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A Review Paper on Partial replacement of cement by using fly ash in concrete pavement.

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Abstract: *Cement is a family of different material like binding material (cement+fly ash),fine aggregate,coarse aggregate and water. Today construction cost is very high with using conventional material due to unavailability of natural material .this problem can be solve by total replacement of concrete with different material which is not convenient in term of required properties. Due to this limitation of unavailablility of material which plays the vital role of concrete we have only choice of partial replacement of concrete ingredients by waste material. Fly ash concrete has economical and environmental advantages.it also makes concrete sustainable, the most popular construction material, involves use of cement which is responsible for 7% of the total worlds carbon dioxide emission. Fly ash concrete is an effort in reducing cement content in construction.*

Keywords: *Fly ash replacemet, 10% 20% 30% and 100%*

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I. INTRODUCTION:

Concrete is a composite material consisting mainly of Portland cement and , water, and aggregate (gravel, sand or rock). Which these materials and mixed together, they form a workable paste which then gradually hardens over time. Fresh concrete can be molded into almost shape, giving it an inheretent advantage over other material. M40 grade of concrete has been under in casting concrete cube molded in 15/15. The grade of concrete is defined as the mainimum strength the concrete should have after the completion of 28 days of construction period with proper with proper quality control. The cocrete cubes are casted with 10% 20% 30% and 100% of fly ash added with concrete mixture. The use of fly ashin Portland cement concrete has many benefits and improves concrete performance in both the fresh and hardened state. Fly ash use is also cost effective. The use of fly ash Portland cement (PCC) has many benefits and improved concrete performance in both the fresh and hardened state. Fly ash used in concrete improved the workability of concrete the strength and durability of hardened concrete fly ash is also use is also cause effective. When fly ash is added to concrete the amount of Portland cement maybe reduced.

II. GET PAPER REVIEWED:

Azmat Ali Phula , Muhammad JaffarMemonSyed Naveed Raza Shaha, Abdul Razzaque Sandhu March 2019: This paper investigates the compressive strength properties of concrete with Ground Granulated Blast Furnace Slag(GGBS) and Fly Ash in concrete by partial replacement of cement. The incremental demand of cement in the constructionfield is a concern for environmental degradation, in this regard; replacement of cement is carried out with waste materialsby using GGBS and Fly Ash. On optimum level of GGBS and Fly Ash was assessed with varied percentage from 0 to 30%for different curing days. Replaced concrete were tested with the slump, compaction factor, Vee-bee and compressivestrength. Cement to water ratio was maintained at 0.47 for all mixes. The compressive strength tests were conducted for 3,7, 14 and 28 days of curing on a M25 grade concrete.

A.J.Patel1, Dr.V.M.Patel2, Dr.M.A.Patel3: Concrete is a family of different material like binding material (cement+ fly
ash), fine aggregate, coarse aggregate and water. Today construction cost is very high withusing conventional materials due to unavailability of natural materials. This problem can besolved by total replacement of concrete with different material which is not convenient interms of required properties. Due to this limitation of unavailability of material which playsthe vital role of concrete we have only choice of partial replacement of concrete ingredientsby waste materials.

Syed Asif Ali1 Professor Shaik Abdullah2. PG Student (Structural Engineering): This paper presents a

laboratory investigation on optimum level of Fly ash and Ground Granulated Blast Furnace Slag (GGBS) as a partial replacement of cement to study the strength characteristics of concrete. Portland cement was partially replaced by 5%, 6%, 7%, 8%, 9%,10% of GGBS and Fly ash by 20%, 40%, 60% respectively.The Water to cementations materials ratio was maintained at 0.45 for all mixes. The strength characteristics of the concrete were evaluated by conducting Compressive strength test, Splitting Tensile strength test and Flexural strength test.

