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**A REVIEW ON UTILIZATION OF RICE HUSK ASH IN CONCRETE****Prof. V. N. Kanthe\*<sup>1</sup>, Tanmayee Dighe\*<sup>2</sup>, Dhanshree Jagale\*<sup>3</sup>, Archana Sanap\*<sup>4</sup>,  
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**ABSTRACT**

This paper presents review on the use of Rice Husk Ash (RHA) in concrete. The objective of this paper is to review the use, effects and performance of RHA on concrete. The effect on different properties of concrete i.e. workability, strength, and durability of RHA concrete. From the review of it is found that RHA can be used as replacement of cement and sand. In various researches it was found that replacement for cement and sand with RHA at different percentage from 5 to 25 %. The optimum replacement percentage of cement and sand is ranges between 5 to 10% with improving in properties of concrete. In the literature it is seen that very less study on replacement of sand by RHA is done, hence this study need more research.

**Key words:** Concrete, Rice Husk Ash, Strength, Durability, Workability.

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**I. INTRODUCTION**

In construction industry concrete is one of the most essential and extensively used material for construction work and its demand continuously increasing. Construction industry largely depends on cement, fine aggregate and coarse aggregate for the production of concrete. Among these ingredients cement is an very expensive and demanding material. In construction sand is just as important as cement. The sand used in concrete for construction is obtained by mining of sand. The sand found in beds, river and lakes is best for construction. To meet demand sand is extracted from natural sources i.e. rivers and lakes. Consumption of sand is more as compared to formation of sand. Mining of sand has major negative impacts on climate, marine ecosystem, infrastructure, biodiversity, river, deltas, Hydrological function etc. Due to extraction of sand loss of land, lowering of water level, change in water turbidity, landscape, pollution of river, flood regulation related problems occur.[1] Hence it is important to find out substitute for cement & sand. After China, India is counted as second largest rice producing country in whole world. Rice hull is a outer shell of rice grain. It is a agricultural type of waste which is obtained by separating rice from its outer shell of. This obtained waste during the processing of rice is burned or dumped in open area that causes pollution and consumption of land due to its disposal problem. Rice husk ash is a ash which can is produced by burning all type of rice hull. RHA is pozzolanic material and it can be use in concrete as partially replacing material. Amorphous silica content is present in RHA[2]. By utilizing RHA in concrete environmental damages, waste treatment cost, contamination of water can be reduce.Fig.1 shows the particle of RHA.

**II. LITERATURE REVIEW****Effect of RHA on Strength of Concrete:**

The effect of rice husk ash on strength of concrete as replacement of cement and sand it was seen that compressive strength of the concrete improved by using RHA as partial replacement of cement. The influence of rice husk ash as cement replacement by different percentages was discussed and they made conclusion at 10% replacement of cement with RHA shows improvement in compressive strength [3]. It was investigated the effect of partial replacement of cement by rice husk ash, and waste of limestone powder & wood fibre. The result shows compressive strength of sample increased when RHA content increase compared to other [4]. It was reported that compressive strength of concrete made by using different proportion of RHA first increased up to 10%, after it decreases. The optimum percentage of cement replacement was reported with RHA 7.5% for both compressive and split tensile strength [5]. The research on replacement of cement by RHA and plastic fibre result shows that the replacement of 5% & 10% RHA with 1% & 2% plastic fibres enhance compressive

strength and split tensile strength of concrete [6]. From the literature it was seen that up to 15% RHA replacement the compressive strength of concrete is increase [7].

#### **Effect of RHA on Workability of Concrete**

In the comparison of workability of weight and volume batches concrete in which fine aggregate replaced by rice husk ash and conclude that loss of workability in weight batched rice husk concrete is more as compared to volume batched rice husk concrete [8]. Cement was partially replaced by mix of rice husk and fly ash up to 30%. Based on result they made conclusion that workability goes decreased as RHA content increases in concrete [9]. Reported that workability goes decrease as rise in RHA content in concrete. From the result they conclude optimum percentage of RHA is 5 to 10 % [10]. The workability test of concrete for replacement of cement by 10% RHA the workability of concrete shows less compared to normal concrete [11]. For RHA as replacement of sand in preparation of foamed concrete it was seen that by replacing sand with RHA shows reduction in workability as increase in volume ratio of RHA [12]. Based on test result workability of concrete prepared by using RHA and FA goes decreased due to structure and surface of RHA[13]

#### **Effect of RHA on Durability of Concrete**

The research concluded for partially replacing cement at 20% combine with fly ash and RHA shows improvement in durability of concrete is noticed [14]. For water absorption test on concrete specimen using RHA shows reduction in water absorption [7]. It was investigated influence of RHA in concrete for water absorption shows that as content of RHA increases, lead to reduction in percentage of water absorption. Acid attack test result shows that increase in RHA content shows reduction in weight loss. They concluded by using RHA durability of concrete enhanced[15].



**Figure 1:** Rice Husk Ash.

#### **Current Application Of RHA**

The RHA used for various purposes other than concrete like, as a silica source, as a aggregate and partly replacement for cement in concrete, in ceramic glazes as a release agent, in steel industry for production of high quality steel, as a micro silica substitute. Used as insulation powder in steel mills Rice husk ash (RHA) has been widely used as an insulation powder in steel casting tu Its effect on the reoxidation of molten steel as well as on the corrosion of magnesia refractory was investigated.

### **III. CONCLUSION**

Based on review of available literature from various researcher following conclusion are drawn-

1. RHA in concrete as cement and sand replacement shows increase in compressive strength up to 10%.
2. By using RHA as cement as well as sand replacement shows reduction in workability of concrete.
3. Split tensile strength and flexural strength of concrete first increase then gradually decrease as a percentage of RHA is increase.
4. The optimum percentage of replacement of cement and sand by RHA in concrete is found between 5-10 %
5. Current applications of RHA - It is used as filler, oil absorbent in industry, RHA used for making brick, ceramic industry, and polymer industry as a filler in polyethylene as a insulation material.

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