EXPLORATORY STUDY ABOUT RICE HUSK ASH AS PARTIAL SUBSTITUTE OF CEMENT IN CONCRETE APPLICATIONS

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ABSTRACT

Rice production is highly important for economy of Brazil. The residual husk of rice production is usually burned and causes a worthless ash for agriculture. Rice husk ash has high silica content. As silica is one of the most used pozzolanas in construction industry, rice husk ash is expected to develop pozzolanic activity in concrete. Considering the specific case of Montes Claros region in Brazil, an exploratory study with the goal to check the effect in the concrete properties when cement is partially replaced by rice husk ash was carried out. Concrete specimens were produced in the laboratory with 0%, 5%, 10% and 15% of cement replacement by rice hush ash. The slump was measured just after mixing, and the compressive strength tested at the ages of 1, 3, 7 and 28 days. A summarized economic analysis was done considering the locations of site production of the rice husk ash and the expected location of the concrete plant. After the analysis, it was found that the procedure brought benefits for the 5% and 10% replacement. However, due to the distance between the city and the large-scale rice production sites, the high cost and high energy expenditure related to the material's transportation make it economically and ecologically unworkable for product use in Montes Claros in Brazil.

Keywords: Cement, Concrete, Pozzolan, Rice Husk Ash, Waste

INTRODUCTION

'Oryza sativa', widely known as rice is a plant of the grass family, which stands out for its production and cultivation area, playing a strategic role for both the economic and social issues. Its seed (rice) is part of the diet of a large part of the population, being cultivated and consumed on all Continents [1]. According to the FAO (Food and Agriculture Organization of the United Nations), in 2017 the world production of rice reached 769.7 million tons, being classified as the second largest crop in terms of production [2]. According to data published by EMBRAPA (Brazilian Agricultural Research Corporation), in 2017 Brazil produced more than 12.5 million tons of rice, being the largest producer of this crop among countries outside the Asian continent [1].

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