



Bricks and Tiles from Stubble

Technical Brief

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Technology Summary

The Brick and Tile Innovation uses stubble residue (mainly rice straw) combined with clay, sand, plastics, and cement to create lightweight yet durable construction materials. By incorporating 11 wt.% stubble, these eco-bricks and tiles achieve reduced weight without compromising strength, offering a sustainable alternative to conventional materials. The technology directly addresses stubble burning by turning agricultural waste into value-added products. It has demonstrated functional prototypes of bricks and floor tiles with comparable durability to market products.

Background

India faces a recurring problem of stubble burning, especially in northern states like Punjab and Haryana, contributing to severe air pollution, soil degradation, and greenhouse gas emissions. Traditional disposal methods have failed to create economic incentives for farmers. The use of stubble in construction materials presents a dual benefit: reducing environmental hazards while generating affordable, eco-friendly building solutions. With growing demand for sustainable infrastructure, such innovations fit well into national missions like Swachh Bharat Abhiyan and Smart Cities.

Technology Description

Bricks are manufactured by blending stubble, clay, and plastics, while floor tiles are produced using stubble (11 wt.%), cement (50 wt.%), and sand (50 wt.%). The mixture is molded and baked/cured to achieve high compressive strength with reduced weight. These products are engineered for good load-bearing capacity, reduced thermal conductivity, and resistance to wear. By substituting part of the raw material with stubble, the process reduces dependence on conventional inputs and lowers production costs. The end products are visually and structurally comparable to regular bricks and tiles.

Market Potential / Proposed Deployment

- Global Green Building Materials Market: USD 421B (2024) → USD 770B (2030) | CAGR ~10.3%.
- Indian Construction Market: Rapidly expanding with focus on sustainable housing and infrastructure.
- Target Segments: Real estate developers, government housing missions (PMAY), eco-conscious builders.

Applications

- Construction Industry: Sustainable building materials for housing and infrastructure.
- Rural Housing Schemes: Affordable alternative for cost-sensitive government projects.
- Urban Development Projects: Integration into Smart Cities and eco-construction practices.
- CSR & Green Building Programs: Promotes corporate adoption of low-carbon building products.

Value Proposition

- Waste-to-Value: Provides an eco-friendly solution to manage stubble waste.
- Lightweight yet Durable: Reduced material weight with comparable strength to standard bricks.
- Cost-Effective: Uses agricultural residue, lowering raw material costs.
- Environmental Benefits: Reduces stubble burning, cutting air pollution and carbon footprint.
- Scalable Production: Adaptable to small-scale units and large industrial plants.

Technology Status

- Technology Readiness Level (TRL): 7 (Prototypes successfully developed and tested).
- Outcome: Functional bricks and tiles fabricated; further testing for durability and certification in progress.
- IP Status: Open technology; potential for patenting process improvements.

