

Wood Ash: As A New Source of Pozzolanic Material

By Tarun R. Naik

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ABSTRACT

Wood ash is generated as a by-product of combustion in wood-fired power plants, paper mills, and other wood burning facilities. Since wood is a renewable source of energy and environmentally benign friendly material, there will be increased use of wood in energy production in the future. As a result, there will be increased amount of wood ash generation. Currently, most of wood ash generated in the USA is either landfilled or applied on land as a supplemental fertilizer. The cost of landfilling is increasing due to passes of strict environmental regulations and limited availability of landfill space. Presence of heavy metals and/or high alkalinity in wood ash may limit its application on land under a stricter environmental regulation. In the light of these, it has become essential to develop beneficial uses of wood ashes to solve the problems associated their disposal. Wood ashes were divided in to two major classes of fly ash and bottom ashes. Knowledge of various properties of wood ashes such as such as physical, chemical, and microstructural properties would be necessary to establish beneficial applications for them. These properties depend heavily upon several factors including type and source of wood, design and operating parameters of the boiler (especially combustion temperature), and ash collection technique. This investigation was performed with a view to establish various physical, chemical and microstructural properties of wood ashes derived various sources in the USA and to determine potential uses of wood ashes in cement-based construction materials. Wood ash is generated as a by-product of combustion in wood-fired power plants, paper mills, and other wood burning facilities. Since wood is a renewable source of energy and environmentally benign friendly material, there will be increased use of wood in energy production in the future. As a result, there will be increased amount of wood ash generation. Currently, most of wood ash generated in the USA is either landfilled or applied on land as a supplemental fertilizer. The cost of landfilling is increasing due to passes of strict environmental regulations and limited availability of landfill space. Presence of heavy metals and/or high alkalinity in wood ash may limit its application on land under a stricter environmental regulation. In the light of these, it has become essential to develop beneficial uses of wood ashes to solve the problems associated their disposal. Wood ashes were divided in to two major classes of fly ash and bottom ashes. Knowledge of various properties of wood ashes such as such as physical, chemical, and microstructural properties would be necessary to establish beneficial applications for them. These properties depend heavily upon several factors including type and source of wood, design and operating parameters of the boiler (especially combustion temperature), and ash collection technique. This investigation was performed with a view to establish various physical, chemical and microstructural properties of wood ashes derived various sources in the USA and to determine potential uses of wood ashes in cement-based construction materials.