

A Comparative Study of Portland Cement Clinker Obtained from Ordinary Raw Mixture and Mixture with Fly Ash

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KEYWORDS: Portland cement clinker, fly ash, raw mixture burnability, clinker phase composition

ABSTRACT

Portland cement clinkers synthesized under laboratory conditions from two different raw mixtures were investigated. One of the raw mixtures was ordinary raw mixture from the industrial production of cement in "Holcim – Serbia, a.d." cement factory. This raw mixture contained of lime and marl, as basic raw components and quartz sand as a corrective raw component. The other raw mixture was fly ash raw mixture, composed only of limestone and fly ash. These two mixtures were sintered at the temperatures of 1250, 1300, 1350 and 1400°C with the retention time of 60 minutes. After the chemical (free lime content determination) and mineralogical investigation (by X-ray powder diffraction) of obtained clinkers, it was concluded that the temperatures of 1250 and 1300°C are insufficiently high for proper clinker to form. Then both mixtures were sintered again at the temperatures of 1350 and 1400°C, with the retention times of 60, 90 and 120 minutes. Chemical composition of obtained clinkers, clinker parameters and phase composition were determined by X-ray fluorescence, the content of free lime was determined by titration, while the qualitative analysis of clinkers was performed by X-ray powder diffraction and optical microscopy (in reflected light). Both laboratory clinkers were also compared to an industrial Portland clinker sample. The results showed that although the fly ash raw mixture tends to have better burnability comparing to the ordinary mixture, in terms of qualitative and quantitative phase composition, clinkers from these mixtures are very much alike.

Submitted for consideration in the 2007 World of Coal Ash Conference, May 7-10, 2007.