

Effects of Mechano-chemical Activation on the Combination of Cement Kiln Dust and Fly Ash

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ABSTRACT

Combinations of cement kiln dust and fly ash were used to develop cementitious material through mechanochemical activation. Activation is accomplished through the use of attrition mill grinding. The two materials were combined and subjected to various grinding regimes to cultivate mechanochemical activation. Energy absorbed by the material on impact may result in a modification of the particle surfaces by introducing dislocations, point defects, and other structural defects. This leads to materials with increased surface free energy, which makes them more reactive. The research involves properly blending CKD with fly ash to create a cementitious material in which the material deficiencies will be converted into benefits. The purpose of this research is to explore an effective way to substantially utilize CKD and fly ash by developing an environmentally friendly, sufficiently performing, and cost effective cementitious product for future concrete materials. Properties, including particle size distribution, initial time of set, and compressive strength of the new material were determined. The results indicate that separate grinding of the two materials is most effective at activating the materials and provide the best properties of the paste. The results also show that such a material is feasible with additional research.