Study on Properties of Concrete Using Marble Dust and Rise Husk Ash

Jayesh Patel1 Prof. M.A.Jamnu2
1ME Student 2Assistant Professor
1,2Dept. of Applied Mechanics
1,2Government Engineering College, Dahod, Gujarat, India.

Abstract—The study on Waste can be used to produce new products or can be used as admixtures so that natural resources are used more efficiently and the environment is protected from waste deposits was studied in this paper. Marble stone industry generates both solid waste and stone slurry. Marble powder is one of the materials which severely affects the environment and health problems. It is produced from sawing, shaping, and polishing process. Rice Husk Ash which is an Agro-Waste and known to be a Super Pozzolan have been used for mass concrete. The study on experimental work for the concrete using marble dust and rise husk ash of m20 mix design .The use of marble dust and rise husk ash in concrete production as cement replacement. The concrete using different type waste material and perform fresh properties like as workability and hardened properties like as compressive strength , tensile strength and durability test.

Key words: M20 mix design Concrete, marble dust, rise husk ash, workability, compressive strength, split tensile strength, durability test.

I. INTRODUCTION

The marble has been commonly used as a building material since ancient times. Disposal of the waste materials of the marble industry, consisting of very fine powders, is one of the environmental problems worldwide today. Now-a-days the cost of material is increasing so if we use the waste material in the production of the concrete so we decrease the price. In India, million tons of wastes from marble industries are being released from marble cutting, polishing, processing and grinding. Exposing the waste material to the environment directly can cause environmental problems.

The marble powder used was obtained from the processing plants out of sawing and polishing of marble blocks. Marble powder is brought Egyptian factories of marble company. Rice Husk Ash (RHA) is an agricultural waste product, and how to dispose of it is a problem to waste mangers. While Concrete today has assumed the position of the most widely used building material globally. The ash collected was sieved through BS standard sieve size 75μm and its colour was grey. There is an increasing importance to preserve the environment in the present day world. RHA from the parboiling plants is posing serious environmental threat and ways are being thought of to dispose them. This material is actually a super pozzolan since it is rich in Silica and has about 85% to 90% Silica content.

II. LITERATURE REVIEW

Prof. P.A. Shirule [1] were investigated PARTIAL REPLACEMENT OF CEMENT WITH MARBLE DUST POWDER in this paper author studies 30 cubes and 30 cylinders have been casted. The compressive strength and split tensile strength of cubes and cylinders was measured for 7 and 28 days and cement used is 53 grade. M20 grade with nominal mix 1:1.5:3 as per IS 456-2000 was used and a water cement ratio of 0.5. Marble powder were added in concrete in step of 5% (0%, 5%, 10%, 15%, 20% ).this paper concluded by the author strength of concrete has been tested on cylinder at 7 days curing and 28 days. 7days test has been conducted to check the gain in initial strength of concrete. 28 days test gives the data of final strength of concrete at 28 days curing. At 10% use of marble waste in concrete there is 27.4% increase in initial compressive strength. Up to 10% replacement of marble waste there is increase of compressive strength and split tensile strength.

Nutan Patel et al. [2] were studied on Marble Waste: Opportunities For Development of Low Cost Concrete. The author studied Based on the Indian Standard (IS: 10262-1982), design mix for M30 grade of concrete was prepared by partially replacing fine aggregate with five different percentages by weight of marble powder (0%, 5%, 10%, 15%, and 20%). There is a slight decrease in compressive strength value concrete mix when 20% marble powder is used as compared with that of 15% marble powder mix. Compressive strength of the concrete has increased with increasing percentages of marble dust additions. The author conclusion for this research rate of the 0% marble waste 28 days strength is 38 N/mm2 at this strength of concrete rate is Rs. 3760.25. After adding the marble dust increases the strength. The highest compressive strength has been demonstrated by 15% marble dust is 40.5 N/mm2 at this strength of concrete rate is Rs. 3732.56. By using the marble dust the rate of the concrete is decrease and strength is increase.

Ali A. Aliabdo et al. [3] were studied on the Re-use of waste marble dust in the production of cement and concrete. The author study in paper the properties of concrete contained marble dust as a cement replacement and as a sand replacement. The replacement ratios which have been studied were 0.0%, 5.0%, 7.5%, 10.0% and 15% by weight. Water to powder ratio (w/p) or water to cement ratio (w/c) were 0.50 and 0.40 in case of cement replacement and in case of sand replacement respectively. This paper concluded by in concrete compressive strength increases with the increase of marble dust ratio as sand replacement up to 15.0% of sand by weight. 0.4 w/c ratio use of replacement marble dust in cement content of slightly increase comp. strength.0.4 w/c ratio use of replacement of marble dust in cement content for 10% in max. split tensile strength and 0.5 w/c ratio in7.5% replacement marble dust for max. split tensile strength Max. bond strength of steel – concrete recorded with 10% replacement of marble dust in cement or sand both w/c condition.

Kurs at Esat Alyamac et al. [4] were investigated on A preliminary concrete mix design for SCC with marble powders The author studied by experimental program a series of SCC mixes with different water-to cement and...
water-to-powder ratios were prepared by using three type marble powder: cherry, gold and white. Different marble powder ratios were used in tests and measurement for different test values like, slump-flow, T500 time test, L-box, V-funnel and compressive strength and split-tension strength at 7, 28 and 90 days. This paper concluded by self compacting concrete in increases marble powder so decrease the compressive strength and split tensile strength. 10% adding marble dust in concrete so maximum increase compressive and tensile strength. According this paper cherry marble dust use in concrete so increase the compressive strength compare gold and white marble dust.

