

A Review on Mechanical Properties of High Strength Self Compacting Concrete Incorporating Silica Fume

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Sharma Vikash N.

*Student M.E. structural engineering
SAL Institute of Tech. & Engg. Research
Gujarat Technological University
Vikas1638sharma@gmail.com*

Utsav D. Patel

*Assistant professor
Sal collage of Engineering
Gujarat Technological University
Udpatel.casad@gmail.com*

Abstract: High-strength concrete is a self-extracting fluid mixtures suited to congested reinforcement. It must be a balance between the militia deformability and compliance. This hotel is the durability of the mechanical properties than traditional concrete and increase in volume in recent years. Minerals and other concrete compressive strength in this review suggests high self-use and performance. By adding silica fume admixtures, such as ash and quarry dust, gamsoyi super plasticizer added to improve the flow capacity flight. Successful utilization of silica fume, fly ash and quarry dust was able to turn the euroyi waste precious resources. This paper presents the results of experimental work of self-compression high-strength silica fume concrete, fly ash and quarry dust and super plasticizers and mechanical properties.

Keywords: *Self compacting concrete, silica fume, fly ash, quarry dust, mechanical properties.*

I. INTRODUCTION

The purpose of High strength self compacting concrete is one of the most important development in the building industry. The purpose of using this concrete is to decrease the human risk. The properties of high strength self compacting concrete differ from conventional concrete.

Gaywala N R (2011) ascertained that, self compacting concrete with fly ash decreased Permeability and increased density by long term pozzolanic action. It is more resistant to sulphate attack and reduced shrinkage because fly ash ties with lime. The maximum compressive strength, tensile strength and flexural strength were obtained by 15% of fly ash replacement with cement.

Ben cart Rao (2013) has observed that it is necessary demand for the population, industrialization and urbanization, the growth of infrastructure. Creating a concrete critical infrastructure plays an important role in meeting the needs of the construction industry. Because concrete flexibility, increasing the utility at all stages of construction on the suitability and adaptability. Achieved through the existing concrete vibrating sex it can be, but can not get the whole archive. Constitute a large number of voids improper compression. The pores of the concrete reduces the strength and durability of the concrete. Concrete satisfying the contribution of the magnetic compression requirements. Production of the European Union (EFNARC) and designed to use high-quality concrete compression specification itself, and gave the instructions. It determines the state of the fresh concrete characteristics of the concrete itself compressed. Passing ability and resistance to segregation of fresh concrete,

you must posses a charge. Fresh concrete is tested with a slump flow test, V- funnel test, L- box testing. High water-binding agent leads to a volume change ratio, the transmittance and the crack. Thus, the lower water binder ratio, it is necessary to manufacture a dense barrier durable concrete. Low water binder ratio reduces the corrosion of the reinforcement. Super plasticizer is made easier manufacturing of concrete with low water / binder ratio and makes the high-strength concrete, high-performance magnetic compression. It reduces the intensity of the damage caused by the low water / binder ratio of the concrete impact resistance magnesium sulfate.

It flows by its own weight due to the vibration isolation resist not been proposed as a concrete mixture with a performance by Ahmed Fathi self-compressed concrete. Of course, the amount of super-plasticizer chemical cement admixture can be achieved by increasing and reducing the total amount required mixing. Increasing the total cost of the increased content of the cement. Itdayi cement has excess material can avoid the problem. To improve the compression characteristics of sexual self rice husk ash, silica fume concrete, concrete mixing combustion ash cement Microwave extra content, is a well-known type of fly cement replacement material. Allow the concrete mixture were all good deformability own militia 650-768mm compressed slump flow value. Compacting the concrete mix has a value of its own in the range of 1.0 0.8 L- box test. In order to achieve the fresh characteristics, there is a need for a more electronic rice hull silica fume incinerate water. It achieved a 30% higher compressive strength and tensile strength divided silica fume, and 5% fly ash concrete mix. All cement replacement materials Where to ignore the result of bleeding because of high flexural strength and high cohesion. A cement substitute rice husk incineration electronic performance is dependent on the degree of affecting the microstructure of the binder combustion.

