

COMPRESSED EARTH BRICK (CEB)



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Results

Introduction

The sustainable and the affordable construction materials at low cost is needed in Rwanda for economic and environmental solution. Compressed Earth bricks (CEB) might be used as one of the solution of affordable housing. This research work was conducted on soil, kaolin, sawdust and ash powder.

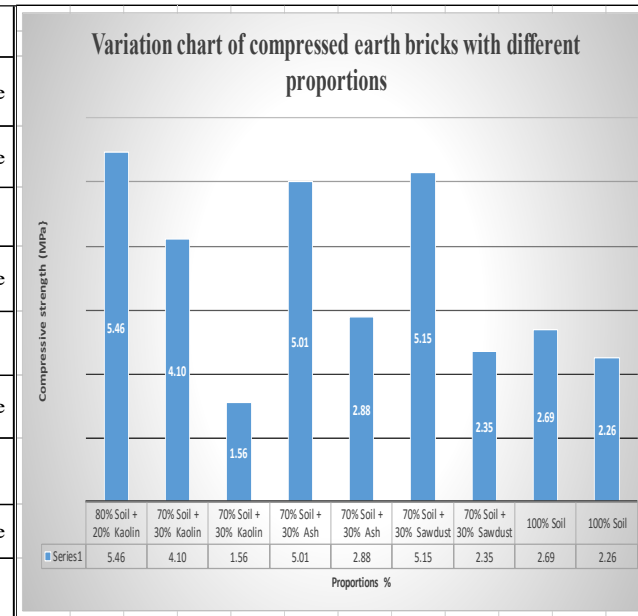
Objective

To evaluate the mechanical property of different types of compressed earth bricks with different soil proportions in order to get bricks made in local materials that is sustainable and affordable with good quality.

Methodology

CEB was designed by varying earth soil, kaolin, sawdust and ash powder. Thereafter, soil was mixed at 100% ,80% and 70%. Added water was mixed at optimum moisture content, thereafter in sample production with different proportions, some samples were produced with a constant applied load of 100KN with an automatic press machine and other samples produced manually with dynamic equipment by hammering samples with 100 blows.

S/N	Mixture	Average Strength(MPa)	Method
1	80% Soil + 20% Kaolin	5.46	Automatic machine
2	70% Soil + 30% Kaolin	4.10	Automatic machine
3	70% Soil + 30% Kaolin	1.56	Manual machine
4	70% Soil + 30% Ash	5.01	Automatic machine
5	70% Soil + 30% Ash	2.88	Manual machine
6	70% Soil + 30% Sawdust	5.15	Automatic machine
7	70% Soil + 30% Sawdust	2.35	Manual machine
8	100% Soil	2.69	Automatic machine
9	100% Soil	2.26	Manual machine



Conclusion & recommendation

The present study was carried out to better understand the mechanical property (compression strength) of different types of compressed earth bricks with different soil mix proportions. The results proved that as its illustrated on above table, the fabricated adobe bricks with an automatic machine got the compressive strength ranged between 2.63 to 5.46 MPa. The produced bricks with manual machine got the compressive strength ranged between 1.56 to 2.88 MPa. Among all trial mix, a mixture of 80% soil with 20% kaolin and 70% soil with 30% of ash they can resist to the highest compressive strength and for affordable prices ranged between 25 to 50 Rwf depends on required strength. The author recommends for further researchers to check for the water absorption of CEB and to deal with some other mix proportions for the strength increase purpose.

Ref:

- [1] B.V. Venkatarama Reddy, and P. Prasanna Kumar, "Embodied energy in cement stabilised rammed earth walls", Energy and Buildings, 42(3): p. 380-385, 2009
- [2] J.C. Morel, et al., "Building houses with local material: means to drastically reduce the environmental impact of construction", Building and Environment, 36: p. 1119-1126, 2001



Fabricated adobe bricks with dynamic equipment by hammering 100 blows

Manual machine

Fabricated adobe bricks with automatic machine by applying 100 KN



Automatic machine

The above figures illustrate some fabricated adobe bricks with different mix proportions and methods.