Bouziani Tayeb et al. [5] were studied on Effect of Marble Powder on the Properties of Self-Compacting Sand concrete. This paper studies the effect of marble powder content (MP) on the properties of sand concrete (SCSC) at fresh and hardened states. The experimental properties of the fresh prepared mixes tested are the mini-slump flow, the V-funnel flow time and viscosity. At the hardened state in determined is the 28-day compressive strength. The effect of MP content on evolution in the mini-slump flow and the V-funnel time flow are respectively illustrated. The increase of MP dosage in SCSC increases both of the mini-slump flow and the V funnel flow time and the positive effect of MP on the fluidity of SCSC. The addition of MP to SCSC requires an increase in water/cement ratio, which leads to a decrease in compressive strength at 28 days.

V.M.Shelke [6] presented a paper on “Effect of marble powder with and without silica fume on mechanical properties of concrete”. In this investigation, in this paper, compression tests were conducted, cylindrical specimens using a modified test method using silica fume of constant 8% with and without marble powder of volume fractions 0, 8, 12, & 16% on Ordinary Portland cement concrete. Experimental investigation was carried out to study the properties of M30 grade of concrete. The compressive strength of cube is increased up to 3.65%, 8.58% at 7 days & 28 days of curing by using 8% replacement of OPC cement with silica fume. The compressive strength of cylinder is increased up to 7.50%, 6.05% at 7 days & 28 days of curing by using 8% replacement of OPC cement with silica fume. The optimum result of compressive strength of cube is found at 8% silica fume and 8% marble powder with replacement of OPC cement in concrete that is 1.64%, 3.92% at 7 & 28 days of curing. The optimum result of compressive strength of cylinder is found at 8% silica fume and 8% marble powder with replacement of OPC cement in concrete that is 2.79%, 1.78% at 7 & 28 days of curing.

Hassan A. Mohamadien [7] presented a paper on The Effect of marble powder and silica fume as partial replacement for cement on mortar. The author studied in Replacement and addition ratio of both marble powder and silica fume with cement content separately at 0%, 5%, 10%, 15%, 20%, 30% and 50% by weight were investigated. The mechanical properties of mortar were measured in terms of compressive strength at 7 and 28 days and it was observed that the strength developments at 7, and 28 days and the highest development rate of compressive strength was observed at 15% replacement ratio for each the marble powder and silica fume separately. Using marble powder up to 15% as an additive materials enhancement the compressive strength up to 31.5%. The maximum value for compressive strength was obtained with the use of 15% silica fume as a partial replacement and the percentage of the increasing 48.3%.

Noha M. Soliman [8] studied on the Effect of using Marble Powder in Concrete Mixes on the Behavior and Strength of R.C. Slab. The author study in paper is the percentage of marble powder as partial replacement of cement content in concrete mixes. The experimental results showed that, using definite amount of marble powder replacement of cement content increases the workability, compressive strength and tensile strength. Using marble powder enhanced also the structural performance of the tested slabs as it increased the stiffness and the ultimate strength compared to the control slabs. Super plasticizer used was a high range water reducer HRWA. It was used to improve the workability of the mix. the conclusion for this increasing the marble powder ratio replacement of cement led to the increasing as the compressive strength by about (25% and 8%) for the marble powder replacement ratios (5% and 7.5%) compared to the control mix. Increasing the marble powder ratios higher than 5% decreased the compressive strength of another concrete mixes. Increasing indirect tensile strength and modulus of elasticity was recast of the by using marble powder ratios (5% and 7.5%) compared to the control mix.

Godwin A. Akeke et al. [9] published a paper on STRUCTURAL PROPERTIES OF RICE HUSK ASH CONCRETE study on this paper Rice Husk Ash which is an Agro-Waste and known to be a Super Pozzolana have been used for mass concrete and found to have compressive strength ranging from 33-38.4N/mm2 at replacement percentages of 10-25% in a mix of 1:1.5:3. The author concluded by the maximum 10% replacement of RHA for the max compressive strength and split tensile strength. And more than 10% replacement RHA so decrease compressive strength and tensile strength.

Shazim Ali Memon et al. [10] published paper on Production of Low Cost Self Compacting Concrete Using Rice Husk Ash. The study on author by These were subdivided into three groups: Control Concrete, 5% RHA and 10% RHA. For each group, dosage of super plasticizer was varied from 3.5% to 4.5% with an increment of 0.5% For each mix, slump flow, L-box and V-funnel test were carried out. Brief explanation and illustration of Slump flow, L-box and V-funnel test is required. The utilization of RHA in SCC solves the problem of its disposal thus keeping the environment free from pollution.

III. CRITICAL REMARKS
Following critical remarks has been drawn from this literature review.

(1) Literature shows that uses of marble dust up to 10% uses of concrete make the maximum strength for the normal concrete. Maximum strength for 10% replacement of marble dust in concrete. Maximum compressive and tensile strength about 10% replacement of rise husk ash for cement content so both materials are use up to 10% replacement of cement content in maximum strength.
(2) It is depicted from this study that the marble dust is very low cost and west material and improves the strength compare the normal concrete and rise husk ash is agro waste so his cost is low and improve the workability and increase compressive strength.

(3) Combine use of marble dust and rise husk ash replacement of cement content improve the harden properties and retard the crack and decrease the cost of concrete.

(4) Research on combined use of marble dust and rise husk ash replacement of cement content so cost are decrease and strength are increase so this study are required.

REFERENCES


