International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 05 | May - 2023 SJIF 2023: 8.176 ISSN: 2582-3930

"REPLACEMENT OF NATURAL FINE AGGREGATE IN CONCRETE WITH POLYVINYL CHLORIDE AND POLYETHYLENEWASTE"

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Abstract
The use of plastic is increasing day by day, although steps were taken to reduce its consumption. The plastic waste material may be considered as one of the main environment pollution recourses which affect the public health. This creates substantial garbage every day which is much unhealthy. A healthy and sustainable reuse of plastics offers a host of advantages. The suitability of recycled plastics as fine aggregate in concrete and its advantages are discussed here.
Waste plastic and polyvinyl chloride was used as a partial replacement of natural fine aggregate by 0%, 5%, 10%, and 20% in concrete mixtures. All of the concrete mixtures were tested at room temperature. These tests include performing density, compressive strength. 12 cubes were molded for compressive strength and density tests. Curing ages of concrete cube is 7, and 28 days. The results prove that such concrete is used for low cost and light weight construction. It is also helpful that solve the solid waste problem posted by plastic.

Keyword- *AC, light weight, Reduces, Eco-Friendly*

I. INTRODUCTION:

Plastics created problems especially to the environment, because many users used plastics bags and through it any place after its use. The numbers of animals are die in every year due to the eating of plastics. Polyethylene has the highest share of production of any polymer type, while four sectors represent wide use of plastics demand: packaging, construction, automotive, and electrical and electronic equipment. The other sectors in which plastics used such as household, furniture, agriculture and medical device, In many metropolitan cities in developing countries the amount of plastic waste takes up to 20% of the total amount of the household waste. Together with the increased complexity of many plastics, plastic waste is becoming a major headache for waste management officials. Choked drainage systems cause floods in urban areas after rainfalls, causing health problems such as malaria and other water borne diseases. Cities, littered with plastic waste, suffer of serious visual nuisance, a reason for tourists to avoid these places, Now it is largely accepted that plastics cause environmental problems. Plastics bags are very cheap to produce and convenient to use. Modern technology has created the plastic age.Plastic do not easily decay and can thus, be used for long time. Polyvinyl chloride (PVC) is one of today's most common plastics. PVC is an odorless and solid plastic. It is most commonly white but can also be colorless or amber. It can also come in the form of white powder or pellets. PVC is made from vinyl chloride. The chemical formula for vinyl chloride is C2H3Cl.PVC is made up of many vinyl chloride molecules that, linked together, form a polymer (C2H3Cl)n. PVC production involves the creation of many toxic chemicals, as feedstock's, as additives or as by- products. Because of PVC's heavy chlorine content, dioxins are released during the manufacturing, burning or land filling of PVC. Exposure to dioxins can cause reproductive, developmental, and other health problems. The dioxin is a known cancer- causing agent. Additionally, dioxin exposure has been linked to a number of other diseases ischemic heart disease, and an skin disease called chlorine, a hallmark of dioxin exposure

II. OBJECTIVE:

1. To study the wastage occurs in environment like PVC & polyethylene.

2. To observe the effect of PVC & polyethylene over compressive strength of concrete.

3. To compare the strength of PVC & polyethylene mix concrete with conventional mix concrete.

4. To observe the effect of PVC & polyethylene over weight density of concrete.

III. LITERATURE REVIEW:

Johan Alexanderson (1979): investigated the associations between structure as well as mechanical qualities of autoclaved aerated concrete. Tests for hardened concrete and fresh concrete were brought out. It's realized that when the pores increases it decreased the compressive strength. Therefore boost in aluminium powder negatively impacts the strength. N Narayanan and K Ramamurthy, the Microstructural investigations on lime and bond as follows Hardened concrete details such as, the porosity along with the pore estimate appropriation were examined. Shrinkage along with compressive strength had been measured. The response items had an area together with the tobermorite gathering of calcium silicate hydrates as well as the term crystallinity was recognized as the level of 11.3 Å tobermorite from the aggregate sum of calcium silicate hydrates. The shrinkage diminished with expanding crystallinity while the compressive strength expanded as much as the ideal esteem. The strength also expanded with expanding measures of hydrates along with diminishing porosity. Various components of the result items have been evidencedby thermal conduct

Gunnar Bave (1980): examined over the aerated concrete towards the improvement of eco-friendly building. The fabricate of aerated concrete provides the advantage of utilizing promptly accessible crude components, including particular mechanical waste materials that's been collected from industry. Aerated concrete is a substance with good thermal protection against warmth and frosty consolidated with sufficient strength to be used in loadbearing buildings up to 3-4 stories. Generation strategy takes an in the same way minimal contribution of vitality. Aerated concrete reduces the vitality necessary for warming and cooling amid the life expectancy of a construction. The mechanical details will be improved with the aid of industrial wastes.

