



A Scalable Approach towards Significance of Rice Husk Ash in Various Applications

S.SHIVA PRAKASH REDDY

B.Tech Student
 Department of CE
 Guru Nanak Institute of Technology
 Hyderabad, T.S, India

B.RAJA VARDHAN REDDY

Assistant Professor
 Department of CE
 Guru Nanak Institute of Technology
 Hyderabad, T.S, India

S.PRASHANTH

B.Tech Student
 Department of CE
 Guru Nanak Institute of Technology
 Hyderabad, T.S, India

S.MADAN MOHAN

Professor & HOD
 Department of CE
 Guru Nanak Institute of Technology
 Hyderabad, T.S, India

Abstract: In numerous countries which are rice producing, rice husk is one of most extensively obtainable agricultural wastes. Rice husk is extraordinarily high in ash when considered to other biomass fuels. Rice husk ash is used in several applications. Because of less importance, removal of rice husk during the process of rice refining, produce disposal problem Commercial usage of rice husk as well as its ash is considered as an alternative solution for the problem of disposal. Rice husk burning in ambient condition will leave a residue recognized as rice husk ash. In our work we make a study on various properties and advantages of rice husk as well as its ash. An attempt was made for collection of information from a variety of research work that is related to rice husk and its ash. The usage of rice husk ash significantly gets better the strength of cement mortar.

Keywords: Rice Husk Ash, Cement, Agricultural Wastes, Biomass Fuel, Disposal.

I. INTRODUCTION

In the most of countries where rice is produced, for the most of much of husk produced from rice processing is moreover burnt or else discarded as waste. Managing of rice husk is challenging because of its low density. Rice husk ash is considered as an important threat that causes damage to an area where it is dumped. In our work we study various properties and advantages of rice husk as well as its ash [1]. An effort was made for collection of information from a variety of research work that is related to rice husk and its ash. Presence of more quantity of silica makes it an important material for usage in industrial application. Numerous factors that make an influence on ash properties are crop variety, usage of fertilizer, temperature, duration, rate of heating and burning method. Rice husk ash is used during making of high quality flat steel and in several applications as an outstanding insulator, containing very well insulating properties that include low thermal conductivity, low bulk density, a high melting point and high porosity. Rice husk ash is in usage of refractory bricks manufacturing due to its insulating properties and has been used in manufacture of low-priced as well as lightweight insulating boards. Applicability of rice husk ash that is to be used for various applications relies on several husk properties of physical and chemical for instance content of ash and content of silica and so on. The usage of rice husk ash considerably improves the strength of cement mortar. For

reduction of emission of damaging green house gasses, usage of cement have to be substituted by other eco-friendly as well as resourceful material for instance fly ash [2][3]. It moreover ensures accurate utilization of fly ash, in an effectual means which if not been dumped by making to environmental threat.

II. METHODOLOGY

Burning of rice husk in the atmosphere of ambient will leave a residue known as rice husk ash. We study various properties and advantages of rice husk as well as its ash. Direct usage of rice husk as fuel was observed in power plants. Other than usage of rice husk as fuel, it can be used as source raw material meant for synthesis as well as improvement of novel compounds. Rice husk ash is employed in manufacture of refractory bricks due to its insulating properties and has been used in manufacture of lightweight insulating boards. Ash of rice husk has been used in a variety of industrial applications for instance cement, processing of steel and so on. Suitability of rice husk ash principally depends on chemical composition of ash, mostly of silica content in it. Rice husk ash is found to be advanced when compared to other materials such as slag, silica fume as well as fly ash. Rice husk ash was used as silica source in support of cordierite production. The adding up of rice husk ash for cement paste makes improvement in initial as well as final setting time at the replacement level. Rice husk ash appropriateness that is to be used for various applications relies on

several husk properties of physical and chemical for instance content of ash and content of silica and so on. Because of presence of huge silica content within ash, silica extraction is reasonable. Silica is moreover precipitated in modified forms to meet up the needs of several uses. Presence of more quantity of silica makes it a significant material for usage in industrial application. In studying of strength of materials, compressive strength is ability of a material to endure loads tending to decrease size which is measured by means of plotting applied force that is against deformation in testing machine. The water demand in support of standard consistency linearly enhances by means of an increase of cement replacement level by rice husk ash. There are several tests performed on rice husk ash such as fineness test that is completely done by hand so that that there exists additional accurateness in experiment [4]. Specific gravity test determines specific gravity which is the ratio among weight of a given volume of material as well as weight of an equal capacity of water. Several materials fracture at compressive strength limit; others distort irrevocably, hence a specified amount of deformation might be considered as limit for compressive load. Compressive strength is an important value for designing of structures.

III. AN OVERVIEW OF PREPARATION OF RICE HUSK ASH

Usually burnt rice husk is collected for making of brick kiln and the material is burnt for a period of one month constantly under open air conditions. After that it is left to air for one day of cooling period with the intention that bricks get harden and at the same time the rice husk moreover cools and later rice husk is collected into bags. The rice husk that is burnt is grinded in ball mill machine hence a fine powder is obtained which is moreover called as rice husk ash. Before grinding we need to observe that whether there are no sand as well as stone particles in raw material. Raw material has to be collected rapidly subsequent to cooling or else there is observation of moisture content in air that results its effect in normal constancy as well as specific gravity test. It is essential to make sure quality of cement on site at preliminary examination. It is not promising to make sure the entire engineering qualities of cement however there exist several field tests that give us a rough thought of quality of cement. It is necessary that cement set neither too quickly nor too slowly and in first case there may be unsatisfactory time to convey and position concrete earlier than it becoming too inflexible; in second case too long a setting time period have a tendency to reduce work excessively, also it may put off real usage of structure due to insufficient strength at required age. Setting refers to gain in mechanical strength subsequent to convinced degree of resistance to

