

Use of Sugar Cane Ash in The Production of Concrete: A Critical Review

Jessica Diaz, Isabela Noury, Jude Lori Saint Rome, Justin A. Tagle, Fazil Najafi

University of Florida

Extended Abstract

The production of cement generates significant environmental impacts, such as the discharge of CO₂ gases into the atmosphere. Portland cement is responsible for about 5-8 percent of global CO₂ emissions. This issue calls for the need of more environmentally friendly ways of producing and reducing the cement used in concrete. Researchers are investigating methods using industrial and agricultural waste as a partial replacement for cement and studying their effects to curb this impact. Sugarcane ash, which is currently being discarded as hazardous landfill, can be used as a partial replacement for cement in concrete, making it a "greener choice" in the production of concrete. Also known as sugarcane bagasse ash, or SCBA, this substitute can increase the strength of the concrete while lowering the harmful emissions. Typical tests substitute around 5-10% of the concrete with SCBA. The light-weight nature of SCBA proves to be another attractive factor as it has physical similarities to Portland cement. SCBA can also add a black pigment to the concrete, eliminating the need for pigmentation that can be harmful to the environment as well. Additionally, other characteristics that define SCBA include strength, durability, and the ability to reduce permeability of concrete. The SCBA byproduct is created in abundance in countries where sugarcane and alcohol are produced. In addition to being the most critical ingredient, cement is typically the costliest component in concrete production. Up to a 30% reduction of cement ensues when SCBA is included in the mix, further establishing its economic benefits.