EVALUATION OF PRECAST CONCRETE PRODUCTS USING INDUSTRIAL BY-PRODUCTS

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ABSTRACT

This research was directed toward establishing high-volume recycling technologies for fly ash, bottom ash, and used foundry sand in manufacture of precast molded concrete products. Mixture proportion and production technology were developed for wet-cast concrete masonry products such as bricks and paving stones, as well as precast concrete walls and windows products. Two reference mixtures, one for bricks and the other for paving stones, without fly ash, bottom ash, or used foundry sand, were proportioned. ASTM Class F fly ash (FA) was used as a partial replacement of portland cement. Bottom ash (BA) and used foundry sand (UFS) were used as a replacement of regular concrete sand. For precast masonry products, 50% and 70% of regular concrete sand was replaced with both bottom ash and used foundry sand. Compressive strength, freezing and thawing resistance, drying shrinkage, and abrasion resistance tests were conducted on the wet-cast concrete products manufactured at the Advance Cast-Stone Company, Random Lake, WI. Based on strength and durability evaluations, it was concluded that all wet-cast bricks could be used for both exterior and interior walls in warm climates and for interior walls in cold climates. None of wet-cast paving stone mixtures including the reference mixture met all the ASTM requirements for paving stones.