Development of Low-Cost Wall Panels Using Waste Foundry Dust

K. M. D. N. De Silva[1], M. U. S. Jayarathna[1], G. I. P. De Silva[1]*, and T. N. Fernando[2]

[1]*Department of Materials Science and Engineering, University of Moratuwa*

[2] *National Engineering Research and Development Centre of Sri Lanka*

**Email: indikagip@uom.lk*

Waste foundry dust (WFD), a residual material generated by the metal casting industry, presents a significant environmental challenge due to its high volume and current disposal practices, which primarily involve landfilling. This research investigates the potential of WFD as an economically viable construction material for the development of wall panels. The study aims to address the depletion of high-cost and limited natural resources by proposing a substitute material that is both readily available and cost-effective. The research encompasses a comprehensive framework encompassing material selection, processing techniques, and rigorous testing protocols to evaluate the feasibility of incorporating WFD into wall panel production. Performance evaluation will focus on key parameters including flexural strength, thermal conductivity, and water absorptivity, benchmarking against existing wall panel products in the market. Sample 4, composed of a 1:1 ratio of cement and laterite soil, 0.75 foundry dust, and 0.25 biochar, exhibited the highest flexural strength at 4.56 MPa. This sample also demonstrated a thermal conductivity of 0.134 W/mK and a water absorptivity of 21.97%. Through the development of a cost-effective wall panel utilizing WFD, this research endeavors to contribute to the advancement of green building practices within the construction industry.

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