penetration of particular attachment that is pressed into it. Setting time is time necessary for hardening of cement paste to a described constancy. Initial setting time is time when paste loses its plasticity and this test is significant for transportation, placing as well as compaction of cement concrete [5]. On rice husk ash fineness test is completely done by hand so that that there exists additional accurateness in experiment. The test of specific gravity is the ratio among weight of a given volume of material as well as weight of an equal capacity of water. In studying of strength of materials, compressive strength is ability of a material to endure loads tending to decrease size which is measured by means of plotting applied force that is against deformation in testing machine. The water demand in support of standard consistency linearly enhances by means of an increase of cement replacement level by rice husk ash. Duration of Initial setting time is necessary to hold-up procedure of hardening. Final setting time is time when paste totally drops its plasticity and it is the time considered for the cement paste to solidify adequately and achieve shape of mould in which it is spread. The usage of rice husk ash considerably improves the strength of cement mortar [6]. The addition of rice husk ash for cement paste makes improvement in initial as well as final setting time at the replacement level. Determination of final setting assists protected exclusion of scaffolding. During period of time primary reaction of cement by water is finished.

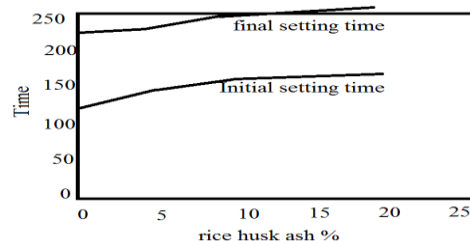


Fig1: An overview of Initial and final setting time verses rice husk ash percentage.

IV. CONCLUSION

Practice of cement has to be substituted by other eco-friendly as well as resourceful material for reduction of emission of damaging green house gases. Due to less importance, elimination of rice husk during the process of rice refining, produce disposal problem. Commercial utilization of rice husk as well as its ash is considered as an alternative solution for the difficulty of disposal. rice husk ash is produced by burning of rice husk in the atmosphere of ambient. In our work we make a study of various properties and advantages of rice husk as well as its ash. An attempt was made for collection of information from a variety of research work that is related to rice husk and its ash. Suitability of rice husk ash mainly depends on




chemical composition of ash; mostly of silica content in it. The utilization of rice husk ash significantly improves the strength of cement mortar. The adding up of rice husk ash for cement paste makes enhancement in initial as well as final setting time at the replacement level. The water demand in aid of standard constancy linearly enhances by means of an increase of cement replacement level by rice husk ash.

V. REFERENCES

- [1] Ganesan , K. Rajagopal, K . Thangavel, 2007, " Rice Husk Ash Blended Cement Assessment of Optimal Level of Replacement for Strength and Permeability Properties of Concrete ," Construction and Building Materials .
- [2] Habeeb, G.M., 2000, "Residual Mechanical Properties of High Strength Concrete Subjected to Evaluated Temperatures", Ph.D, Thesis, University of Al-Mustansiriyah, College of Engineering, November.
- [3] Ganesan , K. Rajagopal, K . Thangavel, 2007, " Rice Husk Ash Blended Cement Assessment of Optimal Level of Replacement for Strength and Permeability Properties of Concrete ," Construction and Building Materials .
- [4] Mahmud, H. B., Koay , Y.C.N. Hamid , B.A.A., and Zain , M.F.M., 2004." Use of Rice Husk Ash to produce High Strength / High Performance Concrete," National University of Malaysia.
- [5] Mehta PK, 1979, "The Chemistry and Technology of Cement Made from Rice Husk Ash, " UNIDO / ESCAP / RCTT. In proceeding of Work Shop on Rice Husk Ash Cement, Peshawar, Pakistan, Bangalore, India: Regional center for Technology Transfer.
- [6] BS. 1881- part 4, 1989, "Method for Determination of Compressive Strength of Cement Mortar", British Standard.

VI. AUTHORs PROFILE

	<p>Shiva Prakash Reddy swarigari was born on 1995 at medak district, telengana. He is pursuing his Bachelor of Technology degree in Civil Engineering from Guru Nanak Institute of Technology, Jawaharlal Nehru Technological University Hyderabad. At present he is Final year student in civil department from Guru Nanak Institute of Technology, JNTU Hyderabad.</p>
---	--

	<p>Sri Ram Prashanth was born on 1993 at karimnagar district, telengana. He is pursuing his Bachelor of Technology degree in Civil Engineering from Guru Nanak Institute of Technology, Jawaharlal Nehru Technological University Hyderabad. At present he is Final year student in civil department from Guru Nanak Institute of Technology, JNTU Hyderabad.</p>
	<p>Raja Vardhan Reddy Boddu was born in 1991 at Nizamabad district, Telangana. He received his Bachelor of Technology degree in Civil Engineering from Guru Nanak Institute of Technology, Jawaharlal Nehru Technological University Hyderabad in 2013. At present he is Final year student of Master`s Degree in Structural Engineering from Guru Nanak Institute of Technology, JNTU Hyderabad.</p>
	<p>Prof. S. Madan Mohan received his Bachelor of Technology degree in Civil Engineering from JNTUCE Hyderabad in 1998. In 2001 he received his Master's Degree in Structural Engineering from University College of Engineering Osmania University, Hyderabad. He joined Gurunanak Institute of Technology as a faculty where he is a Professor and Head of the Civil Engineering Department with a total experience of 17 years in field of Research, Designing and education. He is guiding M.tech Thesis work in field of Civil/ Structural Engineering. He has papers published in National Conferences and International Journals.</p>