



A Review on Self Compacting Concrete Using Marble Dust and Crumb Rubber as Fine Aggregate Replacement

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Abstract: This paper presents the results of research about the performance of self-compacting concretes (SCC) using marble dust and crumb rubber as replacement of fine aggregates. Self-Compacting Concrete is a fluid concrete mixture having no segregation and bleeding. The use of SCC is spreading all over the world, but it is in the initial stage in India. SCC requires more quantity of quality compared to normal conventional concrete for self-compatibility. This paper presents a study on different types of papers for completing Self-Compacting Concrete using waste materials like marble dust and crumb rubber. Through different scientists derived that different percentage replacement in concrete can be used in industries to improve self-compacting concrete.

Index Terms - self-compacting concrete, marble dust, crumb rubber, high-performance concrete.

I. INTRODUCTION

Concrete is one of the all-around construction materials which has been used worldwide. Self-compacting concrete is capable of flowing into formwork equally into all parts without the need of vibration or other mechanism and with no segregation or bleeding, also it reduces manpower and gives a safe working environment. Self-compacting concrete can be placed easily into the thinner concrete section. For self-compacting concrete have many advantages like construction can be done faster with less time consuming, improved durability. Waste materials like marble dust and other material have been used for construction so the industries increasing in India for waste material. Due to the shortage of skilled laborers self-compacting concrete is growing rapidly. Self-compacting concrete can be made with the same conventional concrete with the addition of viscosity modifying admixture and super plasticizing admixtures to improve the quality of the material.

Self-compacting concrete is extremely built concrete with a lot of higher fluidness while not segregation and is capable of filling each corner of formwork underneath its self-weight solely (Okamura 1997). Therefore, SCC eliminates the necessity for vibration either external or internal for the compaction of the concrete while not compromising its engineering properties.

II. LITERATURE SURVEY

DARAPANENI C (2020) at ^[1] have proposed validate a mixture design procedure for Self-compacting concrete proposed by Ghazi & Al Jadiri with the local materials available at Vijayawada city, Andhra Pradesh India. The proposed method is capable of proportioning Self-compacting concrete mixtures with the previous methods which primarily consider fresh properties rather than the strength requirements. This method covers a wide range of strength (15 to 75MPa) covering standard and high strength concretes. Three grades of concrete mixtures 30, 40 & 60 MPa were designed using the proposed method and the mixtures are varied until the fresh as well as hardened properties are satisfactory. Standard concrete mixtures showed good agreement in both fresh, hardened states whereas high strength concrete requires slight changes in the design assumptions.

VENKATESWARA RAO (2020) at ^[2] In this paper, the grade of concrete for the finding out became designated as M25 and blend proportion designed by the IS code technique. In self-compacting concrete, the equal mix was chosen in keeping with the literature in reference. Self-Compacting Concrete is mixed with 3 extraordinary superplasticizers and three special VMA with chosen fly ash content had been organized by variable mixtures and therefore the dosages. Cube specimens were solid within the mixes, to work out the density and compressive power within the hardened nation. From the density and compressive strength effects, the butter mixture and dose of VMA and unbelievable softener to supply the proper self-Compacting concrete had been designated

SUBODHA KUMAR RAUTARAY (2020) at ^[3] In this paper, researchers are attempting to develop a lot of and a lot of eco-friendly materials. Self-compacting geopolymer concrete (SCGC) is one in every one of the eco-friendly materials that are termed inexperienced concrete. SCGC not solely reduces pollution however additionally enhances the atmosphere and performance of concrete with relation to cement concrete. the benefits of the event of SCGC are (a) intense industrial waste and (b) self-consolidation with no vibration, towards higher strength of concrete. This review paper critically analyses the varied factors related to the event of SCGC. The factors just like the concentration of hydroxide, ash (FA) content, replacement of different industrial wastes, the indefinite quantity of superplasticizer, the quantitative relation of glass to hydroxide (alkali solution), the quantitative relation of alkali resolution to ash, the quantitative relation of water to geopolymer solid and hardening condition on workability and mechanical properties of SCGC.