Muhammad Nouman Haral (2013) It is believed to be a natural pozzolan binder alternatives for the construction industry. Current environmental aspects have been a number of major concern in the construction site. By minimizing the amount of CO₂ introduced in the cement industry CO₂.It environment, a significant amount was about the environment, it is essential to control the overall process of manufacturing cement contamination. The introduction of the supplementary cementitious materials may be achieved.

Another added after the increase in demand and in the supplementary cement material chosen because from day one of the other applications. The concrete must have a small amount of higher quantity, higher aggregate content and aggregate content of the compressed self-binder. Therefore, it is essential to include a super plasticizer chemical admixtures such as to maintain a proper consideration of the processability aspects of viscosity itself compressed concrete. In order to achieve the properties of fresh concrete, it is added to the high quantity of fine particles. As a self-compacting concrete alternative binder mix can provide a mixed flow of the application up to 20% natural pozzolan. Determination of the optimal dosage of polycarboxylate ether for a variety of paste can be found in the modified Marsh cone test. Flow capacity and a polyether carboxylic increase with the increase of the dosage of the paste mix. Slump flow increases with the increase of the volume fraction of the high binder content of the paste. High volume water separation occurs and the risk of settlement of the aggregates. Value of T500 is decreased with the increase in the volume fraction of the paste, and non-water agents

Mostafa Jalal (2015) explained that, high strength concrete is one of the classification of high performance concrete. The grade above M60, concretes refers to high strength concrete. High strength and durability properties achieved by reducing porosity, in homogeneity, micro cracks in concrete. The reduced sizes of structural member, increased building height in congested areas, early removal of form work, in prestressed concrete construction makes greater span-depth ratio, early transfer of prestress and application of service loads can be achieved by using high strength concrete. Reduction of corrosion of steel and attack of aggressive chemicals can be done by Low permeability characteristics of high strength concrete. This permits the use of high strength concrete in nuclear power plants, bridges, marine structures and places of extreme climatic conditions. High strength concrete reduces maintenance and repair cost. By combining the BIS method, ACI methods for concrete mix design and the available literatures simplified mix design procedures are formulated. Some times the mix proportion should be modified to meet the desired workability and strength criteria, by adjusting the % replacement of cement by SF, % dosage of super plasticizer solid content of binder, air content and unit weight by means of trial batches to optimize the mix proportion. Based on the above formulated mix design, mix proportions are arrived for M80 and M100 grades of concrete and by replacing 0, 2.5, 5, 7.5, 10, 12.5 and 15% of the mass of cement by silica fume. The increased percentage of silica fume content decreases the workability of concrete. The cement replacement by silica fume 10% is the optimum percentage for M80 and M100 grades of concrete. The maximum compressive, split tensile and flexural strength and elastic modulus are achieved by the optimum percentage of cement replacement by 10% silica fume.

D.W.S. (2002) reported the number is separation without magnetic compression known to achieve the appropriate compression to the basis weight of its own without the use of

fresh concrete Flow long-range sensors. It produces a low stress Newtonian fluid access to plastic viscosity. The introduction of the surface active agent, such as those high powder content and super plasticizer itself is thereby compressed. A by-product of the crushed rock in the manufacturing process of the concrete aggregate is known as granite fine powder. Also known as fine dust from the granite quarries. Due to the limited fine of quarry dust introduced into the concrete mix. Fresh concrete job requirements and additional demand for water will increase the cement quarry Chapter dust content of the prescribed strength requirements. The use of compressed concrete quarry dust itself can be set euroyi waste valuable resources, you can save money. It requires a high dose of super plasticizers for quarry dust yield stress and other rheological properties similar. It may facilitate the problem of the durability, such as high fineness alkali silica reaction of precision granite.

