J. Int. Environmental Application & Science, Vol. 7 (5): 847-857 (2012)

Contributing to Ecosystem Conservation via Utilization of Beneficiated High Carbon Fly Ash for Greener Cement Production[#]

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Accepted June 06, 2012

Abstract: Fly ash represents the particulate matter captured from exhausted gases of coal burning thermal power plants by electrostatic precipitators. Fly ash is a byproduct of coal combustion and it contains many different mineral matters such as carbon, iron oxide and sulphur. Fortunately, fly ash is a desirable raw component in several product applications. However this requires that, as with any other "raw" products, the fly ash meets certain specifications dictated by the ultimate product application. Unburned carbon in fly ash is usually undesirable since it can hamper its utilization. Fly ash with a high volume of unburned carbon not only indicates poor combustion efficiency, which results in a high emission of pollutants and higher fuel requirement, it also prevent power plants from selling the coal fly ash to secondary markets for recycling. Current ash beneficiation technologies focus on dealing with the unburned carbon (UBC) in fly ash since the most plentiful use of fly ash is in the manufacture of cement and concrete. Like many other industries, the cement sector is a resource intensive business. It affects and depends on the biodiversity and ecosystems. The production of cement and aggregates depends on long-term access to raw materials acquired through quarrying, which as activity has an impact on ecosystems. The deforestation that occurs due to soil excavation affects the bio-diversity. Cement is already the 3rd largest man-made source of carbon dioxide - more than 3.3 billion tones of it a year. Because of all the construction going on around the world, cement's carbon footprint is growing rapidly. The "green" materials are considered as materials that use less natural resources and energy and generate less CO_2. Using fly ash can reduce the total amount of energy needed to make cement. Furthermore substituting pozzolans like fly ash for cement clinker can reduce the most significant environmental impact of the manufacturing process and the demand for carbon-intensive Portland cement. The utilization of waste materials for new products rather than land disposal in addition to supporting sustainable development principles contributes directly to the conservation of ecosystems and environmental protection. This paper provides an overview of the current technologies available for fly ash beneficiation, with a focus on the production of greener fly ash cement from beneficiated high carbon fly ash.

Key words: *Ecosystem preservation, beneficiated high carbon ash, green cement production.*

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[#]*This paper has been presented at ICE-2012 Tirana, Albania*