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Effectiveness of sewage sludge ash combined with waste pozzolanic minerals in developing sustainable construction material: An alternative approach for waste management

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1 **Effectiveness of sewage sludge ash combined with waste pozzolanic minerals in developing**
2 **sustainable construction material: an alternative approach for waste management**

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8 **Abstract:** Utilization of the sewage sludge ash in fabricating the construction material would be
9 an effective alternative approach under the sludge management scheme other than landfilling.
10 The present investigation deals with the utilization of the recycled sewage sludge ash (SSA)
11 combined with the quicklime (QL) and blast furnace slag (BFS) as a cementitious material in
12 controlling the physical and mechanical performances of mortar. The mortar samples were
13 prepared using the different amount of SSA, QL, BFS, and alkali activator (AA). The
14 performance of the sewage sludge ash based mortar (SAM) was evaluated measuring the bulk
15 density, apparent porosity, compressive strength, flexural strength, and shrinkage strain, etc. The
16 result reveals that the higher dose of AA (50% weight w.r.t the volume of water used) and QL
17 (20% w.r.t. weight of the total cementitious material) influences the mechanical strength of SAM.
18 Additionally, the optimum dose of the BFS (10% w.r.t. weight of the total cementitious material)
19 leads to yield a maximum compressive strength (31.3 MPa) of SAM. Finally, based on the
20 analytical analysis, a model has been proposed to explain the overall performance of the SAM.
21 Hence, the utilization of SSA (70%) combined with QL (20%) and BFS (10%) for the fabrication
22 of mortar and concrete is assumed to be an effective alternative technique in developing
23 sustainable construction material and waste management as well.

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