Prajapati Krishnapal (2013) found that, the most revolutionary development in concrete industry is Self-Compacting Concrete. It has advantages like faster construction, reduction in size for concrete sections, better durability, suitable for congested reinforcement. Therefore this concrete becomes popular in the construction industry. The self compacting concrete is developed by using various percentages of fly ash (10%, 20% and 30%) by weight of cement as partial replacement of cement. The fresh properties of self-Compacting Concrete are been assessed by using the methods such as T500 time, V funnel and, L-box test as per EFNARC specification. The poly carboxylic ether is used as water reducing admixture. The cement is replaced by fly ash up to 30% (10%, 20% and 30%) by weight of cement and quantities of the fine aggregates and coarse aggregates are kept constant. The fine aggregate is kept approximately 37% by weight of concrete. The coarse aggregate is kept approximately 34% by weight of concrete. The water binder ratio is kept 0.40 and 0.45 by weight. The mixes thus prepared follow the EFNARC guidelines. The addition of Fly ash decreases the addition of super plasticizer content for same and better workability. The addition of Fly ash results is decrease in 7 days and 28 days of compressive strength. The 28 days compressive strength is decreased and the fly ash content is increased to 30%. However all the mixes have good 28 days compressive strength. Therefore, it is possible to produce a good performing self compacting concrete using locally available Fly ash.

Rahul Dubey (2012) developed that, the self compacting concrete has more powder content, less coarse aggregates, high range water reducing super plasticizer and small dosage of viscosity modifying agent. Self-compacting concrete has to posses high flowing ability when it is being cast and high viscosity when it is at rest, in order to prevent bleeding and segregation. To achieve above properties super plasticizers were used. Trial mixes were prepared by varying the dosage of super plasticizers from 2% to 12% of cement material with an increment of 2% to achieve required strength. Self compacting characteristics in fresh state of mix proportion with varying dosages of super plasticizers slump flow test, V-

funnel flow test and L-Box test were performed according to the procedure proposed by EFNARC. The filling ability of self compacting concrete can be determined by Slump Flow test. The filling ability and passing ability can be determined by L-box test. The addition of super plasticizer upto 4% gives good strength. Addition of super plasticizers up to 8% increases the compressive strength at all ages but the increase was marginal. The setting time was increased with increase in dosage of super plasticizers. On addition of super plasticizers more than 10%, the mix was not set even after 11 days.

K.S. Johnsirani (2013) proposed that, a concrete which can be placed and compacted under its self weight without vibration effort and at the same time cohesive enough to be handled without segregation is considered as self-compacting concrete. It contains super plasticizer, high content of fines and viscosity modifying agent. The use of super plasticizer maintains the fluidity. The resistance against bleeding and segregation is attained by using high fine content and super plasticizer. The use of blast furnace slag fly ash and quarry dust in self compacting concrete reduces the super plasticizer dosage. Self compacting concrete may result in up to 40% faster construction than using normal concrete. The use of mineral admixtures improved the performance of self compacting concrete in fresh state and also reduces the use of viscosity modifying agents. Passing ability, filling ability and segregation resistance are well within the limits only when water/binder ratio is 0.4. The compressive strength and split tension strength had shown higher strength when replacement of admixture is 25% of finest materials. Beyond that limit the hardened properties of concrete decreases.

M.Iyappan (2014) ascertained that, self compacting Concrete is one of the category of high performance concrete characterized by ability to spread and self consolidate under its own weight without bleeding and segregation. Among the various manufactured nano materials such as nano silica, nano alumina, nano titania, nano zirconia, nano Fe_2O_3 etc, the addition of Nano Silica (NS) enhances the possibility for the reaction with Calcium Hydroxide (CH) to develop more strength. Self compacting concrete with partial replacement of cement by nano silica in three different percentage such as 2%, 4%, 6% and hardened properties were found. Mix design was designed by ACI Mix Design method. The water Cement Ratio is 0.32 and the mix ratio is 1:2.05:2.3. The nano silica has large surface area which improves the compressive, flexural and split tensile strength at early ages and reduced porosity and water absorption when compared with conventional concrete. The nano silica about 4% in self compacting concrete gives more acid resistance compared with conventional concrete due to reduced porosity.

