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Review Article

Compressive Strength of Concrete using Fly Ash and Rice Husk Ash: A Review

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Abstract

Decreasing our over-reliance on cement as an ingredient in the making of concrete due to its contribution to the CO_2 emissions has led to numerous researches been conducted to find suitable replacement for cement in concrete mixes. Materials like fly ash, ground granulated blast furnace slag, silica fume, rice husk ash and metakaolin among others have been identified as materials that can at the very least be used as a replacement for cement in concrete mix. These materials are referred to as supplementary cementitious materials (SCMs). This paper reviewed the work that has been done on the use of fly ash and rice husk ash as partial replacements for concrete, its chemical composition and its effect on the compressive strength of concrete. Charts, tables and figures were employed as tools to study the various chemical compounds of fly ash and rice husk ash. It was seen that depending on how the coal or rice husk was initially processed the percentage of some of the minor compounds like Sodium oxide (Na_2O), Titanium oxide (TiO_2) and Phosphorus pentoxide (P_2O_5) were sometimes very low or not recorded as part of the final product. The data on the compressive strength of concrete after fly ash and rice husk ash had been added in percentage increments of 0%, 10%, 20%, 30%, 40%, 50% and 0%, 5%, 7.5%, 10%, 12.5%, 15% respectively analysed over a minimum period of 7 days and a maximum period of 28 days found out that the optimal percentage partial replacement of fly ash and rice husk ash for a strong compressive concrete strength is 30% of fly ash and 7.5% of rice husk ash.

Keywords: Compressive Strength; Rice Husk Ash; Fly Ash; Concrete; Chemical Properties.

1. Introduction

Industrialization and urbanization, population growth, globalization of the economy market and consumerism and environmental pollution are the main factors which contribute to the social and economic changes in the society. These factors have caused another phenomenon; climate change. This is resulting in dangerous issues to humanity [1].

Negative environmental impacts associated with widespread use of cement has led researchers to take giant steps concerning the advancement of tools and materials with the aim of decreasing the over-reliance of cement in the production of concrete and masonry building materials [2].

Environmental protection and conservation are a big problem in a global context. The construction industry is increasing at an exponential rate and this has an impact on the demand for construction materials [3]. The rapid advancement of globalisation and the increase in population growth has caused an increase in building construction which has subsequently resulted in a greater demand for building materials [4]. Currently, sustainable development is one of the most interests around the world [5].

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