INVESTIGATION OF BURNED TIMBER ASH AS A PARTIAL SUBSTITUTE OF CEMENT IN SOIL-CEMENT MIX AS A BACKFILLING MATERIAL IN SMALL-SCALE BUILDING CONSTRUCTION

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Abstract: Backfilling is a critical process which is to be done after the construction of the substructure. The backfilling can be done using the same soil that has been excavated. However, if the soil lacks the bearing capacity or shear strength, then soil stabilization can be done. Soil stabilization is mainly done using cement or using lime. However, the incorporation of cement in stabilization is not a very sustainable process. Much research is being done to determine the suitable material to partially replace the cement. Among the research materials, wood ash is a priority. Cinnamon ash is commonly found in the Galle district, hence, this research is focused on determining the optimum mix ratio, when cement is partially replaced with cinnamon ash. It was found that mixing cinnamon ash decreases the compressive strength of the stabilized soil. However, when the ratio of Water: OPC: Cinnamon Wood ash: Soil is maintained at 2.5: 0.8: 0.2: 8.5 respectively, the strength decrement is only 0.4 N/mm^2. Hence, the optimum ratio is selected as the above ratio. Further, approximately Rs. 1000.00 can be saved from 1 m^3 which is a saving of 4.8% when the optimum mix is used instead of the conventional mix. Therefore, cinnamon ash can be recommended as a sustainable material to be used in partial replacement of cement in backfilling provided that the strength gained is within the required range.

Keywords: Backfilling, Partial replacement, Wood ash..