

# Repurposing Waste Foundry Sand as a Sustainable Building Material with Improved Thermal Performance



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## 1 Introduction

Sand has been utilized widely as a construction material from the dawn of human civilization. Sand can be found in fired earthen bricks, mud mortars, and lime mortars. Nowadays, concrete is mostly used as building medium, and sand is an essential component of concrete. Metals were employed to make tools and utensils after the stone era. Foundry operations are generally necessary for the manufacturing of metal goods. Sand has been utilized for mould manufacturing since the beginning of the human being's use of metals in everyday life. Sand is used in foundries for two key applications: mould building and core making [1]. Landfilling has also become unfeasible due to high national average tipping prices for foundry wastes. After China and the USA, India's foundry sector is the world's third largest casting maker. With roughly 6000 units of foundry with total capacity for production is 15 million metric tonnes per year. Yearly production for 2020–21 is reported to be nearly 11.31 million metric tonnes. The installed production capacity and actual production may be larger than estimated because foundry sector is mostly disorganized (approximately 85%) and does not report publicly. The waste generated by these foundries (WFS) is roughly 1,710,000 tonnes (1.71 MT) each year [2, 3, 11].

Because of the massive amount of WFS, depositing it in landfills has a significant impact on the ecosystem and the environment. As a result, reuse of leftover foundry sand (WFS) in construction industry other than land filling benefits society in both economic and environmental terms. The building sector is the greatest consumer of natural sand; hence, research on repurposing leftover WFS as a substitute of natural sand in construction industry is critical. In fact, the natural supplies of sand are being

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