Jatale, K. Tiwari, S. Khandelwal, "Effects on Compressive Strength when Cement is Partially Replaced by Fly Ash", IOSR Journal of Mechanical and Civil Engineering, ISSN 2278-1684, Volume 5, Issue 4, Jan.-Feb: The present paper deals with the effect on strength and mechanical properties of cement concrete by using fly ash. The utilization of fly-ash in concrete as partial replacement of cement is gaining immense importance today, mainly on account of the improvement in the long term durability of concrete combined with ecological benefits. Technological improvements in thermal power plant operations and fly-ash collection systems have resulted in improving the consistency of fly-ash. To study the effect of partial replacement of cement by fly-ash , studies have been conducted on concrete mixes with 300 to 500 kg/cum cementious materials at 20%, 40%, 60% replacement levels. In this paper the effect of fly-ash on workability, setting time, density, air content, compressive strength, modulus of elasticity are studied Based on this study compressive strength v/s W/C curves have been plotted so that concrete mix of grades M 15, M 20,M 25 with difference percentage of fly-ash can be directly designed.

P. R. Wankhede, V. A. Fulari, "Effect of Fly Ash on Properties of Concrete", International Journal of Emerging Technology and Advanced Engineering, ISSN 2250-2459, Volume 4, Issue 7, July 2014: The cement is the main ingredient used for concrete. The production of cement involves emission of large amount of carbon dioxide into the atmosphere. Therefore, the search of any other such material which can be used as an alternative to cement should lead to lowest possible environmental impact. The fly ash obtained by combustion of coal can be used as partial replacement for cement owing to its pozzolanic nature, which provides strength to cement. The huge quantity of fly ash being accumulated over the years is likely to pose a serious threat for its disposal and cause environmental problems. In this paper, an effort has been made to determine the effect on compressive strength of concrete by partial replacement of cement with 0%, 10%, 20% and 30% of fly ash for M20 grade of concrete. Test results indicate that workability and durability of concrete increases with increase in fly ash content. It has also been obtained that with increase in fly ash content, there is reduction in compressive strength of concrete. The optimum replacement of cement with fly ash is 30%.

III. RESULT

100%

WEIGHT	LOAD	N/mm^2	AVERAGE
8.682	936	41.6	41.106
8.812	968	43.02	
8.716	871	38.7	

10%

WEIGHT	LOAD	N/mm^2	AVERAGE
8.708	592	26.31	26.54
8.622	578	25.68	
8.826	622	27.64	

20%

WEIGHT	LOAD	N/mm^2	AVERAGE
8.372	618	27.4	27.1
8.750	732	32.5	
8.552	482	21.4	

30%

WEIGHT	LOAD	N/mm^2	AVERAGE
8.552	853	37.9	33.8
8.526	669	29.7	
8.628	762	33.8	

IV. CONCLUSION

The concept of replacement of natural fine aggregate by quarry dust highlighted in the present investigation could improve the utilization of generated quarry dust, thus reducing the requirement of land fill area and conserving the scarcely available natural sand sustainable development. Strength of the concrete is mainly dependent on bonding of the fine aggregates which fills the voids between the coarse aggregates. It is found that the strength of concrete is more for w/c of 0.45 when compared with w/c of 0.5. As the quantity of water increases, the compressive strength decreases when replaced with quarry dust. This is due to the water absorption property of quarry dust. It is well known that the w/c ratio increases 15 20 25 30 35 40 0 10 20 30 40 50 60 70 80 90 100 Percentage replacement of quarry dust Compressive strength (N/mm2) 7 days 14 days 28 days Compressive strength of 7, 14, and 28 days for M20 grade Figure 5: Compressive strength of 7, 14, and 28 days for M20 grade up to 100% replacement of quarry dust. as the strength decreases. But the observation regarding compressive strength of quarry dust when compared to sand is nonlinear. From the experimental study, it is concluded that the quarry dust can be used as a replacement for fine aggregate. It is found that 40% replacement of sand by quarry dust gives maximum result in strength compared to normal concrete and then decreases from 50%. The results proved that up to 40% replacement of sand by the quarry dust induced higher compressive strength and the workability of concrete decreases as replacement increases. Thus the environmental effects and waste can be significantly reduced. Competing Interests The authors declare that they have no competing interests.

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