



## Use of Coconut Waste and Glass Waste in Bricks

---

Shivam Patel, Vaibhav Nanda, Keyur Rohit, Pragnesh Bhalu and  
Vrajesh Patel

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

February 14, 2024

# USE OF COCONUT WASTE AND GLASS WASTE IN BRICKS

SHIVAM U PATEL

Civil Engineering  
Department,  
PIET, Parul University,  
Waghodia, Vadodara.  
Gujarat.391760  
[210303104747@paruluniversity.ac.in](mailto:210303104747@paruluniversity.ac.in)

VAIBHAV NANDA

Civil Engineering  
Department,  
PIET, Parul University,  
Waghodia, Vadodara.  
Gujarat.391760  
[210303104744@paruluniversity.ac.in](mailto:210303104744@paruluniversity.ac.in)

Keyur J Rohit

Civil Engineering  
Department,  
PIET, Parul University,  
Waghodia, Vadodara.  
Gujarat.391760  
[210303104757@paruluniversity.ac.in](mailto:210303104757@paruluniversity.ac.in)

PRAGNESH BHALU

Civil Engineering Department,  
PIET, Parul University,  
Waghodia, Vadodara.  
Gujarat.391760  
[210303104760@paruluniversity.ac.in](mailto:210303104760@paruluniversity.ac.in)

Dr.Vrajesh M. Patel

Assistant Professor  
Civil Engineering Department,  
PIET, Parul University,  
Waghodia, Vadodara.  
Gujarat.391760  
[Vrajesh.patel29510@paruluniversity.ac.in](mailto:Vrajesh.patel29510@paruluniversity.ac.in)

*Abstract*—All around the world, there has been a serious issue with the allocation of space for different types of garbage. Wastes include hazardous, e-waste, industrial, municipal, commercial, chemical, and agricultural wastes, among others. Worldwide, brick is a commonly used building and construction material. Bricks are made from artificial trash (glass powder) and natural waste (coconut waste). For natural trash, soil is utilized as a list material. Reducing the amount of soil that contains both manmade and natural trash is the primary goal of the current investigation. The lightweight materials are made from coconut fibers.

Building bricks that help with solid

waste management are made from coconut fibers, which would otherwise be landfilled. Much study has been done on the creation of bricks from waste material, both for environmental preservation and sustainable development. Since there is less soil in many places of the world, this waste is utilized to lower the volume of soil. The amount of soil used to create the bricks is decreased by using glass powder and coconut fibers with different soil compositions.

- Introduction

Historical Aspects

A brick is a type of building material that is used to make partitions, clear-ments, and other elements of brick construction. The phrase "slipup" used to refer to a unit made of stone, but it is now used to refer to any blocky unit that is mortared. A mistake might consist of beach sand, lime, and/or complexion-causing dirt or concrete accessories. Bricks are supplied in large quantities and come in a variety of vibrant hues, feathers, accessories, and sizes that vary depending on the location and the period.

Let go and non-fired bricks are the first two commands in the series. Although the term "square" may refer to a blocky structural unit made up of relative accessories, it usually refers to anything larger than a slipup. Extended complexion aggregate is used to make featherlight bricks, often known as featherlight pieces. Terminated bricks, often referred to as produced stone, are among the most durable and fundamental building elements. They have been in use since around 5000 B.C.

Air-dried bricks, often referred to as slush bricks, are more seasoned than let-go bricks and include a mechanical folio that is redundantly fixed, much like straw. Bricks can be set in various mortar feathers to hold the bricks together to produce a solid building. Bricks are laid in courses and colorful designs known as bonds, collectively known as brickwork.

The most seasoned and resilient of humankind's building materials are bricks, which are created by

molding a plastic mass of water and skin that is then dried and fired. Until relatively recent times, when the clay was dug out, bricks were made, and furnaces were built by hand with help from animal control.

- The first brick-making machines were successfully introduced around a century ago, and since then, the trend toward mechanizing clay extraction, manufacturing, and handling processes has continued at an accelerating rate. The oldest and greatest type of construction material is brick. Very few other constructed building pieces have enjoyed such widespread and continuous fame. Properties that the builder and owner were promoted by brick.
- This one piece of cloth can be used to surround a structure that has a load-bearing, enriching wall. These walls are particularly durable and, if built legally in the first place, require very little support. Brick construction has remained a cost-effective method due to the inherent flexibility of the coarse cloth, which can be quickly molded into an astounding range of forms and sizes. Materials made with auxiliary clay are mixtures of alumina, silica with minor sums of lime, magnesia, pop or potash.
- Press compounds, which are often oxides, hydroxides, or carbonates, are what cause brick clays to constantly exhibit

debasements and are mostly responsible for the broad range of colors present in the wrapped object.

- General

For a very long time, bricks have been a significant development and structural material. As of right now, there are over 1391 billion bricks produced annually worldwide, and demand for bricks is expected to continue growing. Conventional bricks are transported from soil using a heater that has an infinite temperature. It is so widely accepted that it is absent from the vibrant hallways of the globe.

Several nations, like China, have been enforcing the use of complexion-made bricks in order to protect the soil and landscape. Coconuts may be used for a variety of purposes and are rather versatile. Almost every inch of a real coconut's hallway, whether elegant or utilitarian, is used in some capacity. With 13 billion nuts produced annually, India is one of the world's leading producers of coconuts. The process of making ended bricks involves working with soil-beach mixtures containing varying amounts of red-hot rice cocoon remnants. At 9000C, the final periods were 2, 4, and 6 hours. The effects of rice cocoon material on Atterberg limits for workable mixing water material

The bricks' water retention, compressive quality, consistency, and direct loss were all investigated. The

results showed that taking into account the rice cocoon increased the bricks' compressive strength. For improving purposes, bricks composed of dirt, coconut fibers, rice hulls, glass paint, and shell mixtures may be used.

