Study Of Conventional Concrete with Lathe Dust Scrape and Fly-Ash

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ABSTRACT: To enhance the characteristics of concrete; some scrap materials are incorporated besides fly-ash . In this effort a effect of lathe dust (scrap) additives can be combined with concrete to design for specific applications and optimize workability and strength properties.
The fly-ash contributing 1% , 3% , 5% and 7% percentage were used in concrete mixes by volume of cement and lathe dust (scrap) of various proportions i.e. ranging from 1% , 3% , 5% and 7% as additives for each of the concrete mixes of M25 grade as per IS code method of mix design. Super plasticizer was also used in all mixes to make concrete better in workability.
Besides cubes of M25 grade concrete were cast 1% , 3% , 5% and 7% fly ash and different percentages of lathe dust respectively, by volume of cement and identifies its combinations that demonstrate maximum compressive strength of concrete. Finally we obtained that by addition of scrap and mineral admixture the concrete increase their properties as compare to normal concrete mass.

Key Words: Conventional concrete, strength –properties, fly-ash, scrap , lathe dust, industrial waste.

INTRODUCTION

To counteract the cracks, a fighting strategy has come into use, which mixes the concrete with the addition of discrete fibers. Experimental studies have shown that fibers improve the mechanical properties of concrete such as flexural strength, compressive strength, tensile strength, creep behavior, impact resistance and toughness. Among them, polymer fibers and the steel fibers enjoy popularity in the domain of concrete. It is obvious that the behavior of HFRC depends on the aspect ratios, orientations, geometrical shapes, distributions and mechanical properties of fibers in concrete mixtures. from a brittle to a more ductile material.
Cement is a hydraulic binding agent, which means that it's a binding agent that hardens when water is added. The cement type that is used today is called Portland cement, because of its colour which is similar to the colour of stone from the island of Portland. The cement is mainly consisting of four minerals which constitute 90-95% of the blend. These are made up of oxides of calcium (Ca), silicon (Si), aluminium (Al) and iron (Fe). In addition to the "main minerals" the cement contains small amounts of oxides of manganese (Mn), sulphur (S),potassium (K) and sodium (Na) The main minerals in the blend influence its properties like heat generation, development of strength, the final strength and its durability. These properties may be controlled by changing the proportionality of the main minerals. Even though the rest of the minerals make up a small part of the cement, these can have important effects on the cement's properties as well. The potassium- and sodium oxides (the alkalies) are important. They can make the cement harden faster and make it expand. When the different minerals in the cement react with water there will be heat generation. As a result of this it is important to keep the concrete damp while hardening to avoid dehydration and cracking.

LITERATURE REVIEW

Maria Harja et al (2022) they studied that Fly ash wastes (silica, aluminum and iron-rich materials) could be smartly valorized by their incorporation in concrete formulation, partly replacing the cement. The necessary binding properties can be accomplished by a simple procedure: an alkali activation process, involving partial hydrolysis, followed by gel formation and poly condensation. The correlations between the experimental fly ash processing conditions, particle characteristics (size and morphology) and the compressive strength values of the concrete prepared using this material were investigated by performing a parametric optimization study to deduce the optimal processing set of conditions. **Himanshu Gola et al (2021)** has been studied that the effect of incorporating fly ash and steel fibres on the properties of concrete. Fly ash can be utilized in concrete as partial replacement of cement and is gaining importance these days. The quality of fly ash is being improved in thermal plants as of due to Technological improvements. Waste generated from lathe machine which has similar physical properties can be availed as a substitute for steel fibers and this will aslo improve the economy. **K. Karthika et al (2017)** they studied that natural river sand is one of the key ingredient in concrete, now a days it is expensive due to over population and increasing infrastructure projects and also large scale of depletion of natural resources create environmental issues. **Srinivasan.k et al (2016)** they studied that the increasing demand for producing Durable Construction materials is the outcome of the fast polluting environment. Supplementary Cementitious materials prove to be effective to meet most of the requirements of durable concrete. Fly ash and Rice husk ash is found to be greater to other supplementary materials like silica fume. Due to its high Pozzolanic activity, both strength and durability of concrete are enriched. Artificial aggregates are made out of various waste materials. In the current scenario, the disposal problem of industrial by-products like Fly ash, Paper pulp, Municipal Solid waste, Power plant Solid waste, Saw dust, Rice husk ash, Granite powder Iron Ore Dust etc. On the other side, there is a demand on natural aggregates for the growing infrastructure industry, which creates problem of depleting Natural resources and hence a need for Artificial aggregates. The world is much interested in innovative production of alternate material in construction industry recently using industrial byproducts, the large scale utilization of these industrial by products reduces environmental pollution and dwindling of natural resources. Hence there is a need for, the production of artificial

aggregates, which meets present requirement of the construction industry. In the present project on artificial aggregate Manufactured incorporate Fly ash , Rice husk ash and Iron ore dust aggregate are mixed together with cement can produce an artificial aggregate. The Evaluation of Mechanical properties like Compressive strength, Weight loss and Reduction in Strength was monitored up to 56 days and Durability test was conducted on normal cured specimens, for 28 days continuous immersion in Nacl Solution. From the results, it shows that the present manufactured aggregates.

OBJECTIVE OF THE STUDY

The idea behind this study is the utilization of lathe scrap in improvement in the strength of concrete and use of waste for savior of earth. This study aims to have a comparative study between lathe scrap and fly ash concrete at 1%, 3%, 5% and 7% replacement with cement and conventional concrete in M25 concrete.

The main objective of the study is to investigate the change in characteristics strength properties and workability of concrete mixed with different percentage of fly ash with lathe dust. Following are objectives of the study.

