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A REVIEW ONEXPERIMENTAL INVESTIGATION ON CONCRETE USING CRUSHED FLUORESCENT LAMP POWDER WITH PARTIAL REPLACEMENT OF SAND

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ABSTRACT

Actually, as we all know that there is some strength of normal concrete block. But what happens when we add some of the crushed fluorescent lamp powder in concrete. So we are partially replacing the sand with fluorescent lamp powder and comparing the normal concrete block and block containing fluorescent lamp powder. To find the strength of the concrete by using crushed fluorescent lamp powder in concrete that how much strength is gained by that particular concrete. This is mainly used to determine the best composition of glass powder as a partial replacement of sand against the compressive strength of concrete. The content of the glass powder mixture used is 10%, 20%, and 30% of the weight of sand in the concrete mixture. We were performing various tests to get up to the results. We were using OPC (ordinary Portland cement) and fluorescent powder, of grade 53.

Keywords-Replacements, Fluorescent Light Tube, Waste materials, compression strength, economical

I. INTRODUCTION

In order to address the environmental effects associated with the production of fine aggregates, it is necessary to develop alternative binders for concrete production. As a result, extensive research is underway into the use of fine aggregate replacements, using many waste materials,and industrial by-products. In this study, the light residues of the finely ground fluorescent tubes are used as a partial replacement for the fine aggregate in the concrete, and compared it to conventional concrete. The light residues of the fluorescent tubes were partially replaced as their compressive, tensile and flexural strengths were tested at 10%, 20% and 30% up to 7, 14 and 28 days of age and compared with that of conventional concrete. On the basis of the results obtained, it is found that the light residues of the fluorescent tubes can be used as a substitute material for fine aggregates up to a particle size smaller than 4.75 mm. Recycling of waste from fluorescent tubes, within the concrete, and components of municipal waste destined for landfills. It is suitable for sustainable building practices. Ecological or environmental benefits of alternative materials include diversion of non-recycled waste from landfills for useful applications, reduction of negative effects of fine aggregate production, i.e. consumption of non-renewable natural resources. As we all know that the fluorescent lamp is dumped at the landfills and it is not reusable. So to make that waste material there is not another way to use it anywhere than it is usable than concrete and fond out the strength of the concrete than the normal concrete or plain concrete. As we all knows that the construction work never stops or the construction work never stops, so the construction is major part for the civil engineers. So as some waste materials are used in concrete is the best way to develop economy as well as the costing gets ultimately reduces foe construction purpose like the material we are using is fluorescent lamp powder with partial replacement of sand. Collection of fluorescent lamps from the landfills, or from scarp shops for the experiments and to use it in concrete to get to know the strength of concrete. Actually, it is more worthy than the other material to use it in concrete. It also solves the environmental problem of huge disposal of waste fluorescent lamp.

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II. LITERATURE REVIEW:

[1] M. Mageswari: In whole world, concrete is used for all types of construction. Hence, it has been properly labelled as the backbone to the infrastructure development of a nation as well as in various countries. Currently, our country is taking major initiatives to improve and develop its infrastructure by constructing express highways or industrial structures, etc. To emerge as a major economic power for our country. To meet out this rapid infrastructure development a maximum quantity of concrete is required. Unfortunately, our country is not self-sufficient in the production of cement and heavy availability of natural sand is also decreasing making the construction activities very costlier and non-economical. Hence, currently, the entire construction industry is in search of suitable materials and methods that would considerably or mainly minimize the use of concrete ingredients or materials and ultimately or fastly reduce the construction cost. Some of such products have already been identified like few of the material from waste and households like fluorescent lamp or its powder, so if it used in concrete the cost gets ultimately reduces.

S.G.P. as Fine Aggregate Replacement in Concrete (partially):

Experimental study was carried out by substituting Natural fine aggregate in weight by Sheet Glass Powder at rates varying from 10,20,30,40,& 50 percentages. From the test results it has been found that the optimum replacement level in fine aggregate with SGP is 10% byDr.B.Vidivelli.

[2] Batham Geeta: In this study,literature review has been conducted to study the characteristics strength properties of concrete using various alternative aggregates such as coconut shell aggregates, tire rubber aggregates, glass waste aggregates, plastic aggregates, palm kerenal shell aggregate, recycled brick ballast aggregate, recycled concrete aggregate, ceramic aggregates etc. for partial replacement of coarse aggregate . Review of work done by various researchers are studied and compiled here. Study reveals that incorporation of alternative coarse aggregates affects workability, strength and durability properties in significant manner. Therefore it can be easily said that incorporation of alternatives to coarse aggregates in concrete from agro-industrial wastes will help in conserving the natural resources and maintaining the ecological balance of the nature.