. I wish you the best of success.

JANUAR  
Y 10,  
2024

- Subsection Heading Here

#### OBJECTIVES

- Examine the potential for using glass greasepaint and coconut waste as a partial substitute for soil in brick design.
- Secondly, to reduce the amount of soil needed to make bricks using both mechanical and ordinary waste equipment.
- 3) To employ waste materials in development units, such as glass greasepaint and coconut cocoon.
- 4) Take into account the compressive quality and absorption of water geste
- 5) Examine the outcome against a typical error.
- Materials / Tools required
- Material Used - Cement - Sand - Water - Coconut Husk AND Glass Powder
- Tool required
- 1. Compression Testing Machine
- 2. Brick Mould
- 3. Weighting machine
- 4. Hand Float

## Test Set-Up

In order to determine the brick quality, four tests can be carried out subsequently. Most of these experiments are conducted on the field, with the remainder taking place at exploration installations.

1. Colour Test
2. Soundness Test
3. Hardness Test
4. Compressive quality Test

## WORKING METHOD

Step 1: Use the wire brush to clean the inside of the brick form that will be used in the test.

Step 2: Material Preparation

Step 3: Combine ingredients to form a brick

Step 4: Fill the mold with the prepared material. Using a hand float, level the surface after filling the mold to the brim.

Step 5: Marking the brick's upper surface according to the waste utilized.

Step 6: Position the brick to be tested on the compression machine's center plate. Make sure the lower surface of the brick plate is in contact with both plates. To raise the foot plate till the brick touches the over plate, release the stack valve. Note the stack where the tested block will be placed.

## • Conclusion

### RESULTS

#### • COLOR TEST

- Husk-Brick made of cocoa nuts
- Bricks have excellent vivid livery color and may reach up to 20 rate extent for coconut cocoon. Nevertheless, bricks have a dull taupe color—a shade of brown halfway between argentine and brown—after a 20-rate professional parcel. Below charred brickwork

- Powder-Glass Bricks
- Bricks have excellent vibrant livery color and glass greasepaint up to a ten-rate extent. yet, bricks have several white spots on their faces after 10 percent master- coating; yet, color canny is sanguine up to 30 percent glass greasepaint may be used. Below charred brickwork

#### • SOUNDNESS-TEST FOR BRICKS

Brick coconut cocoon When two bricks are struck against one another, they produce an essential sound to the tune of twenty percent. However, a 30% percentage point causes caliginous sound.

#### Brick with Glass-Powder

A metallic sound is produced when two bricks are hit against one another for up to thirty percent of their whole length.



- **COMPRESSIVE STRENGTH TEST RESULT**

1S r. No	SPECIMEN	SAMPLE	C/S AREA mm <sup>2</sup>	LOAD KN	COMPRESSIV E STRENGTH N/mm <sup>2</sup>	AVERAGE COMPRESSIVE STRENGTH N/mm <sup>2</sup>
1	CONVENTIONAL BRICKS	SAMPLE 1	210 × 95	70	3.50	3.46
		SAMPLE 2		65	3.25	
		SAMPLE 3		73	3.659	
2	BRICKS WITH 10% OF COCONUT HUSK	SAMPLE 1	210 × 95	120	5.01	5.26
		SAMPLE 2		110	5.51	
		SAMPLE 3		105	5.26	
3	BRICKS WITH 20% OF COCONUT HUSK	SAMPLE 1	210 × 95	115	5.76	5.76
		SAMPLE 2		120	6.01	
		SAMPLE 3		110	5.51	
4	BRICKS WITH 30% OF COCONUT HUSK	SAMPLE 1	210 × 95	65	3.25	3.0
		SAMPLE 2		55	2.75	
		SAMPLE 3		60	3.00	
5	BRICKS WITH 10% OF GLASS POWDER	SAMPLE 1	210 × 95	65	3.25	3.33
		SAMPLE 2		70	3.50	
		SAMPLE 3		65	3.25	
6	BRICKS WITH 20% OF GLASS POWDER	SAMPLE 1	210 × 95	85	4.26	4.0
		SAMPLE 2		75	3.75	
		SAMPLE 3		80	4.01	
7	BRICKS WITH 30% OF GLASS POWDER	SAMPLE 1	210 × 95	50	2.50	2.5
		SAMPLE 2		55	2.75	
		SAMPLE 3		45	2.25	

- **HARDNESS TEST**

Bricks are sensitive to up to 20 percent. When a scrape is formed, it is not thoroughly checked for mistakes in glass greasepaint and coconut cocoon. However, the mistaken face had scrape removed after 30 percent of the area.

### ACKNOWLEDGMENTS

We would really want to thank our guide Dr. Vrajesh Patel for providing us with the wonderful opportunity to complete this design.

Topic: using glass and coconut trash to make bricks.

### Citations

#### USED MATERIAL: COCONUT-HUSK

Project on “Experimental investigation on bricks by using various waste materials” by K.R. Vinodh et al. Published in the January 2016 issue of the International Journal of Latest Trends in Engineering and Technology, volume 6, issue 3.

#### TYPE OF MATERIAL: GLASS POWDER

Torres-Gonzalez, LC, Alvarez, N., Alvarez-Mendez, A., and Torres-Martinez, LM. (2003) Glass and ceramics made from industrial wastes using kinetic thermal analysis. *Non-Crystalline Solids Journal*, 329, 73–76.

ASTM, ed. (1986) ASTM, C 67. Common Procedures for Testing and Sampling Structural Clay Tile and Brick. Brick Manufacturing, Part I. The American Society of Measurement and Testing, West Conshohocken, PA, USA.