DANISH P (2020) at ^[4] has proposed there are a unit ton of analysis on SCC has been exhausted Japan, Turkey, Iran, UK, Algeria, Thailand, Malaysia, and India. Common industrial materials such as stone Powder (LP), Metakaolin (MK), ash (FA), silicon oxide Fume (SF), and coarse Blast Furnace scum (GBFS) has been wanting to increase the potency of SCC. There are various choices on employment materials that will be used for the event of SCC, the main focus on the utilization of pozzolanic material like Metakaolin (MK) as admixture and non-pozzolanic material as Waste Marble Powder (WMP) as a filler. each variety of materials have a positive result on the fresh, hardened, and sturdy state of SCC. The utilization of MK plays a very important role in decreasing environmental pollution by the approach of lesser dioxide emissions. the utilization of WMP reduces the segregation, bleeding, and value of production of SCC. Therefore, this paper containing valuable and vital information will offer a platform for brand spanking new researchers for future investigations on SCC.

P. SACHIN (2018) at ^[5] introduced ash, wood ash, and their combos square measure used as cement replacement materials. as0068 could be a mineral admixture that may be utilized in concrete. The Wood ash containing less Calcium oxide and a major amount of silicon oxide are also used for the replacement of cement. The incorporation of those replacement materials reduces the necessity for consistent modifying agents. Higher sturdiness and bigger mechanical integrity is achieved by lowering the water content within the concrete. Experimental investigations like split lastingness, compressive strength, the flexural strength of self-compacting concrete containing cement replacement materials square measure conducted to see their mechanical properties. Workability tests (slump, L-box, V-funnel) on the corresponding combine is additionally accustomed study the characteristics. The methodology adopted here is that the cement replacement materials square measure replaced 100% and 2 hundredths by weight of standard hydraulic cement and also the performance is measured. to boost the workability of the concrete one.5 you look after superplasticizer (selenium B233) by weight of the cement is employed as a chemical admixture. tips given by EFNARC square measure followed to style the combo. From this investigation, it's ascertained that the optimum replacement of 100% of wood ash and ash in self-compacting concrete will increase the compressive strength of the concrete mixture.

ASHTEYAT A (2018) at ^[6] they study to investigate the potential of victimization of this mud in manufacturing self-compacting concrete (SCC) for structural functions is reported. SCC mixtures were ready at a relentless water-to binder magnitude relation of zero.45 victimization 5 completely different replacement percentages of cement by WCBPD ranging from ten to twenty-fifth (by cement weight) with partial replacement of fine stone aggregate by crushed stone mud. recent and hardened properties were investigated to establish the importance of mud employed in SCC. The recent properties of the SCC mixtures were determined by slump flow, V-funnel, and L-Box take a look at. Tests on hardened SCC included compressive strength, internal pore structure in terms of unbearable pulse velocity and capillary consistency, dry shrinkage growth, and sturdiness against alkali-silica reaction. SCC mixes incontestable acceptable resistance to segregation. With satisfactory passing and filling talents. the employment of WCBPD had considerably contributed to reducing alkali-silica reaction expansions by as high as four hundred and forty yards. the various tests indicated the employment of WCBPD at levels below 100 percent wouldn't undermine strength or durability, maintain acceptable stability, and impart improvement to resistance against ASR. What is more, the study disclosed that concrete for structural application with compressive strengths bigger than forty MPa may be made at the twenty-fifth WCBPD replacement of cement by mass.

V.MALARVIZHI (2017) at ^[7] In this technique is that SCC technology offers the chance to reduce or eliminate concrete placement issues in troublesome conditions. It avoids having to repeat constantly reasonably internal control check on the concrete, that consumes each time and labour. Construction and putting become quicker & easier. It eliminates the necessity for vibration & reducing sound pollution. It improves the filling capability of extremely full structural members provides higher quality particularly within the members having reinforcement congestion or decreasing the porosity and up the sturdiness of concrete. this study is to explore the feasibility of exploiting SCC by examining its basic properties and sturdiness characteristics i.e., water absorption, shrinkage, and sulphate resistance.

MR. SWAPNIL PATEL (2016) at ^[8] In this paper, Concrete been compounding with a binding material, aggregates, and eventually water. Concrete is generally employed in the frame structure, however, there's some limitation like self-compaction, surface finishes, maintains strength at the full space. Due to this limitation, we tend to are attempting to create self-compacting concrete. SCC is taken into account concrete which will be placed and compacted underneath its own weight with no vibration effort, reassuring complete filling of formwork even when access is hindered by slim gaps between reinforcement bars. Self-compacting concrete has the ability to involve not solely high deformability of cement paste however additionally resistance to segregation between coarse mixture and mortar once the concrete flows through the confined zone of reinforcing bars. In recent years, self-compacting concrete (SCC) has gained wide use for placement in full ferro concrete structures with troublesome casting conditions. For such applications, the recent concrete should possess high fluidness and sensible cohesiveness.

