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## **Assessment of the potential of incorporating rice husk ash in compressed stabilized earth block manufacturing process**

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Rice husk ash (RHA), an agricultural waste discharged from rice milling industries has become an environmental issue in certain districts in Sri Lanka. Since RHA shows high pozzolanic properties, the present study was designed to determine whether there is a potential to incorporate RHA in compressed stabilized earth block (CSEB) manufacturing process in a production line without changing the proportion of ordinary Portland cement (OPC). Analysis of chemical properties and particle size distribution of RHA and soil texture were done prior to the manufacturing process to confirm the suitability of raw materials. The mixing proportion of OPC and clay soil was, thus, 1:15. Six different types of CSEBs having the size of 300 mm × 150 mm × 100 mm (length, width, height) were manufactured by replacing 0% (control-B1), 5% (B2), 7.5% (B3), 10% (B4), 15% (B5), and 20% (B6) of clay soil by RHA. Properties of CSEBs including dry and bulk densities, water absorption, compressive strength, erosion resistance, acid resistance and percentage weight reduction were determined. Each test was quadruplicated. Data were subjected to One-way ANOVA followed by Tukey's tests in MINITAB 14. The values were compared with SLS 1382-2009 and British standards. Results revealed that a significant reduction of dry and bulk densities of B3, B4, B5 and B6 ( $p < 0.05$ ) was achieved when compared with controls. The block B3 showed the lowest water absorption, pitting depth, pitting rate and the highest compressive strength. According to SL standard, all the blocks manufactured were suitable for construction of walls (Grade 3), but not for interlocking except B3. When compared with the British statutory minimum compressive strength requirements of bricks for various walls, all types of blocks manufactured were suitable for load bearing walls for one and two storey houses and storey houses divided into flat and non - load bearing walls (both external and internal). Nevertheless, considering acid tolerance of the manufactured blocks, it is recommended to use all types of blocks for load bearing walls for one and two storey houses and storey houses divided into flat and non - load bearing walls (external). The present study suggests that the RHA discharged from rice milling industry can be effectively utilized in CSEB manufacturing by hydraulic compaction at  $1.37 \times 10^9 \text{ N/m}^2$ .

**Keywords:** Clay soil, compressed stabilized earth block, compressive strength, pozzolanic properties, rice husk ash