N Narayanan and K Ramamurthy (2000): investigated the Structure and qualities of aerated concrete. The qualities of aerated concrete rely upon the microstructure of its (void ± paste framework) and set up, that are affected by the cover type utilized, methods for curing and pore-development. Albeit aerated concrete was at first imagined as a good insulation material, there's been re-established enthusiasm for the basic attributes of its in viewpoint of the lighter weight of its, reserve funds in potential and material for expansive scale use of squanders like pummelled fuel ash. The focus of this paper is grouping the exams on the qualities of aerated concrete as a lot as physical (microstructure, density), concoction, mechanical (tensile and compressive strengths, modulus of flexibility, drying shrinkage) as well as comfortable (warm insulation, strength, dampness transport, resistance and acoustic insulation) qualities.

N Narayanan and K Ramamurthy (2000): investigated the microstructures of the aerated concrete. This exploration reports the examinations guided on the structure of bond based autoclaved aerated concrete (AAC) and non AAC with sand or maybe fly ash as the filler. The uses behind changes in compressive strength and drying shrinkage are disclosed with reference to the changes within the microstructure. Compositional exploration was performed utilizing XRD. It was noticed that fly ash reacts inadequately to autoclaving. The paste± void interface in aerated concrete analyzed in connection to the paste± aggregate interface in regular concrete uncovered the presence of an interfacial change zone. From this we realized that the microstructural improvements, whether due to compositional variety (sand/fly fiery continues to be as filler) or perhaps curing (moist curing/ autoclaving) altogether influences the attributes of aerated concrete. Non- autoclaved aerated concrete experiences alterations in framework with some time though autoclaved products are for all purposes and intents stable. Autoclaving brings about greater power as an outcome of the greater crystallinity of the items framed. The competence of autoclaving is much less when fly ash is available within the mix, the result items currently being inadequately crystalline

EP Kearsley et al (2001): investigated the porosity and also permeability of foamed concrete. An evaluation was welcomed to examine the impacts, on the attributes of frothed concrete, of supplanting extensive volumes of bond (up to 75 % by weight) with each purchased and unclassified fly ash. This paper reports specifically about the aftereffects of porousness and also porosity measured as much as an age of one yr on a lot cured concretes. Porosity was witnessed being needy for probably the most part on the dry density of the

concrete rather than on ash form or perhaps substance. Penetrability was calculated regarding water retention and water vapour porousness. The amount of water (in kg/m3) used by frothed concrete was around two times that associated with a proportional bond glue yet is not tainted with amount of air entrained, ash content or ash sort. The water vapour penetrability expanded with expanding porosity along with ash content.

A Laukaitis and B Fiks (2006): investigated the Acoustical properties of aerated autoclaved concrete. Three most broadly utilized types of AAC are resolved because of the investigation: gas bond concrete, gas concrete with joined folio (Portland bond and lime), and also froth bond concrete. The procedure and strategy of the materials' plan is showed in this work. The evaluation of acoustic qualities of AAC depends upon the material's air porousness and also porosity (i.e., ratio of the quantity of the interconnected pores on the aggregate quantity of pores). For this specific purpose the estimations acquired by an acoustic interferometer are utilized. The effects on the evaluation show that relapse problems for the AAC sorts, whose density ranges from 250 to 500 kg/m3, is used to look at the materials' ordinary frequency ingestion coefficient esteems, that rely upon the environment porousness and porosity. Results prove that retention coefficient of not exclusively treated AAC is fairly small. As suggested by the estimations got in an exceptional reverberation room of 202 m 3, a sound assimilation coefficient may possibly increment as much as 0.6, provided that openings of Helmholtz resonator's sort are built in the chunks ofAAC gas bond concrete with joined cover

Cenk Karakurt et al (2010): Utilization of all natural zeolite in aerated concrete production. In this particular research, natural zeolite (clinoptilolite) was used as a complete plus air pocket making operator in autoclaved aerated concrete (AAC) creation. The smashed and crushed specimens have been set up into two several molecule sizes: 100 lm (fine ZF) and 0.5?1 mm (coarse-ZC) prior to using in AAC blends. The impacts of molecule estimate, substitution sum (25 %, 50 %, 75 % along with 100
% against curing time and quartz) on the AAC properties had been tentatively examined. It was learned that use of healthy zeolite, especially with a coarser molecule measure, has invaluable effect on the mechanical and physical components of AAC. The top substitution sum was solved as more than half and in light of existing circumstances the compressive strength, thermal conductivity and unit weight of AAC had been assessed as 3.25 MPa, 0.1913 W/mK, 0.553 kg/dm3, separately. Scanning electron microscopy analysis similarly affirmed the above mentioned discoveries. Denser C?S?H structures have been acquired as much as a substitution measure of half. At long last, the test outcomes exhibited that calcined zeolite surely goes about as both a complete as well as an air pocket producing operator, and that AAC by way of a compressive strength of 4.6 MPa and unit weight of 0.930 kg/dm3 is produced with no aluminium powder use. It was learned that supplanting of silica sand with zeolite reduces the device weight of aerated concrete examples. At any rate, utilization of fine zeolite contrasted and also a coarse example increments the water requirement of the mix because of the bigger surface zone which has contrarily influenced the strength of the Zeolite Aerated Concrete (ZAC) examples. Effects of thermal insulation analysis acquired in this particular research (0.1157? 0.1932 W/mK) demonstrate that the concretes delivered could be used as a thermal insulation material in auxiliary uses as the common thermal conductivity values provided for AAC run from 0.08 to 0.19 W/mK. It was similarly learned that utilization of calcined zeolite (particularly that with coarse particles), each as an aggregate and as an air pocket producing operator, delivered stronger and denser ZAC examples on account of the reduced air circulation capacity of zeolite contrasted which of aluminium powder within the composite.

