

USE OF CLEAN COAL ASH AS SETTING TIME REGULATOR IN PORTLAND CEMENT

By Zichao Wu and Tarun R. Naik

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ABSTRACT

Traditionally about 3 to 5% gypsum is inter-ground with portland cement clinker as setting time regulator for portland cement production. In this paper a source of clean coal ash (CCA) was used to replace gypsum as a setting time regulator and mineral additive in CCA cements. CCA is defined as the coal ash derived from SO_x control technology. Up to 80% of CCA was blended with ground portland cement clinker. The resulting blended cements were evaluated for time of setting (ASTM C191), soundness (ASTM C151), compressive strength (ASTM C109), and sulfate resistance (ASTM C 1012). Test results indicate that the time of setting of the blended cements increased with CCA content up to 40%, then decreased with higher CCA content. All the CCA cements with CCA were sound regarding the autoclave expansion test. The early strength (one day) of the CCA cements were decreased. However, from the age of seven days and above the compressive strength of the CCA cements was equivalent to or higher than gypsum-regulated cement with up to 60% CCA. CCA cements were less vulnerable to sulfate attack than the gypsum-regulated cement.