

Coal Ash: The New Golden Treasure

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ABSTRACT

Coal is the major fossil fuel used for power production in utilities, and it will remain an important energy source for several decades to come. A major environmental problem associated with coal combustion is the ash residues. Most of the ashes produced are stored in ponds and its utilization as a useful commodity worldwide is less than 50%. The main utilization mode of the ashes is as a partial substitute for other materials in cement, sand or aggregates, in concrete for civil engineering projects.

An appreciable percentage of the coal ash produced, contains large amounts of basic elements (mainly aluminosilicate with appreciable lime- CaO content) that can be used for neutralization of acidic wastes. The small ash particles (1-35 μ m) also have a relatively large surface area and contain aluminate ($-AlO_2^-$) and silicate ($-SiO_3^-$) anionic groups at their surface. Thus, coal ash has excellent adsorption properties.

We have shown that coal ash is an excellent neutralization and fixation reagent for acidic industrial wastes especially from the phosphate industries and efficiently traps toxic trace elements and organic contaminants. The scrubbed product proved to be a nonhazardous waste according to the improved EPA TCLP 1311 method and the European Compliance test 14257 or the CALWET methods.

In addition, coal ash can be used as a partial substitute to cement or sand in concrete to be used for industrial projects. Thus, coal fly ash is a valueable commodity with an actual added value that can reduce costs of treatment of toxic industrial wastes and solve storage problems of the ash and the waste upon its incorporation in industrial concrete as a green product.

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