[3] AKSHAY P.S: At present paver block is used in outdoor versatility application and also it is used in street road and other construction places. Paver block has low cost maintenance and easily replace with a newer one at the time of breakage. The quality of concrete used to make paver block may be the major issue, so that the durability of paver block depends measuredly on quality of concrete, thus an attempt is made by partial replacement of fluorescent lamp powder & rubber chips as fine aggregate and coarse aggregate respectively affect the properties of paver blocks. This research study presents the information about the development of the paver blocks by fluorescent lamp powder & rubber chips.

[4] K. Kaviya: Experimental investigation an attempt has been made to find the suitability of the fluorescent tube light wastes as a possible substitute for conventional fine aggregate. In a district about40-60% of the fluorescent tube light are wasted due to various reasons. These wastes are not recycled at present. By utilizing this fluorescent tube light waste as a fine aggregate, safe disposal of waste materials can be achieved and construction costs are reduced. This investigation was carried out to evaluate the strength and durability properties ofM25 grade concrete with control specimen 10%, 20%, 30% replacement of fine aggregate with fluorescent tube light waste. Among the strength properties, compressive strength, split tensile strength and flexural strength were conducted. Under the durability properties porosity, acid attack, alkali attack and fire resistance test were conducted.

[5] Thavasumony D: Now a day's Building demand is constantly increasing & the capital cost of the construction of a building to is escalating, The demand for construction material is also increasing, at the same time the cost of the construction material is also increasing, To overcome these type of problems are want to found the new composition with low cost, Our ultimate aim of the project is: To introduce Fluorescent lamp powder as fine aggregate as one of the new material into the concrete. To find out the mix ratio by using Fluorescent lamp powder as fine aggregate in concrete to achieve the target mean strength. To solve the

environmental problem of the huge amount of disposal Waste Fluorescent lamp. Moreover disposal of solid waste is the major problem in recent scenario. This project deals with the study of concrete by partial adding of fine aggregate with the Fluorescent lamp powder. Trial mixes are performed to achieve a concrete of M20 grade where natural fine aggregate is substituted by weight with crushed Fluorescent lamp powder at the rates varying from 2,4,6,8 and 10percentages. The properties of binder, aggregates and Fluorescent lamp powder are also studied. The tests are conducted after proper curing on 7 days and 28 days and the test results are furnished in tabular form as well as in graphical form.

[6] Patricija Kara: Typical problem for Baltic States is recycling of glass; glass wastes are mainly dumped into landfill. Landfills of non-recyclable fluorescent lamp glass do not provide an environment-friendly solution for these wastes. In the present research waste borosilicate (DRL) and leaden silicate (LB) glass chippings after fluorescent lamp crushing were ground and used as micro filler as partial substitution of cement therefore reducing landfill pollution and CO2 emissions into the atmosphere. Waste glass powder additional grinding time was in the range of 30min to 90min in order to increase fineness. Superplasticizer was used in order to raise compressive strength of concrete.

[7]A.M. Pitarch: Spent fluorescent lamps glass (SFLG) waste, manually and mechanically processed in a lamps waste Treatment Spent fluorescent lamps glass (SFLG) waste, manually and mechanically processed in a lamps waste treatment plant, was used to partially replace up to 50 wt% Portland cement (PC). Both waste types exhibited similar pozzolanic activity. The mortars containing up to 35 wt% SFLG met the specifications for other pozzolanic materials (e.g. fly ash) and, after 90 curing days, their compressive strength values were similar to or higher than those of the 100% PC sample (58.8 MPa). Our results provide an alternative reutilization process for this hazardous waste to reuse SFLG as-received (no washing to reduce mercury)

and contributes to less PC use.

[8]Prabir Kumar Sarker: Cathode ray tubes (CRTs) waste generation has become a great environmental challenge worldwide. CRT glass possesses reasonable intrinsic strength, low water absorption and rich in silica, which makes the glass suitable for use as sand or pozzolona in construction materials. This work presents a comprehensive overview of literature reporting on the reuse of CRT glass to prepare glass-ceramics; cement mortar, paste, and concrete; and bricks. The effects of various critical factors on the resulting products' performance, preparation mechanisms, leaching behavior, lead fate, and environmental and human safety were investigated. The comparison of these recycling methods, and directions for future research were discussed and reported as well. Preparing cement mortar, paste, and concrete from CRT glass offer added advantages in terms of quantity of recyclable cathode ray tube glass at a given time, with minimal environmental and economic implications and thus could be an a promising value-added uses for CRT glass. The geographical distance between waste CRT glass sources and processing facilities, public policies should be taken into account in its recycling.

