Section 1: Administrative & Core Identity

Project Title

Eco-Brick: Transforming Plastic Waste Material into Durable Building Material

Team Members

Sl.No.	Name	Role
1	**Subramanya H M**	Team Leader
2	Chiranjeevi G R	Team Contributor
3	Prajwal Gowda V	Team Contributor
4	Paramesh Gowda B S	Team Contributor

Academic Details

Sl.No.	Name	Programme	Department	Current Status
1	**Subramanya H M**	B.E.	Civil Engineering	Currently in 4th year
2	Chiranjeevi G R	B.E.		
3	Prajwal Gowda V	B.E.		
4	Paramesh Gowda B S	B.E.		

Institution

University/College: Malnad College of Engineering, Hassan

Project Duration

Project Dates: January 2025 – December 2025

Key Adviser / Mentor

Rashmi B R, Assistant Professor, Dept. of Civil Engg., MCE Hassan

Grant Information

Grant Approved: ₹ 50,000

Contact Information

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Section 2: Visual Assets

Student Profile Photo

Primary Project Images

Hero shots of the finished eco-brick product and system in action:

Process Photos

Section 3: Narratives

The Hook (One-Line Summary)

> *An eco-brick process that converts shredded plastic and foundry sand into durable, low-cost building bricks, reducing plastic waste while producing usable construction material.*

Problem Statement

Plastic pollution clogs landfills and drains while affordable, low-impact building materials are scarce in many communities. Traditional bricks use clay and high energy, driving land degradation and cost. Vulnerable communities face both waste management and housing-material shortages. A circular, low-tech solution is needed to divert plastic waste into a safe, practical construction material that can be produced with local inputs and simple processing.

The Solution

The team developed an eco-brick mix using foundry sand, shredded plastic waste (10–30% by weight), ordinary Portland cement, and water. Plastic and sand are blended, then combined with a fixed cement quantity (≈2.013 kg per scaled mix) and water (≈0.967 L) to form a mouldable paste. Mixes were prepared at 10%, 20%, and 30% plastic content. Scaled totals across the three mixes produced approximately 6.04 kg cement, 29.00 kg foundry sand, 7.25 kg plastic, and 2.90 L water. Blocks are compacted in moulds, cured, and inspected for integrity for low-load masonry uses.

Methodology & Key Technology

- Manual shredding of plastic waste
- Proportioned hand mixing at 10%, 20%, and 30% plastic content
- Moulding and water curing of eco-brick blocks
- Density-based yield estimation
- Basic compressive and visual testing for field suitability

Key Findings & Results

The eco-bricks were successfully produced using three different plastic proportions with foundry sand, cement, and water. The following table summarizes the key results:

Plastic Content	Brick Weight (kg)	Compressive Value	Suitability
10%	5.820	7.8	**Best performance**
20%	5.220	6.7	**Good performance**
30%	5.080	4.9	**Adequate for non-structural**

> **Key Insight:** Increasing plastic content slightly reduces compressive strength, but the bricks remain suitable for non-structural applications such as pavements, partition walls, and landscaping blocks — while effectively utilizing plastic waste.

Future Scope & Next Steps

- Optimize the percentage of shredded plastic and foundry sand to improve mechanical properties and durability.
- Conduct standardized tests: water absorption, durability, and long-term compressive strength under different environmental conditions.
- Explore large-scale production methods and cost analysis for commercial viability.
- Collaborate with waste management systems and local construction industries to reduce plastic pollution while promoting sustainable, eco-friendly building materials.