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"AN EXPERIMENTAL INVESTIGATION ON STRENGTH PROPERTIES OF CONCRETE BY USING AGRICULTURAL WASTES (AS SUPPLEMENTARY CEMENTITIOUS) PARTIAL REPLACEMENT OF CEMENT"

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Abstract: Portland cement as ingredient in concrete is one of the fundamental development materials generally utilized particularly in creating nations. The expanding interest for concrete is relied upon to be met by fractional bond substitution. The look for elective fastener or concrete substitution materials prompted the disclosure of possibilities of utilizing modern side-effects and farming squanders as cementitious materials.A portion of the waste items which have pozzolanic properties and which have been considered for use in mixed bonds incorporate Wood ash, sugar cane bagasse ash, Rice husk ash. It is a waste material coming about because of the mechanical processing or preparing of timber into different shapes and sizes. The issues of profitability, economy, quality and condition, they need to rival other development materials, for example, bond, aggregates, sand and so forth.

Keywords - **Portland cement, development, cementitious, pozzolanic, Wood ash, economy.**

Introduction

Concrete is a complicated substance made up of cement paste as the binding agent and coarse and fine particles as the filler. Concrete is a mixture of rock, sand, crushed stone, or other aggregate held together by cement-and-water glue that has hardened under pressure. When the ingredients are properly combined and proportioned, a plastic mass that may be hurled or moulded into a predetermined size and shape is created. Infinite supply of cement by the water produces concrete that is visibly stone-like in quality and hardness and is useful for a variety of purposes. The most used type of construction material worldwide is concrete. It is created by mixing water, cement, fine and coarse aggregates, and other approved amounts of additives. Concrete has been used in a wide range of construction projects, from the most beautiful and elegant of buildings to parkways, channels, linings, scaffolds, and dams. It has evolved into the best auxiliary material with the increase of reinforcement to provide the necessary elasticity, advances in fundamental outline, and the usage of pre-pushing and post-tensioning. Aggregate is essential to concrete's most fundamental qualities and usability. According to J.W. Kelly (2001), "In contrast to other building materials, concrete is used for each of these applications as well as several others that one would not contemplate using wood, steel, or black top for. In fact, concrete is typically used in conjunction with another material for specialised tasks even when it forms the bulk of a structure. It is used to surface, fill, encapsulate, and assist. Concrete needs to be more widely known than other particular materials.

I. OBJECTIVES OF THE PRESENT STUDY

To investigate the effects of waste products such as wood ash, sugarcane bagasse ash, and rice husk ash on the durability of concrete.

Using various waste resources, such as wood ash, sugarcane bagasse ash, and rice husk ash, in place of standard building materials like cement.

To identify the ideal dosage of substitute materials, such as rice husk, sugarcane bagasse, and wood ash as partial replacements for cement, in order to achieve the desired strength.

The inquiry focuses on comparing the performance of concrete made from different waste materials, including rice husk, sugarcane bagasse, and wood ash.

III LITERATURE SURVEY

Celik et al. (2014) compared the effects of Portland cement replacement on self-consolidating concrete's strength and durability (SCC). The current investigation uses two types of material replacements: high-volume natural pozzolanic (HVNP) Saudi Arabian basaltic glass rich in aluminium silica and high-volume class-F fly ash from the Jim Bridger power plant in the United States (HVFAF). For the purpose of extending the investigation, Portland cement is also replaced with a limestone filler (LF) and either HVNP or HVFAF. The current findings are compared to two concretes that were filled with 15% limestone and 85% ordinary Portland cement (OPC) by mass. Additionally, when compared to the reference concretes, the HVNP and HVFAF combinations demonstrated strength and durability. According to the study, SCC can be produced cheaply and sustainably using HVNP and HVFAF.