[9] **Bhupendra Singh Shekhawat:**Concrete is one of the most widely used construction materials in the world. However, the production of portland cement, an essential constituent of concrete, leads to the release of significant amount of CO2, a greenhouse gas; one ton of Portland cement clinker production is said to creates approximately one ton of CO2 and other greenhouse gases (GHGs). Environmental issues are playing an important role in the sustainable development of the cement and concrete industry [Naik and Moriconi, 2005] .There is a need to replace a part of cement by some pozzolanic material to reduce the consumption of cement and the environmental pollution can be checked to some extent. Some of the industrial wastes like fly ash, silica fume, blast furnace slag etc have already established their usage in concrete. Recently the research has shown that the waste glass can be effectively used in concrete either as glass aggregate or as a glass pozzolana. Waste glass when grounded to a very fine powder shows some pozzolanic properties because of silica content. Therefore the glass powder to some extent can replace the cement and contributes for the strength development and also enhances durability characteristics [Chikhalikar S.M. and Tande S.N., 2012]. Demand for recycled glass has considerably decreased in recent years, particularly for mixed-glass. Glass is cheaper to store

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than to recycle, as conditioners require expenses for the recycling process. There are several alternatives for the reuse of composite-glass. According to previous studies, all these applications, which require pre-conditioning and crushing, are more or less limited and unable to absorb all the quantities of waste glass available. In order to provide a sustainable solution to glass storage, a potential and incentive way would be to reuse this type of glass in concrete [Idir R, 2009].This paper present literature review on replacement of cement by waste glass powder which includes current and future trends of research on the use of crushed glass powder in Portland cement concrete.

[10]E.Sureshkumar: Concrete is a construction material composed of cement, aggregates (fine and coarse aggregates) water and admixtures. Today many researches are ongoing into the use of Portland cement replacements, using many waste materials like pulverized fly ash (PFA) and ground granulated blast furnace slag (GGBS). This work examines the possibility of using Fluorescent Glass powder as a partial replacement of cement for new concrete. Glass powder was partially replaced as 6%, 8%, 10%, 12%, 15% 20% and 25% and tested for its compressive, Tensile and flexural strength up to 28 days of age and were compared with those of conventional concrete from the results obtained, it is found that glass powder can be used as cement replacement material up to particle size less than 75μm to prevent alkali silica reaction. For study of size effect of glass powder the powder is divided in to two grades one is glass powder having size less than 90 micron and another is glass powder having particle size ranges from 90 micron to 150 micron. It is found from study, Initial strength gain is very less due to addition of GLP on 7th day but it increases on the 28 day. It is found that 10% addition of GLP gives higher strength. And also GLP size less than 90 micron is very effective in enhancement of strength.

III. METHODOLOGY

A. Cement:

Ordinary Portland Cement (OPC)-53 grade was used for the experimental investigation. It was tested for its physical properties according to Indian Standard specifications.

B. Aggregate:

Locally or easily available fine and coarse aggregates are used in theexperimentalinvestigation and coarse aggregate sieved to the required quantity and the maximum nominal size of 20 mm. the properly Care is taken to arrive the size of coarse aggregate ranging from 4.75 mm to the maximum nominal size of 20 mm.

C. Water:

Potable water available for concrete in laboratory of department of civil engineering is used for mixing the concrete and curing the specimens.

D. Fluorescent Light Tube:

It is crushed into powder by using single hand tool powder Preliminary tests are carried as per IS standard on the material used for concrete like specific gravity, fineness, consistency, and initial setting time for cement. For the aggregates tests such as sieve analysis, specific gravity, impact value.

- Collection of materials in which cement, water, sand, aggregates and fluorescent lamp glass are included. In which ordinary Portland cement (OPC) is required.
- Test on materials in which the various test were carried out like test on aggregates as well as and test on cement.
- Study of materials in which the grade of the concrete is M25 and the grade of the cement is 53.
- Casting and curing of specimen in which the block should be cast properly and the curing should be proper, and the curing is carried out for 7 days, 14 days, and 28 days.
- After the proper curing taking the block to the testing machines for testing.
- Take down the readings and go for calculations as per the testing and then go for the conclusions.

