

[Home](#) [Journal of Material Cycles and Waste Management](#) [Article](#)

Utilization of spent foundry sand for the production of masonry products

ORIGINAL ARTICLE Published: 04 August 2023

Volume 25, pages 3440–3450, (2023) [Cite this article](#)

[Download PDF](#) ↓


Access provided by PSG Institute of Technology and Applied Research



Journal of Material Cycles and Waste Management

[Aims and scope](#)

[Submit manuscript](#)

[Deepasree Srinivasan](#), [Hariharan Arumugam](#), [Kavikumaran Kannadasan](#),
[Muthukaruppan Alagar](#) & [Abdul Aleem Mohamed Ismail](#) 

 131 Accesses [Explore all metrics](#) →

Abstract

In the present work, an attempt has been made to utilize spent foundry sand discarded from foundries as filler material specifically developed to suit the properties of masonry products. This was considered as an effective method of solid waste management alleviating environmental problems caused by the foundry waste. Green foundry sand as a construction material exhibit certain constrains like high shrinkage, varying effects in water absorption resulting in poor performance. In this regard, chemically modified green foundry sand i.e. addition of polymeric resin with green sand and thereby the desired properties were studied to meet the requirements. Generally, polymer composites are considered as remarkable building products in the field of construction because of their extraordinary strength and other related properties. Therefore, an attempt has been made to utilize spent green foundry sand as a filler material with aqueous solution of melamine–formaldehyde as polymeric binder. However, the main drawback of melamine–formaldehyde resin is its poor resistance to water absorption. In this context, to alleviate the deficient behaviour in resin and green sand, the different functional additives such as stearic acid, calcium stearate, and cardanol were added in different percentages ranged between 1 and 15% to the optimized mix of polymer binder. The results showed that of composite specimens with 15% of polymeric binder achieved a strength of 13.8 MPa and water absorption of 7.3%, respectively. Upon addition of functional additives, the rate of water absorption was reduced by a minimum of 63% to a maximum of 83% and the strength improved by 42%.

Similar content being viewed by others

