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Determine strength of concrete cubes using Bakelite powder instead of natural sand

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Abstract-

Construction is the major part of everyday life. It requires all the construction material which mainly includes cement and sand. Cement provides the basic strength to the building. The manufacturing of cement is a major issue as it involves pollution on a large level as well as cost of construction also increases. This cement can be replaced by a construction material called fly ash. Sand provides bulk, strength and other properties to the building.

Sand is a granular material made out of finely separated stone and mineral particles. It is characterized by size, being better than rock and coarser than sediment. Sand can likewise allude to a textural class of soil or soil type; i.e., a dirt containing in excess of 85% sand-sized particles by mass.

Key Words **– Natural sand, Bakelite powder, Strength, Concrete cubes, Compressive strength**

1.INTRODUCTION

Sand is a non-sustainable asset over human timescales, and sand reasonable for making concrete is popular. Desert sand, albeit copious, isn't appropriate for concrete and 50 billion tons of sea shore sand and fossil sand is required every year for development.

.Sand is a granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type; i.e., a soil containing more than 85 percent sand-sized particles by mass.

The composition of sand varies, depending on the local rock sources and conditions, but the most common constituent of sand in inland continental settings and non- tropical coastal settings is silica (silicon

dioxide, or SiO_2), usually in the form of quartz. The second most common type of sand is calcium carbonate, for example, aragonite, which has mostly been created, over the past half billion years, by various forms of life, like coral and shellfish. For example, it is the primary form of sand apparent in areas where reefs have dominated the ecosystem for millions of years like the Caribbean.

Sand is a non-renewable resource over human timescales, and sand suitable for making concrete is in high demand. Desert sand, although plentiful, is not suitable for concrete, and 50 billion tons of beach sand and fossil sand is needed each year for construction.

1.1 USE OF BAKELITE AS A BUILDING MATERIAL

The purpose of this research is the use of waste Bakelite to reduce to quantity of sand used in construction industry. The compressive test result of concrete samples will be ompared between conventional mortar (0% WBFA) and waste Bakelite mortar (WBM) as well as comparing with the mortar standard. From an analysis of the sample test data found that the WBFA content in concrete mixture can predict the strength of WBM.

1.2 Objective

(1) To find alternative building material

(2) To find strength of concrete block at various proportion

(4) To reduce the dumping problem of Bakelite

2.LITERATURE REVIEW

(1)-S.Sakthi Sasmitha, Dr.R.N.Uma "A Critical Review on the Application of Bakelite as a Partial Replacement of Fine and Coarse Aggregate", International Journal for Scientific research & development, Volume 4 Issue 11 –NOVEMBER 2018, ISSN [ONLINE]: 2395-10521[1]:

The current investigation uncovers the properties and utilization of Bakelite as a development material in blocks, paver squares, and strong squares with fitting determinations. The utilization of waste material into development industry makes a difficult work and better execution alongside the advancement of development area. Consolidation of plastic waste in building material gives a savvy and light weight feasible part in development which adjusts the strength and toughness property. This investigation assists with fostering a replaceable material (squander Bakelite) for fine and coarse total to limit removal of plastics which makes a waste administration issue.

(2)-Nopagon Usahanunth, Seree Tuparakay "The transformation of waste bakelite ro replace natural fine aaggregate in cement mortar",Open article published by Elseweir.ltd. in

Highly functional plastic products centering on phenol resin products are used in various automobile-related products due to the outstanding properties achieved by its strong network bridge structure, such as high heat resistance and excellent chemical resistance. In particular, glass fiber-reinforced molding materials excel in strength, rigidity, dimensional stability, and reliability and are used in various elements of mechanisms such as a pulley, disk brake pistons, and water pumps

The objective of this study is a transformation of waste Bakelite from industrial manufacturing by size reduction with the milling machine. The smaller size of waste Bakelite will be classified into coarse aggregate and fine aggregate by sieve.

In this paper, the studying will focus on the transformation of waste Bakelite and the utilization of waste Bakelite fine aggregate (WBFA) as natural fine aggregate (NFA) replacement in a cement mortar. The milling capacity, the gradation of waste Bakelite fine aggregate grain size was analyzed, and illustrated by particle size distribution curve.