H.A.F. (2012) High Concrete Reinforced Concrete Members congestion that can integrate itself without vibration, even if Dehwah works on filling the space level of the cast concrete surface of the empty space separating the components described geouieul forming what is expected to flow freely without each recess. This requires the incorporation of a high reduction gear ratio which is to be used as water chemistry admixture of filler generally high fine material. It includes

dust, metal powder, blast furnace slag, silica fume filler is a silica powder flies. Therefore, self-extracting Hair speed deployment time and construction costs, and enhanced integration to eliminate choraeeun reduction in productivity. Further a good working environment reduces the magnetic noise cast concrete compression, leads to the possibility to increase the time to place the urban area. Test mixture is prepared in a ratio of fly ash to the other metal powder filler powder, silica fume + quarry dust powder. This is done in proportion to the weight of the design and materials of the mixture by suitable mixing his design method. It flows through the flow test in order to assess the flow properties of the flow test V slump flow test performed test box L and U-box test mixture. Mix the maximum bending compression splitting tensile strength of a sample design (8% of quarry dust, powder, water / binder = 0.38). Alone, ash, silica fume, plus alone or a mixture strength produced dust, quarry flight to provide a powder containing at least a metal particulate. Ash or silica fume shows better than their own flour filler quarry, quarry dust, dust powder, add 8-10% of Plus flight. The use of silica fume is a dust material quarries powder flight results in a significant cost reduction can not be used in the area.

Caijun Shi (2015) explained that, mix design is a critical step to obtain high quality self compacting concrete. A good self compacting concrete mixture design method should consider, widely applicable, strong robustness for variable raw materials, technical requirements, sustainability and cost. There are various methods available for mix design of self compacting concrete, such as EFNARC, design method, Compressive strength method, close aggregate packing method, mixture design method based on statistical factorial model, mixture design method based on rheology of paste model. Silica fume and quarry dust were observed to improve the mechanical properties of self compacting concrete because of the pozzolanic action of silica fume. It has been indicated that self compacting concrete having silica fume have higher compressive strength, split tensile strength and flexural strength. As the water cement ratio reduces and cement content increases, strength increases in self compacting concrete made with silica fume and self compacting concrete made with quarry dust.

P. Vinayagam (2012) explained that, High Strength Concrete refers to concretes of grade above M60. High strength and durability properties become reality for Conventional concrete by reducing porosity, in homogeneity and micro cracks in concrete. The use of high strength concrete reduces size of structural member, increased building height in congested areas and early removal of formwork.

II. CONCLUSION

Self-study review silica fume in the cement on the conclusions reached by using the same alternate water quality after compression fly ash and concrete quarry dust. Because of the extreme fineness for highly reactive amorphous silicon dioxide content is high pozzolan quarry dust flying less of a substance produces silica fume concrete denser filler material. Depending on the quarry dust all show good results in tension

compression to compress the magnetic silica fume concrete. Simple mix design procedure using the high intensity magnetic silica fume, fly ash replacement by the optimum ratio of cement, silica fume concrete in order to achieve the compression quarry, strength. The 20% of silica fume winding high-strength self-compression divided by tensile compression dust St. concrete, due to the required high doses of the magnetic super plasticizer concrete compression parameter also local spare parts high strength bulk is reduced variation in particle size is decreased workability. Hence. The mixing ratio of the amount of more than 4% super-plasticizer affects the strength. Quarry dust shall facilitate the usage silica fume than to alkali silica reaction durability problems occur. The optimum ratio of silica fume dust quarries provide the best results, and also thereby to reduce environmental pollution, to reduce costs. Finally, the use of industrial waste silica fume may reduce the risk of re-quarry dust.

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