

Utilization of Wood Ash as Partial Replacement of Cement in Concrete – A Review

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Abstract

Wood ash (WA) is the residue obtained from combustion of wood and its products by burning it with an average temperature of 700 ° C in open field. Wood ash can be used as partial replacement of cement in concrete to increase the strength and thermal insulation for cement blocks. Mineralogical, elemental, Physical and chemical characteristics as well as influence of utilization of wood ash as partial replacement of cement in concrete on different properties of concrete have been reviewed in this paper. The strength properties of concrete decreased marginally with increase in wood ash as replacement of cement, but later increased with age increases. The workability increases with increase in wood ash content but at higher replacement it was low that extra water needed to be added. Hence, the results also depend on the water: cement ratio. It was concluded that WA could be blended with cement without adversely affecting the strength properties of concrete within certain limits. Usage of Wood Ash from 10% to 15% as partial replacement of cement is advisable.

Keywords: Concrete, Wood Ash, compressive strength, workability, Flexural strength, durability.

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Effect of Fly Ash and Rice Husk Ash on setting time of Ordinary Portland Cement

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Abstract

The aim of this research work is to make the suitability of industrial waste materials such as Indian fly ash and rice husk ash as a part of cement and study the effect of these materials on the setting time of the cement. The use of both fly ash and rice husk ash as a part of cement is a new dimension cement, if applied on large scales would revolutionise the construction industry, by economizing the cost of cement and decreasing the ash content in the environment. Fly ash contains mainly silica, alumina and iron with small amounts of calcium, magnesium sulphate, etc. Rice husk ash is a material, which has cementitious properties and contains a high content of amorphous silica; rice husk ash can be successfully used as supplementary cementitious material or can be used as a part of cement but in small proportions. In this research work, the fly ash¹, RHA² and both¹² have been blended with the cement in varying proportions ranging from 0 to 30% for the determination of setting time in each case. The result shows that when only fly ash is blended with cement, the Initial setting time of the cement increases with the increase in the percentage of fly ash but the final setting time of the cement decreases. In the second case when only RHA is blended with cement, both the initial and final setting time of the cement increases with the increase in the percentage of RHA varying from 0-30%. In the third case when both fly ash and RHA are blended with cement, both the initial and final setting time of the cement increases with increase in the percentage of RHA and decrease in the percentage of Fly ash.

Keywords: Setting Time, Rice Husk Ash, Fly Ash.

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Performance Analysis of Photovoltaic Module using SIMULINK and SIMELECTRONICS

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Abstract

The objective of this paper is to investigate the design parameters current-voltage and power-voltage characteristics of the photovoltaic module (PV). The Simulink model of photovoltaic module is designed and designated as Model-A. Further, the model of solar cell is developed using SimElectronics. The presented physical model is designed using two series and two parallel solar cells. The target of connecting cells in series or parallel is to consider the effect on short circuit current and open circuit voltage of the cells. The number of cells are repeated in series to develop the selected PV module and the corresponding simulation model is simulated for environment dependent parameters i.e. solar irradiance and operating temperature. This model is designated as Model-B of PV module and will be compared with the existing one and Model-A to analyze the optimized results. It is concluded that design of Model-B presented better results in comparison of Model-A of PV module.

Keywords: Photovoltaic Module, Simulink, SimElectronics, Current Voltage and Power Voltage characteristics, Solar Irradiations, Operating Temperature etc.

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Utilization of Manufactured Sand in Concrete Production: A Review

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Abstract

Concrete is the most popular material used in construction industry. Cement, sand, water and aggregates are the main constituents of concrete. Natural sand is the mostly used material as fine aggregate in concrete. River sand is obtained using various mining processes on river beds which creates a lot of environmental issues. To conserve the natural resources for sustainable development, mining of sand from rivers is banned by the Government. Good quality of sand is available only at some extent or it is not easy transport from far distances. So, it is very important to find an alternative to natural river sand. Many researches are going on for the replacement of fine aggregate by various materials. The easiest & cheapest alternative to river sand is Manufacturing sand (M-sand). M-Sand is a new structural material produced by crushing stones into required size and grade using suitable methods. M-sand is also known as artificial sand or crushed rock sand. The aim of this review paper is to present the knowledge regarding utilization and production of M-sand. It will help to develop a new material for the replacement of aggregates from natural to manufacture material. It will also provide a new knowledge for the management of resources and economy in concrete production.

Keywords: Manufactured sand, Scarcity of Natural sand, sand replacement, Eco-friendly construction material, Strength.

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Centralized Versus Decentralized Wastewater Treatment and Reuse: A Feasibility Study for NITTTR Campus, Chandigarh

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Abstract

In recent times we have witnessed the emergence of a water availability crisis due to scarcity and pollution of water resources. One of the major causes of water pollution is the widening gap between wastewater generation and treatment which has necessitated a paradigm shift from centralized to decentralized wastewater treatment and onsite reuse. The manuscript attempts to answer the question whether decentralization can be termed as an effective solution to deal with the limitations of centralized wastewater treatment. The scope of decentralization has been explored by means of a feasibility study of decentralized wastewater treatment and onsite reuse in NITTTR campus, Chandigarh. The feasibility study takes into consideration the guidelines, appropriate technology and potential reuse options associated with the adoption of decentralized wastewater management. The purpose of the feasibility study is to determine the saving in freshwater use that can result from adoption of decentralized waste water management and onsite reuse.

Keywords: decentralized wastewater treatment; feasibility study; guidelines; technology; Wastewater recycle and reuse.

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Influence of ALCCOFINE on Strength Characteristics of Concrete of Different Grades

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Abstract

This study has been done to evaluate the performance of concrete using supplementary cementitious material such as Alccofine. Due to demand in construction industry, the need of developing high performance concrete is increasing. Over the past few years, many efforts have been made to improve the performance of concrete and with all those efforts it has been observed that the cement replacement materials along with chemical admixture can improve the strength characteristics of concrete. One of the material commonly in use is Alccofine which is a pozzolanic material that can be utilized to produce high performance concrete composites. The study investigates the performance of concrete mixture in terms of compressive strength and flexural test at 7 and 28 days. Results shows that concrete incorporating Alccofine have improved strength properties.

Keywords: High performance concrete, Alccofine, Cement, Compressive Strength etc.

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Performance Comparison of PAPR Reduction Techniques

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Abstract

Orthogonal frequency division multiplexing (OFDM) is a prominent technique for digital communication systems. A major disadvantage of this system is the high peak-to average power ratio (PAPR) due to superposition of subcarrier signals which results in distortion. In this paper we have analysed and compared PAPR reduction techniques for conventional OFDM, differentially encoded OFDM and Space Time Block Coded (STBC) OFDM systems. The adaptive suboptimal Partial Transmit Sequence (PTS) algorithm has also been simulated. We have analysed sub optimal PTS algorithm using STBC Alamouti coded OFDM and the results showed significant improvement in PAPR and reduced complexity compared to conventional OFDM systems. A Cross Antenna Rotation and Inversion (CARI) which is used to reduce PAPR is also simulated for STBC OFDM systems.

Keywords: Peak to average power ratio (PAPR), Selective mapping (SLM), Partial transmit sequence (PTS), Repeated Clipping and Filtering (RCF), Cross Antenna Rotation and Inversion (CARI).

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