

Influence of Combustion Conditions on the Properties of Fly ash- A Review

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ABSTRACT

Fly ash from combustion of pulverized coal has been used as cement replacement material in the building industry for a long time. Up to 30-40% of the cement in concrete can be replaced. Since fly ash is pozzolanic, it interacts with the calcium hydroxide produced during cement hydration, thus forming additional calcium silicate hydrate that enhances the strength of the concrete. The pozzolanic property of fly ash is due to its content of glass phase, which, in its turn, is related to the composition of the coal and the burning temperature.

Not only the content of glass phase, but also the particle size of the fly ash, its content of unburned coal, color, and other properties, depend upon the combustion conditions. This means that the properties of fly ash produced from one power plant varies with the power load. An increase in power generation load demands a higher burning temperature and resulting in a fly ash with a lower content of unburned matter. This influences the reproducibility of concrete made with addition of that fly ash. As an example, an increase in the content of unburned matter in the fly ash increases the water requirement and decreases the air content in the concrete paste. Thus, the amount of air entraining agent used has to be adjusted to produce the desired concrete. In the article, the influence of variations in fly ash properties on the water requirement for making concrete, bulk density and air entrainment characteristics are reviewed.