
Burnt-Bricks with Extracted Clay and Fly Ash

S.N. Malkanthi^a and A.A.D.A.J. Perera^b

^a *Faculty of Engineering, University of Ruhuna, Sri Lanka*

^b *Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka*

Corresponding author: smalkanthi@cee.ruh.ac.lk

Use of earthen materials for civil engineering construction has a long history worldwide with different forms. Among such materials, burnt-bricks play a major role. The availability of raw material for brick production is short; hence, alternatives are needed. Fly ash, rice husk and ash, industrial and agricultural waste are such alternatives. The present study suggests clay extraction from a clayey soil through washing as a new raw material for burnt-bricks production with fly ash addition. Extracted clay shows high plasticity index and high linear shrinkage. Hence, 20%, 25%, 30%, 40% and 50% fly ash from total weight of the soil were mixed with clay to form more desirable mixture. Since fly ash is an industrial waste, use of fly ash for this kind of production would give a sustainable solution for waste management. Atterburg test was performed for every clay-fly ash mixture to check the mixture properties mainly plasticity index and the linear shrinkage. For the handmade bricks, (220 x 115 x 75) mm size mold was used. Burnt-bricks were tested for compressive strength, flexural strength, water absorption, density, efflorescence and dimension variations. Results were compared with SLS 39: Specification for burnt clay bricks. Wire cut bricks were also made with clay and 25% fly ash addition. First, the prepared bricks were checked for the dimension variation after firing and the results showed, dimensional variation is reducing with the increase of fly ash percentage. Also, bricks showed that slight efflorescence. Bricks made with 25% fly ash addition showed compressive strength of Grade 2 category as in SLS 39. According to above results, addition of 25% fly ash gives more desirable properties for the burnt bricks made with extracted clay and fly ash. Further it reflects that the use of fly ash gives light-weight bricks. The wire-cut bricks made with this selected mixture give Compressive strength of 10.64 N/mm² and it satisfies the SLS 39 requirements for wire-cut bricks. Also, its water absorption was nearly 16% which is below the SLS required value (18%). Surface appearance of the bricks with handmade bricks was fairly uneven, but wire-cut bricks were with acceptable appearance.

Keywords: Burnt-bricks, Extracted clay, Fly ash-added bricks