

Abstract

Valorization of Inert Part of Construction and Demolition Wastes for the Production of Fired Bricks †

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Abstract: Green routes to prepare or manufacture sustainable building materials have been attracting a lot of attention over the years targeting sustainability issues. In this investigation, for the first time, sludge from the inert mineral part of the construction and demolition waste (RA-S) is used as main raw material in the fabrication of fired bricks for building purposes. Fired bricks fabricated with different dosages of RA-S and earth material (i.e., 0%, 30%, 50%, 70% and 100% by weight) were prepared and evaluated in terms of their properties. The RA-S was characterized and the results showed that it can be classified as a clayey material and richly graded silty sand whereas brick soil can be classified as clayey sand according to the French Standards. XRD analysis revealed that the addition of the RA-S into raw earth material did not cause big changes in the final mineralogical properties of the fired bricks. The compressive strength (CS) test results indicated that the strength of the brick samples (fired at 800°C) increased with the addition of the RA-S from 30% to 70%. The CS of bricks fired at 800°C were 10.2 MPa, 13.2 MPa, and 16.7 MPa after incorporating 30%, 50% and 70% RA-S, respectively. The density of the fired brick slightly reduced with the RA-S addition. The highest strength was attained at the firing temperature of 800°C in relation to the firing temperature of 1000°C. The RA sludge can be used in combination with earth material to fabricate fired bricks, which can meet the requirements of many Standards all over the world. In the light of these results, it is possible to say that the RA-S generated from recycling inert mineral part of construction and demolition waste plant is a promising material to prepare efficient fired bricks that can be successfully employed in the real construction sector.

Keywords: recycling and valorization; construction and demolition waste sludge; bricks production; mechanical properties



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