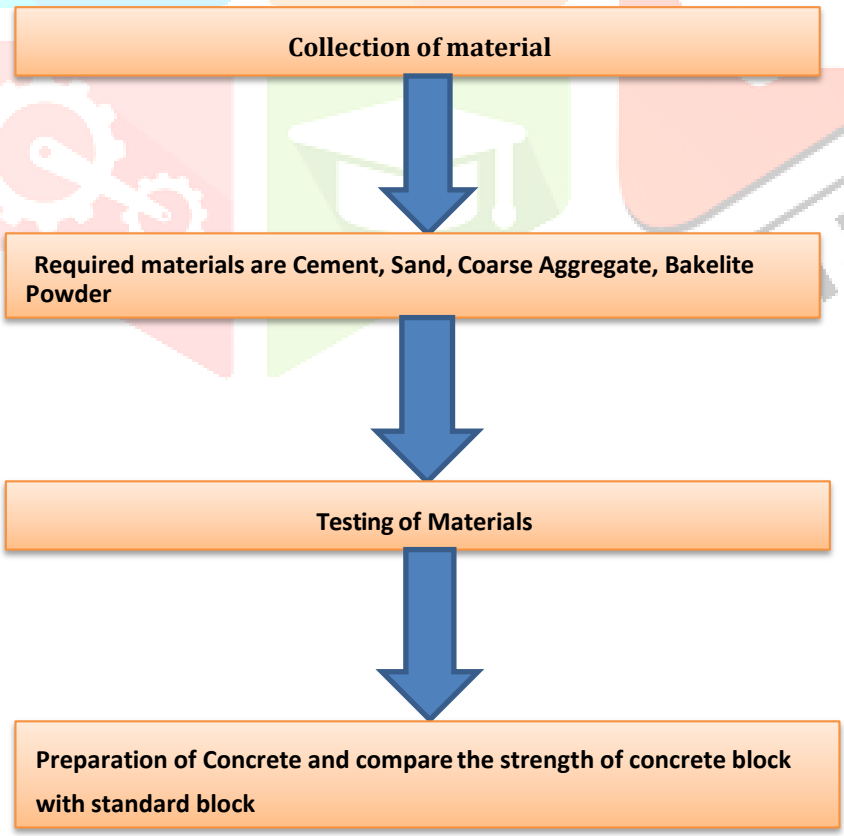
(3)- Lalith Prasanth.R, Gopalakrishnan.S, Thanigainathan.G, Kathiravan A. "Utilization of Waste Plastics in Flyash Bricks", International Journal of Pure and Applied Mathematics, Volume 119, No.15 2018, 1417-1424, ISSN: 1314-3395[3].

They utilized fly ash bricks with a combination of powdered plastics which is added as 5%, 10%, 15%, 20%. Raw materials used are Class F Flyash, Quarry dust, lime, waste plastic powder and water. Test results indicated that the compressive strength increases with increase in percentage of powdered plastic added. Moreover, there is a decrease in percentage of water absorption as the addition of plastic and there is a nil formation of white patches as per the result of efflorescence test. From this study, it was revealed that the partial replacement of plastic for quarry dust decreased the weight of brick and it can be effectively used in construction field.

(4).Ronak Shah, Himanshu Garg, Parth Gandhi, Rashmi Patel, Anand Daftardar. "Study of Plastic Dust Brick made from Waste Plastic", International Journal of Mechanical and Production Engineering, ISSN: 23202092, Volume- 5, Issue-10, Oct.-2017.

They reported to reduce the disposal problem caused by waste plastic thereby manufacturing a product of plastic dust. In this plastic dust is the main component which is formed by adding fly ash, bitumen, plastic dust, etc., in a proposed mix. Results based on the tests conducted were proven to have more compressive strength and water absorption rate with a lower weight than conventional brick. This was made to be more economical which reduces the cost of incinerators for burning and land filling process

3.METHODOLOGY–



4.MATERIAL

4.1 Cement-

In this project we use the ordinary PPC(Portland pozzolana Cement) cement. Portland- pozzolana cement is produced by grinding together Portland cement clinker and artificial pozzolana (Fly ash) with addition of gypsum or calcium sulphate

Fig-1 Cement

4.2 SAND-

Sand derived from a rock, in which the grains separate along their natural boundaries. This includes unconsolidated sand or a soft sandstone where little pressure is required to separate the individual grains.

Fig-2 Natural Sand

4.3 BAKELITE POWDER-

Bakelite powder of the synthetic resins probably the best known and most widely employed is Bakelite. This is produced by a reaction between phenol (carbolic acid) and formaldehyde, a product of wood distillation.

