

# Chapter 4

## Experimental Investigation on the Strengths of Cement Bricks Using Fly Ash and Rice Husk Wastes: Recycling Waste Materials

**P. UmaSai Krishna**

*Department of Civil Engineering, Geethanjali Institute of Science and Technology, Nellore, India*

**K. Ramana Reddy**

*Department of Civil Engineering, Geethanjali Institute of Science and Technology, Nellore, India*

**L. Indumathi Devi**

*Department of Civil Engineering, Geethanjali Institute of Science and Technology, Nellore, India*

**V. RadhaKrishna**

*Department of Civil Engineering, Geethanjali Institute of Science and Technology, Nellore, India*

**D. Pavan Kumar**

*Department of Civil Engineering, Geethanjali Institute of Science and Technology, Nellore, India*

DOI: 10.4018/979-8-3693-3398-3.ch004

Copyright © 2025, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

## ABSTRACT

*Bricks have been a crucial component of building and construction for thousands of years. Burnt Clay brick production is a complex process that requires significant energy and resources, despite its consistent workability and accessibility. Recycling materials are being utilized in various projects to reduce the carbon footprint and organic clay used in the brick industry. This chapter provides a comprehensive review of recent brick studies, categorizing them based on materials and production techniques used to create innovative bricks, aiming to understand the modern context of sustainable and innovative bricks over the past few decades. The bricks are being strengthened using industry waste material flash and Agricultural waste Rice husk as cement replacements to achieve strength and environmental sustainability. The strength properties of cement bricks are assessed by comparing their performance with fly-ash and rice husk in different proportions. Future research should focus on improving mineral admixture reactivity in cement bricks at a reasonable cost.*

## INTRODUCTION

Probably the most significant building material in India is burned clay brick, which is utilised extensively in construction projects. But since all Indian brick kilns use premium clay that is taken from agricultural areas and is thought to weigh three kilogrammes each brick, too much clay is detrimental to society (Naganathan et al., 2015). To produce 10,000 crore bricks, more than 300 million tonnes of clay were taken out of agricultural fields each day. In addition, engineers have been compelled to look for new materials that can reduce construction costs due to the high cost and poor quality of clay bricks that are available in some places. India can currently generate over 10,000 crore bricks in the unorganised sector through more than 45,000 local kilns, or bhattas. The use of industrial and agricultural waste products like fly ash and rice husk for brick production offers environmental and economic benefits by preserving valuable topsoil and achieving the social goal of eliminating waste materials that would otherwise be nuisances and pollutants (Singh & Kumar, 2015).

The global production of fly ash and rice husk is increasing, but its usage is not keeping up. In developing nations, fly ash is commonly used as a partial replacement for Portland cement. Whereas rice husk turned to incineration process to become rice husk ash to be replace in Portland cement. Concrete can substitute fly ash and rice husk ash for up to 25% of the Portland cement. This prudence makes sense in the context of raw-ash concrete, where studies are still being done to determine the consequences of high-volume replacement. However, adopting a similarly cautious stance by the brick business is not entirely justified. In regions of the world where

22 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/experimental-investigation-on-the-strengths-of-cement-bricks-using-fly-ash-and-rice-husk-wastes/356643](http://www.igi-global.com/chapter/experimental-investigation-on-the-strengths-of-cement-bricks-using-fly-ash-and-rice-husk-wastes/356643)

## Related Content

---

### Use of Mobile Device Apps in Product Design

Tom Page (2013). *International Journal of Green Computing* (pp. 18-34).  
[www.irma-international.org/article/use-mobile-device-apps-product/80237](http://www.irma-international.org/article/use-mobile-device-apps-product/80237)

### The Effect of Monetary Policy on the Nigerian Deposit Money Bank System

Alex Ehimare Omankhanlen (2014). *International Journal of Sustainable Economies Management* (pp. 39-52).  
[www.irma-international.org/article/the-effect-of-monetary-policy-on-the-nigerian-deposit-money-bank-system/109855](http://www.irma-international.org/article/the-effect-of-monetary-policy-on-the-nigerian-deposit-money-bank-system/109855)

### Critical Analysis of Educational Aspirations and Practices Inside a Low-Cost Rural Private School: Possible Implications for Quality and Sustainability

Wahid Ahmad Dar (2022). *International Journal of Social Ecology and Sustainable Development* (pp. 1-11).  
[www.irma-international.org/article/critical-analysis-of-educational-aspirations-and-practices-inside-a-low-cost-rural-private-school/306648](http://www.irma-international.org/article/critical-analysis-of-educational-aspirations-and-practices-inside-a-low-cost-rural-private-school/306648)

### Donor Project funded ICT Initiatives in the Vocational and Technical Education (VTE) Sector of Asian Developing Countries: A Systems Approach to Managing Project Intervention Processes

Channa Wimal Gunawardena and David H. Brown (2011). *ICTs for Global Development and Sustainability: Practice and Applications* (pp. 268-301).  
[www.irma-international.org/chapter/donor-project-funded-ict-initiatives/47140](http://www.irma-international.org/chapter/donor-project-funded-ict-initiatives/47140)

### Has Gender Equity Improved?: An Examination of the Challenges Faced by Professional Women in Law and Healthcare

Michaeline Skiba and David P. Paul (2013). *International Journal of Social Ecology and Sustainable Development* (pp. 87-95).  
[www.irma-international.org/article/has-gender-equity-improved/93840](http://www.irma-international.org/article/has-gender-equity-improved/93840)