

**PROPERTIES OF FIELD MANUFACTURED CAST-CONCRETE PRODUCTS  
UTILIZING RECYCLED MATERIALS**

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**ABSTRACT**

This investigation was performed to develop technology for manufacturing cast-concrete products using Class F fly ash, coal-combustion bottom ash, and used foundry sand. A total of 18 mixture proportions with and without the by-products were developed for manufacture of bricks, blocks, and paving stones. Replacement rates, by weight, for sand with either bottom ash or used foundry sand were 25% and 35%. Replacement rates, by weight, for portland cement with fly ash were: 25% and 35% for bricks and blocks; and 15% and 25% for paving stones. Analysis of test data revealed that bricks with up to 25% replacement of cement and blocks with up to 25% replacement of cement and sand with recycled materials are suitable for use in both cold and warm climates. Other bricks and blocks were appropriate for building interior walls in cold regions and both interior and exterior walls in warm regions. Paving stones with 15% replacement of cement with fly ash showed higher strength, freezing and thawing resistance, and abrasion resistance than the control.

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