO₂ content and lower toxic emissions. This review focuses on the use of agro-waste in construction material since its origins in ancient architecture till the latest findings. Through this review, the research aims to explore new approaches in upcycling agrowaste into sustainable construction material. By analyzing and comparing various examples and case studies where architectural spaces were constructed using materials manufactured / modified by agro-waste, it is noticed such material rarely scale-up to industrial level, and constructed spaces are usually temporary or pilot studies with one or two floors. The research concludes that the agro-waste to be used is best utilized within the same region of cultivation and proposes the use of transformed manufacturing, undergoing chemical and mechanical treatment, for higher performance, permanent and unlimited architectural spaces.