



Potential of replacing clay soil by rice husk ash (RHA) in enhancing the properties of compressed earth blocks (CEBs)

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Abstract

The present study was planned to assess the potentiality of replacing clay soil with rice husk ash (RHA), in manufacturing of compressed earth blocks (CEBs) while maintaining the required mechanical properties of CEBs. CEBs having the size of 300 mm × 150 mm × 100 mm (length, width and height) were manufactured by hydraulic compaction at 1.37×10^9 N/m² using ordinary Portland cement (OPC) and clay soil at 1:15 ratio and a commercially available resin adhesive (20 mL/kg cement). Six different types of CEBs were manufactured by replacing 0% (control and B1), 5% (B2), 7.5% (B3), 10% (B4), 15% (B5) and 20% (B6) of clay soil with RHA. Dry and bulk densities, water absorption, compressive strength, erosion and acid resistance were tested. Each test was quadruplicated. The highest compressive strength, the lowest water absorption and acceptable erosion resistance were recorded from B3. Results further revealed that 25.7% improvement in the compressive strength of B3 was achieved compared to B1. Although all types of CEBs recorded compressive strength greater than 2.75 N/mm², indicating that the blocks were suitable for load bearing walls for one and two story houses and story houses divided into flat and non-load bearing walls (both external and internal), the results of acid tolerance revealed that they were more suitable for internal walls. As such, the present study recommends to replace the maximum of 7.5% clay soil with RHA in manufacturing of CEBs for load bearing and non-load bearing internal walls.

Keywords Compressed earth blocks · Clay soil · Compressive strength · Pozzolanic properties · Rice husk ash

1 Introduction

Compressed earth blocks (CEBs) are a cost-effective and environmentally friendly modern construction material, which is widely used in modern buildings (Mostafa and Uddin 2016). Ability to manufacture with less expertise knowledge, no additional sand

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