

CAST-CONCRETE PRODUCTS MADE WITH FBC ASH AND WET-COLLECTED COAL-ASH

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ABSTRACT

Cast-concrete hollow-core blocks, solid blocks, and paving stones were produced at a manufacturing plant by replacing up to 45% (by mass) of portland cement with fluidized bed combustion (FBC) coal ash and by replacing up to 9% of natural aggregates with wet-collected, low-lime, coarse coal ash. Cast-concrete product specimens of all three types exceeded the compressive strength requirements of ASTM from early ages, with the exception of one paving-stone mixture, which fell short of the requirement by less than 10%. The cast-concrete products made by replacing up to 40% of cement with FBC ash were equivalent in compressive strength (89% to 113% of control) to the products without ash. The abrasion resistance of paving stones was equivalent for up to 34% FBC ash content. Partial replacement of aggregates with wet-collected coarse ash decreased compressive strength of cast-concrete products. The resistance of hollow blocks and paving stones to freezing and thawing decreased appreciably with increasing ash contents. The cast-concrete products could be used indoors in regions where freezing and thawing is a concern, and outdoors in a moderate climate.