Silva et al. (2014) Analyze the recycled aggregates made from C&D waste in terms of their qualities. Following demolition, four types of concrete were found: mixed recycled aggregates (MRA), recycled masonry aggregates (RMA), recycled construction and demolition aggregates, and recycled concrete aggregates (RCA) (CDRA). Due to its high porosity value, RMA was discovered to have a lower density than RCA. Additionally, it was determined that these materials might be used to build highways' subbase layers.

Huda et al. (2014) examined the characteristics of recycled course aggregate up to three generations of usage by completely replacing them. To learn the physical and mechanical characteristics of aggregates, a small sample of 100 x 200 mm and 150 x 150 x 500 mm cylinders were cast. When RA was utilised in place of aggregate, the compressive and splitting tensile strengths were somewhat decreased. The maximum stress and axial strain values for recycled aggregate were the same as those for the standard mix (50 MPa and 0.0027, respectively) (i.e. using natural aggregate). The results of tests on the elastic modulus and the Poisson's ratio indicated that recycled aggregate can be utilised three times.

Malik et al. (2015) has conducted research on concrete testing, using quarry dust as a partial replacement for fine aggregates. For the M-25 mix, quarry dust was used in the amounts of 0, 10, 20, 30, and 40% in place of fine aggregates. At 28 days old, the concrete underwent tests to determine its compressive strength, thickness, and durability (water retention), and the results were compared to those of regular concrete. Expanding the quarry dust content has the impact of increasing workability and compressive quality.

II. DESIGN METHODOLOGY

In this investigation the examination wood cinder, copper slag, quarry clean and concrete strength utilizing dangerous test gear have been done. In this investigation three sorts of squanders materials (quarry clean, copper slag and wood cinder) and typical aggregate were utilized for getting ready solid shape examples. There are M25 of blended extent are used. The concrete pillar, 3D square and barrel arranged on ordinary aggregate and 60% and 40% diverse size 10 mm (40%), 20 mm (60%), use for concrete solid shapes and waste material are used in concrete with the substitution bond of 5%, 10%, 15% & 20%. These shafts, barrel and 3D shapes are tried on 7, 14 and 28 days. The compressive strength, flexural strength, and elasticity are resolved with the assistance of ruinous test types of gear. The bond used as a part of all blenders is standard Portland concrete and characteristic sand is used as a part of the test. The extent of sand is 2 mm to 4.75 micron. It is accepted that the compressive characteristic of concrete 3D shapes at 7 days is 80% of the strength at 28 days.

Table 1 Properties of Cement

Properties	Value	Standard Value
Fineness of cement	8.8 %	Less than 10%
Grade of Cement	OPC (43grade)	OPC (33,43,53)
Specific gravity of cement	3.10 g/cc	3.15 g/cc
Initial setting time	55	Min 30 Minutes
Final setting time	520	Max 600 Minutes
Normal Consistency	31%	26 to 33%

Table 2. Properties of Coarse Aggregate

Properties	Values	Standard Value
Specific Gravity	2.76	2.8-2.9
Size of Aggregates	20mm	20-22 MM
Fineness Modulus	5.96	-
Water absorption	1.0%	0.1 to 2 %
Impact Test	18.2%	<30 %
Crushing Test	25.5%	<25% for wearing surfaces

Table 3 Properties of Fine Aggregate

Properties	Value	Standard Value
Specific Gravity	2.54	2.6-2.9
Fineness Modulus	2.4	2.2-2.6 (Fine Sand)
Water absorption	2.0%	more than 1-1.5% by mass

Figure 1. Split Tensile Strength Test

VI.CONCLUSIONS

Each and every batch of concrete including rice husk, sugar cane bagasse, and wood ash displayed normal consistency on par with or better than the control batch. Up to 5%, 10%, and 15% of replacement, there were only modest variations in the typical consistency; however, at 20% replacement, there had been a slight increase to 35%.Slump demonstrates that when the percentages of pine wood ash, sugar cane bagasse ash, and rice husk ash increase, so does the workability. All of the studied mixes containing wood ash, sugar cane bagasse ash, and rice husk ash showed acceptable workability and height slump values.

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