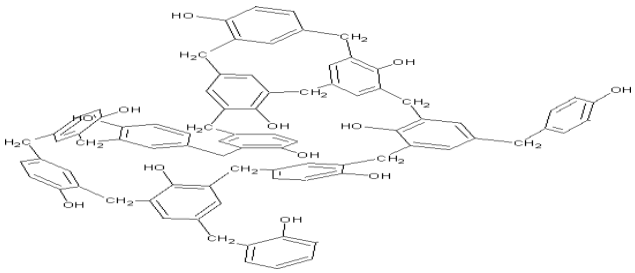


Fig-3 Bakelite

4.4COASRE AGGREGATE

Coarse aggregate is defined as rock particles with diameter more than 4.75 mm, usually called gravels. Commonly-used coarse aggregates in concrete are gravels and pebbles.

Fig-4 Coarse Aggregate

4.5WATER-

Potable tap water available in laboratory with pH 7.0 and confirming to requirement of IS 456-2000 was use for Mixing concrete and curing the specimen as well.

5. TEST-

5.1 TESTS FOR AGGREGATE

Crushing test

Impact test

Water absorption test

5.2 TEST FOR CEMENT

Fineness test

Setting Time test

Specific gravity test

5.3 TEST FOR CONCRETE

Slump test

Compressive strength test

6.RESULT-

FINENESS TEST-

Sieve size-90 micron (IS – 9 number) According to IS-4031-1996

Date of test – 25/01/2021

Table 4.1 Fineness test

Sr.No.	Weight of cement	Weight retained on sieve	Percentage fineness
1.	100gm	2gm	2%
2.	100gm	4gm	4%
3.	100gm	3gm	3%

Result- Average fineness is 3%.

Discussion- As per IS: 4031 (Part 1) – 1996. The cement of good quality should have less than 10% of weight of cement particles larger than 90 µm. (micron)

Our result is 3% of weight, which is less than 10%.

Hence, fineness result is OK.

7. CONCLUSION-

1. Fine aggregate replacement by brick kiln dust showed strength ranging from 24.51Pa to 25Pa for 0% to 10% Bakelite powder content.
2. The optimum result is found to be after replacement of Bakelite powder
3. Strength of concrete with Bakelite powder replacements at optimum ratio was tested to be 24.51 MPa
4. This concrete can be used up to 3 floor house/buildings, surface water tanks and for structure of aesthetic value.
5. High quality control with respect to material and casting is required for this type of concrete manufactures.

REFERENCES-

[1]. S.Sakthi Sasmitha, Dr.R.N.Uma "A Critical Review on the Application of Bakelite as a Partial Replacement of Fine and Coarse Aggregate", International Journal for Scientific research & development, Volume 4 Issue 11 –NOVEMBER 2018, ISSN [ONLINE]: 2395-1052

[2.] Nopagon Usahanunth, Seree Tuparakay "The transformation of waste bakelite ro replace natural fine aaggregate in cement mortar",Open article published by Elseweir.ltd. in 2017,www.elsevier.com/locate/cscm

[3]. Lalith Prasanth.R, Gopalakrishnan.S, Thanigainathan.G, Kathiravan A. "Utilization of Waste Plastics in Flyash Bricks", International Journal of Pure and Applied Mathematics, Volume 119, No.15 2018, 1417-1424, ISSN: 1314-3395.

[4]. S. Alan, B.Sivagnanaprakash, S.Suganya, A.Kalaiselvam, V.Vignesh. "A Study on Mechanical Properties of Flyash Brick with Waste Plastic Strips", International Journal of Applied Engineering Research, ISSN 0973-4562 Vol. 10 No.53 (2015)

[5]. Lairenlakpam Billygraham Singh, Loukham Gerion Singh, Pongsumbam Boss Singh, Suresh Thokchom. "Manufacturing bricks from Sand and Waste Plastics", International Journal of Engineering Technology, Management and Applied Sciences, March 2017, Volume 5 Issue 3, ISSN 2349-4476.

[6]. Puttaraj Mallikarjun Hiremath, Shanmukha shetty, Navaneeth Rai.P.G, Prathima.T.B. "Utilization of Waste Plastic in manufacturing of Plastic-Soil Bricks", International Journal of Technology Enhancements and Emerging Engineering Research, Vol 2, Issue 4 102 ISSN: 2347-4289

[7]. Ronak Shah, Himanshu Garg, Parth Gandhi, Rashmi Patel, Anand Daftardar. "Study of Plastic Dust Brick pmade from Waste Plastic", International Journal of Mechanical and Production Engineering, ISSN: 23202092, Volume- 5, Issue-10, Oct.-2017.

[8]. Dinesh. S, Dinesh. A, Kirubakaran. K. "Utilization of Waste Plastic in manufacturing of Bricks and Paver Blocks", International Journal of Applied Engineering Research, ISSN 0973-4562 Vol. 11 No.3 (2016).