



A Review paper on The Effect of Silica Fume on the property on concrete

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Abstract : Due to the expeditiously increased in the population, the demand of construction is increased. Cement play a substantial role in concrete, it provide strength, durability and workability. As construction increase the demand of cement is also increased, to reduce the shortage of the cement there are different materials which have cementitious properties are examine. This paper presents a strength review on the work done on the concrete which have various percentage of silica fume. In current days the silica fume are used in construction hence in this paper we study the cementitious property of silica fume.

IndexTerms – Silica fume (SF), Ordinary Portland Cement (OPC).

INTRODUCTION

Now a day we are living in a world where everyone want to develop their state, country, etc. hence development is increasing which tends to increases the construction everywhere and concrete is the main part of any type of construction. Concrete is made of much material which provides strength to the structure these materials can be natural or men made, cement is one of them material it is the back bone of the concrete. As the construction increases the demand of cement is increase. So in this paper we study the replacement of cement by SF. We replace cement with the weight percentage that is 5%, 10%, 15%, 20% and we examine the compressive strength of the cube and deformation concrete filled steel tube. We are focus on the heavy structure so we made a design mix of M-40 and use OPC cement grade 43 then conduct the test that is initial setting time and final setting time and normal consistency test on cement and sieve analysis test and specific gravity test on the aggregate.

LITERATURE REVIEWS

Before this study too many researchers have been done. Many numbers of tests have been conducting to examine the partial replacement of concrete input by SF on the properties of concrete. This paper is consisting of literature review which provides different idea to use the SF in the concrete, now we mention the different paper and the result we found:-

3.1 Piotr Smarzewski(2019)-

The article present the investigation on the mechanical properties Of HPC by replacing the weight of cement by SF percentage of 0%, 5%,15%,20% and 25 %. It if found that the tensile splitting strength and modulus of elasticity by about 26% and 5%, compressive strength is 14% at 25% and The calculated characteristic length indicates that the high performance concrete with 15% SF content is the most brittle.

3.2 N. K. Amudhavalli &Jeena Mathew(2012)-

The article present the investigation on the mechanical properties concrete by replacing the weight of Portland cement by SF percentage of 0%, 5%, 10%,15% and 20%. The normal consistency increases about 40% when SF percentage increases from 0% to 20%, the optimum 7 and 28-day compressive strength and flexural strength have been obtained in the range of 10-15 % SF replacement level.

3.3 H. Katkhuda et.al.,(2019)-

The article present the investigation on the mechanical properties Of concrete by replacing the weight of cement by SF percentage of the SF was replaced by 0%, 5%, 10%, 15%, 20% and 25% for a water-binder ratios ranging from 0.26 to 0.42. The compressive strength and tensile is almost same but the flexure strength of concrete is depend on the water cement ratio which increase 15% for water cement ratio 0.26 and 0.30 and 20% for water cement ratio 0.34, 0.38 and 0.42.

3.4 Dilip Kumar Singha Roy, Amitava Sil(2012)-

The article present the investigation on the mechanical properties Of concrete by replacing the weight of cement by SF percentage of 10%. The split tensile strength and flexural strength of the SF concrete (3.61N/mm² and 4.93N/mm² respectively) are increased.

3.5 Faseyemi Victor Ajileye(2012)-

The article present the investigation on the mechanical properties of concrete by replacing the weight of cement by SF percentage of from 0 to 25% in steps of 5% by weight , mix proportioning was based on 1:2:4 mix ratio. Then the result is found is cement replacement up to 10% with SF leads to increase in compressive strength, (16.15% to 29.24%).

3.6 S. Jagannp & T.R. Neelakantan(2021)-

The article present the investigation on the mechanical properties of M25 and M40 grades concrete by replacing the weight of cement by SF percentage of 0, 5, 10, and 15 % replacement levels at 7, 14, 28, and 90 days. The result is found is increase in the percentage of SF decreases the workability, the strength of the concrete increases irrespective of the grades of the concrete.

3.7 Abdullah A. Almusallam et.al.,(2004)-

The article present the investigation on the mechanical properties of concrete by replacing the weight of cement by SF percentage of 7.3%, 16.7%, 11.9%, and 12.0%. The compressive strength of concrete specimens prepared with calcareous limestone aggregate was the lowest and the incorporation of SF improved both the compressive and split tensile strengths of concrete.

3.8 Vikas Srivastava et.al., (2012)-

The article present the investigation on the mechanical properties of concrete by replacing the weight of cement by SF percentage of the addition of SF reduces workability. However, in some cases improved workability were also reported. SF inclusion increases compressive strength significantly (6-57%) and increase in compressive strength depends upon replacement level. Tensile strength and flexural strength of SF concrete is similar to that of conventional concrete

3.9 S. Bhanjaa,B. Sengupta (2004)-

The article present the investigation on the mechanical properties of concrete by replacing the weight of cement by SF percentage 0%, 5%, 10%, 15%, 20%, 25% for a water-binder ratios ranging from 0.26 to 0.42. In 28-day split tensile strength has been obtained in the range of 5–10% SF replacement level, whereas the value for flexural strength ranged from 15% to 25%.

3.10 Madhanasree R. M.1, A. Joe Paulson, et.al.. (2016)-

The article present the investigation on the mechanical properties of concrete by replacing the weight of cement by SF percentage of 0%, 12.5%, 13% and 13.5% on the strength of M20, M25 and M30 grades. In this the strength is increase by 13%.

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