IV. MATERIAL USED

1. **Cement:** The cement should be fresh, of uniform consistency and free of lumps and other matter. It should be stored under dry conditions and for as short duration as possible. The cement used for this experiment is OPC (53 grade) conforming to IS12269-1987

Tab:1 Physical Properties Of Material

Specific gravity of cement	3.15
Specific gravity of coarse aggregate	2.60
Water absorption for coarse aggregate	0.5
Specific gravity for fine aggregate	2.62

2. **Fine Aggregates:** Fine aggregate should be clean, hard, strong, free of organic impurities and deleterious substances and relatively free of silt and clay. It should be inert with respect to other materials used and of suitable type with respect to strength,

density, shrinkage and durability of the mortar made with it. Natural river sand was used as fine aggregate which has size 0 to 4.75 mm and has specific gravity2.65.

3. **Course Aggregate**: The course aggregate used as crushed stone obtained from local quarries. Coarse aggregates can have round, angular, or irregular shape. Course aggregate should be clean, hard, strong, free of organic impurities and deleterious substances and relatively free of silt and clay. The maximum size of course aggregate used was 20 mm and minimum size is 10 mm. The course aggregate confining to requirement of IS 383-1970

4. **Water:** Water used in the mixing is to be fresh and free from any organic and harmful solution which will lead to deterioration in the properties of the mortar. Salt water is not acceptable but chlorinated drinking water can be used. Potable water is fit for use as mixing water.

5. **Plastic Aggregate:** The plastic aggregate made from waste plastic bags. It can be prepared from following steps, a) Collection: The waste plastics are collected from surrounding area which is thrown by human after its use. The plastic collection includes hotels, stores, and houses. b) Cleaning: The waste plastic contain grease, oil and clay particle. The waste plastic cannot be used as it is. The waste plastic washed by using water. c) Cutting: The washed plastic is cut in small size pieces by using cutter. The size of plastic pieces is less than 5mm.

6. **Poly Vinyl Chloride:** The PVC is collected from agriculture area, when farmers are thrown PVC after its use. This are PVC cut in fine aggregate size by using Grinder. The size of PVC pieces is less than 5mm

V. METHODOLOGY

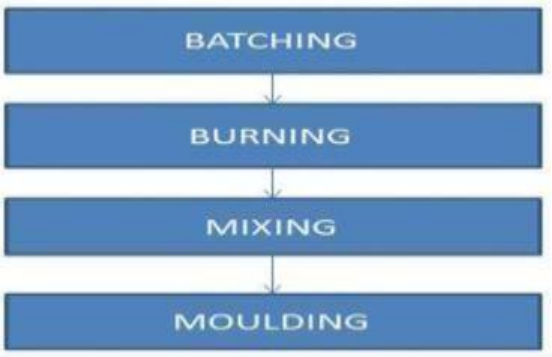

Fig 1 Methodology

Experimental Setup:

Concrete mix of M20 grade was being used. Mix design of concrete (1:1.5:3) was followed. Casting of twelve cubes was done. The standard Is actually Moulds of size 15 × 15 ×15 cm was utilized for casting. At the moment of casting, then cement in required quantity had been combined for a thoroughly clean platform. Then the required quantity of water was put into the mix. The blend is completely combined till uniform colour is obtained. The mixing is performed by machine. The area of block is levelled effectively employing a trowel. These blocks had been saved submerged in water for curing for 28 days after casting. The temperature of water widely used in curing tank was roomtemperature.

VI. RESULTS:

1) RESULTS

2) CONCLUSION:

1. Compressive strength of concrete is affected by addition of plastic andPVC pieces and it goes on decreasingof strength.
2. From above experiment it observed that by using PVC and plastic in the concrete it gives prior warning beforefailure.
3. The result proves such that concrete is used for low cost and light weight construction.
4. It is also helpful that solve the solid waste problem posted by plastic.
5. This replacement can also be used forhigher grade of concrete.

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