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Light weight cement stabilised bricks with partial replacement of rice husk ash

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Utilization of rice husk ash (RHA) for producing cement stabilized earth bricks has been studied as a partial replacement for ordinary Portland cement (OPC). The Rice Husk Ash (RHA) was collected from a rice mill from Akuregoda area, Battaramulla and the soil used was from Artigala area, Kaduwela in the Western province. Hundred and fifty bricks with different mix proportions of RHA, cement and soil were cast and tested according to the SLS 1382 Part 1, 2,and 3 standards. The overall mix ratio of 1:7 (one part of binder to seven parts of soil) was used and OPC was replaced with RHA at different replacement levels of 0%, 20%, 30%, 50%, and 60%. 305 mm×155 mm×100 mm sized bricks were cast, cured and crushed for 7, 14, 28 and 35 days. Engineering properties such as compressive strength, water absorption, linear expansion, size and shape were studied. The engineering properties of bricks with different mixed proportions were compared with normal stabilized bricks to determine the optimum replacement levels of RHA for earth bricks. Twenty eight day compressive strength decreased from 4.01 ± 0.02 to 1.9 ± 0.04 N/mm^2 when the RHA content increased from 0 to 60%, respectively. Blocks made out of 0%, 20% and 30% RHA was measured to have a compressive strength of 4.01 ± 0.04, 3.88 ± 0.07 and 3.08 ± 0.09 N/mm^2, respectively. They were within the required standard of compressive strength (2.6– 6 N/mm^2) as mentioned in CSEB standard, SLS 1382 part 1. Other percentages of replacement levels did not meet the standard compressive strength levels. When water absorption of the blocks were considered, 20-30% of OPC could be seen as the optimum RHA replacement, yielding the SLS standards. The average values of linear expansion of all mix proportions were within the specified upper limits (< 0.10%) implying no significant effect on linear expansion of blocks with the addition of RHA content. Considering all the important parameters, it could be concluded that OPC can be easily replaced by 30%, yielding the cheapest block complying with the SLS standard. It also helped to reduce the weight of the blocks by 10% and reduce the cost by 30%.

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