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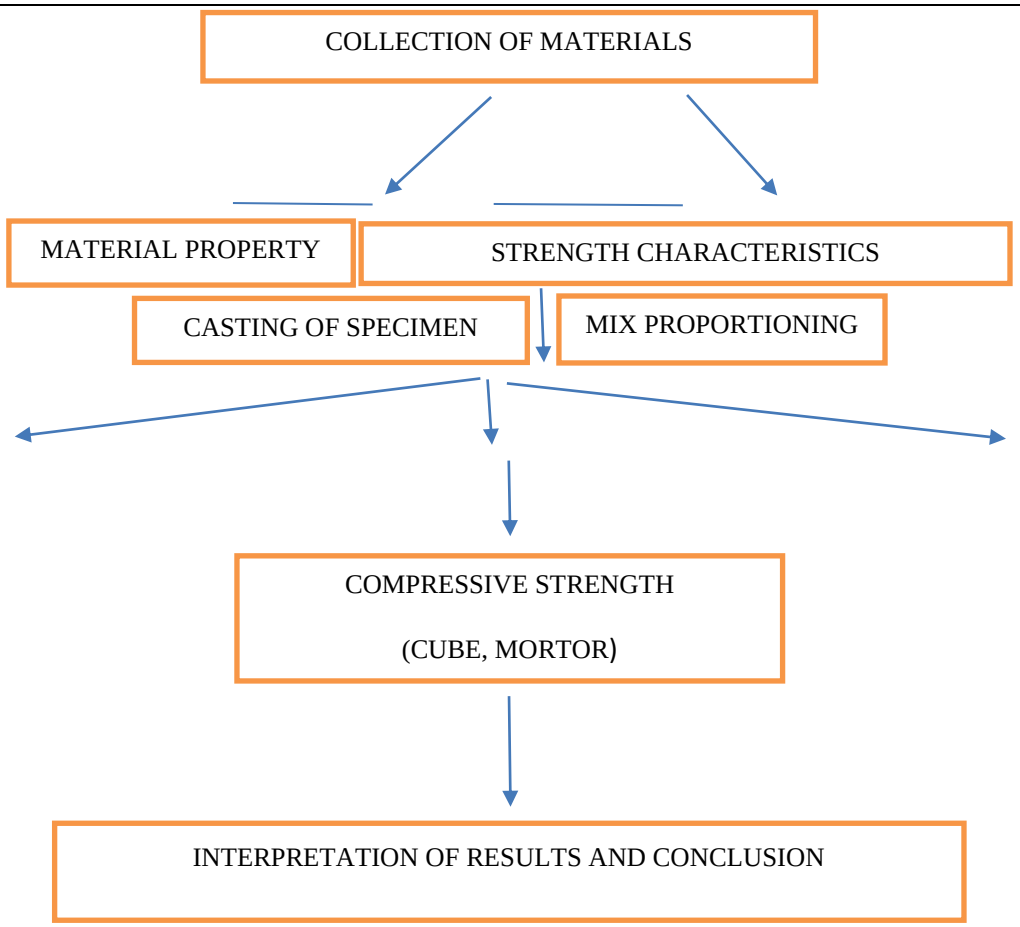

Fig: 1 FLOW CHART OF METHODOLOGY

Actually, the various tests were performed before the casting of blocks and the concrete blocks were casted but now it is in curing period for 7 days, 14 days, and 28 days. So after curing process the blocks are carried out for the compression testing to find out the strength of concrete. The blocks are now in the under process of curing for particular days.

IV. COMPRESSIVE STRENGTH

The test of compressive test was not done yet it will be carried out after curing process as our blocks are in curing process. But as per our material the strength gets increases. We are testing it for 7days, 14 days, and 28 days.

V. SCOPE OF PROJECT OR OBJECTIVE

To achieve the research objective, essential and necessary tests on fine aggregate cement, coarse aggregate, fluorescent tube waste and concrete of different mixtures should be carried out to increase the compressive, flexural and tensile split strength of concrete by using the fluorescent glass tubes. Ignite the waste by replacing the fine aggregate in the following percentages 0%, 10%, 20% and 30% perform various tests like slump cone, compression strength test to find out the strength of the concrete.

VI. CONCLUSION

From this review or study we conclude that how to deal with the waste materials which is dumped in landfills or how the household products are been used in construction field and used in buildings materials to gain the strength of the concrete.

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