S. MAHESH (2014) at ^[9] Self-compacting concrete (SCC) is outlined as a contemporary concrete that possesses superior flowability under-maintained stability (i.e., no segregation) so permitting self-compaction that's, material consolidation while not the addition of energy. Self-compacting concrete may be a fluid mixture appropriate for putting in structures with engorged reinforcement while not vibration and it helps in achieving higher quality surface finishes. However, utilization of high reactive

Metakaolin and Flash as admixtures as a good pozzolan causes nice improvement within the pore structure. The relative proportions of key parts square measure thought-about by volume instead of by mass. self-compacting concrete (SCC) combine style with twenty-ninth coarse combination, replacement of cement with Metakaolin and sophistication F ash, combos of each, and controlled SCC combine with zero.36 water/cementitious ratio (by weight) and 388 liter/m³ of cement paste volume. Crushed granite stones of size 16mm and 12.5mm square measure used with a mixing 60:40 by share weight of the total coarse combination. Self-compacting concrete compatibility is plagued by the characteristics of materials and also the combined proportions; it becomes necessary to evolve a procedure for the mixed style of SCC. The properties of various constituent materials employed. This investigation and its customary tests procedures for acceptance characteristics of self-compacting concrete like slump flow, V-funnel, and L-Box square measure conferred.

PARATIBHA AGGARWAL (2008) at ^[10] This paper deals with the history of SCC development and its bedrock, completely different testing ways to check high-flowability, resistance against segregation, and chance. completely different combined style ways employing a kind of materials are mentioned during this paper presents a process for the planning of self-compacting concrete mixes. The check results for acceptance characteristics of self-compacting concrete-like slump flow; J-ring, V-funnel, and L-Box are bestowed. Further, compressive strength at the ages of seven, 28, and ninety days was also determined and results are enclosed here.

BELAIDI, A., KENAI (2015) at ^[11] This paper gives SCM and SCC with mineral additions. standard Portland cement (OPC), natural pozzolana (PZ), and marble powder (MP) is employed in ternary building material blends system following the cement substitution with PZ and MP in magnitude relation 1/3. Within the framework of this experimental study, a complete of twelve SCM and half dozen SCC were ready to possess a continuing w/b magnitude relation of zero.40. The contemporary properties of the SCM were tested for mini-slump flow diameter, Mini-V-funnel flow time, and viscousness mensuration. Slumps flow test, L-box, J-ring, V-funnel flow time, and stability were measured for SCC. Moreover, the event within the compressive strength makes up my mind at three, 7, 28, 56, and ninety days. check results have shown that victimization ternary blends improved the contemporary properties of the mixtures. The combination of pozzolana marble powder increase the slump flow test up to 826 millimeters for the mixture ready with 100% of mineral additions. Moreover, the employment of mineral addition reduced the time flow to fur.27 s for SCC with two-hundredth mineral addition, so reducing the viscousness of all mixtures. The addition MP increase the capacity of the passage through the plates between eighty-eight.75 and 93.50% for SCC with seven.5 and V-day of MP, severally. The ternary system (PZ and MP) improves the sieve stability with the worth of four.07% of SCC with five hundredths of substitution compared to SSC while not additions. The compressive strength of SCC at ninety days with four-hundredth of PZ and MP was almost like that of OPC.

III. LITERATURE SURVEY

From the review of the above all papers we get some conclusion. Self-compacting concrete has been confirmed as one of the best materials used in concrete technology. Self-compacting concrete is much used in India because of lack of awareness meanwhile in other countries like Thailand, UK, Canada, etc. SCC has been used rapidly. With the help of SCC even complicated formwork and tight reinforcement can be done easily. Due to the elimination of the vibration effect, there will be less skilled labor needed and also noise pollution can be reduced. Using waste materials like marble dust and crumb rubber can create a revolution in building materials. For SCC workability tests mostly J-ring tests, L-box tests, U-box tests, Slump flow tests, etc. are used for archiving consistency in SCC. It has been cleared that durability characteristics of concrete are significantly improved with partial replacing of materials.

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