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Physical and Mechanical Properties of Waste Red-Gypsum Based Concrete Composites

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Abstract:
Red gypsum (RG) was used as a cement replacement material for brick in order to evaluate the performance of this waste material as a filler. A constant quantity of cement (10%) and w/c ratio of 0.45 was used in order to study the effect of replacement of sand by RG. The increase of compressive strength with replacement of sand by RG up to 25% and later showing a decreasing trend of compressive strength when further increase of replacement percentage was related to the particle size modification of the solid mix. Sieve analysis showed between 0 to 25% replacement, the percentage of fineness increases in the same grading zone. Within this region, the hardness value of the solid mix was altered, resulting in an increase in the compression and consolidation index. The increase in the compression and consolidation index is reflected from the thickness of the bricks produced from the solid mix pressing, in which the thickness of the 25% onwards sand replacement showed slightly thinner bricks with denser appearance. The findings were further strengthened with the results from the UPV analysis showing a higher velocity of doppler wave passing through the dense RG cement bricks.