

## **USE OF INDUSTRIAL BY-PRODUCTS IN CEMENT-BASED MATERIALS**

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### **ABSTRACT**

Nearly 4.2 billion tones of non-hazardous by-products are generated from agricultural, domestic, industrial, and mineral sources. Large amounts of wastes generated from industrial and domestic sources are currently landfilled due to non-availability of economically attractive use options. Landfilling is undesirable because it causes not only huge financial burdens to producers of by-products, but also makes them responsible for unknown future environmental liabilities. Additionally, due to shrinking landfill space and increased environmental restrictions, cost of landfilling is escalating. To address these problems it has become essential to find cost-effective solutions to waste disposal problems. Recycling not only saves on huge disposal costs, but also conserves natural resources, and in some cases provides technical and economic benefits. This paper describes various by-product materials generated from industrial operations as well as recycling of these materials. The by-product materials include coal combustion by-products, and wood ash. For each by-product material, production, properties, and potential applications in manufacture of emerging materials are briefly addressed. Some applications include use in Controlled Low Strength Materials, concrete and cast concrete products, blended cement, lightweight aggregates, and in metal composites