- To find out the effect of lathe dust and fly ash on strength when mixed with concrete sample.
- To study the workability of concrete on variation in different material with different percentage of fly ash and lathe dust when mixed with concrete.
- To find out the change in slump value.
- To perform the sieve analysis and specific gravity of aggregate used.

METHODOLOGY

Following test were conducted on prepared samples and materials also as per relevant IS code of Practice:

1. Slump Cone Test
2. Compressive Strength Test

SLUMP CONE TEST

This is a test used extensively in site work all over the work. The slump test does not measure the workability of concrete although ACI 116R – 90 describes it as a measure of consistency, but the test is very useful in detecting variations in the uniformity of a mix of given nominal proportions. The slump test is prescribed by IS: 456 (2000), ASTM C 143 90A and BS 1881 Part 102:1983.

COMPRESSIVE STRENGTH TEST

Compressive strength of concrete depends on many factors such as water-cement ratio, cement strength, quality of concrete material, quality control during production of concrete etc. Test for compressive strength is carried out either on cube or cylinder. Various standard codes recommend concrete cylinder or concrete cube as the standard specimen for the test. Out of many test applied to the concrete, this is the utmost important which gives an idea about all the characteristics of concrete. By this single test one judge that whether Concreting has been done properly or not.

OBSERVATION AND RESULTS

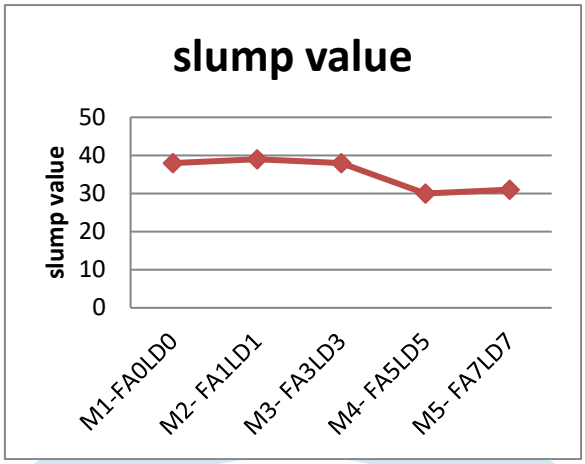
SLUMP CONE TEST

This is a test used extensively in site work all over the work. The slump test is prescribed by IS: 456 (2000), ASTM C 143 90A and BS 1881 Part 102:1983.

SLUMP CONE VALUE OF M25 GRADE OF CONVENTIONAL CONCRETE WITH DIFFERENT % OF FLY ASH AND LATHE DUST SCRAP FOR 28 DAYS

MIX	FLY ASH (%)	LATHE DUST (%)	SLUMP VALUE
M1-FA0LD0	0	0	37
M2- FA1LD1	1	1	38
M3- FA3LD3	3	3	39
M4- FA5LD5	5	5	33
M5- FA7LD7	7	7	32

SLUMP CONE VALUE OF M25 GRADE OF CONVENTIONAL CONCRETE WITH DIFFERENT % OF FLY ASH AND LATHE DUST SCRAP FOR 28 DAYS

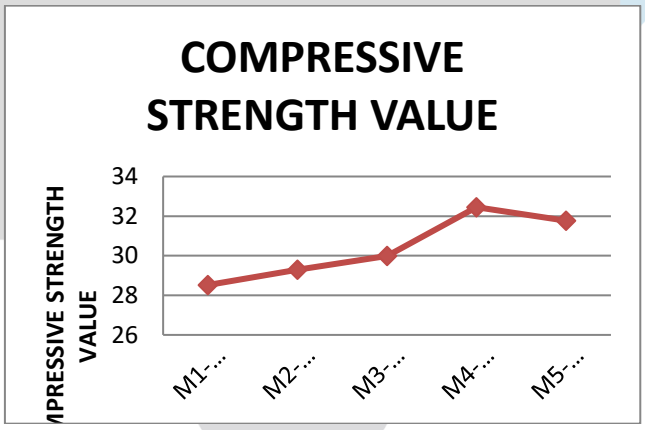


COMPRESSIVE STRENGTH TEST

The compressive strength of concrete is one of the most important Properties of concrete in most structural application concrete is implied primarily to resist compressive stress. This test give us a thought regarding every one of the attributes of cement. With the assistance of this test we can watch that if Concreting has been done appropriately

COMPRESSIVE STRENGTH VALUE OF M25 GRADE OF CONVENTIONAL CONCRETE WITH DIFFERENT % OF FLY ASH AND LATHE DUST SCRAP FOR 28 DAYS

MIX	FLY ASH (%)	LATHE DUST (%)	COMPRESSIVE STRENGTH VALUE
M1-FA0LD0	0	0	27.93
M2-FA1LD1	1	1	28.75
M3-FA3LD3	3	3	28.99
M4-FA5LD5	5	5	34.76
M5-FA7LD7	7	7	32.34



COMPRESSIVE STRENGTH VALUE OF M25 GRADE OF CONVENTIONAL CONCRETE WITH DIFFERENT % OF FLY ASH AND LATHE DUST SCRAP FOR 28

CONCLUSION

The experiment shows that the effect of Fly ash and Lathe dust scrap with normal concrete can still be a promising work as there is always a need to overcome the problem of brittleness of concrete. The following conclusions could be drawn from the present investigation.

The maximum compressive strength of specimen after 28 days is 32.76 N/mm² with 5 % of Fly ash and 5 % of Lathe dust scrap with comparisons of normal concrete and other mix. It is about 15 % increase overcome with normal concrete.

From the above points it can be concluded that Fly ash and Lathe dust scrap is very effective for improving the strength of the concrete. Therefore the performance of the concrete will be improved if proper design and construction methodology is adopted.

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