International Journal of Pure and Applied Mathematics
Volume 116 No. 17 2017, 483-487
ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version)
url: http://www.ijpam.eu
Special Issue

ijpam.eu

STUDY ON PARTIAL REPLACEMENT OF FINE AGGREGATE BY QUARRY DUST

B.Kaviya [1] Aswathy.M[2]
Assistant Professor [1],[2], Department of Civil Engineering,
BIST, BIHER ,Bharath University, Chennai-73
kaviya.civil@bharathuniv.ac.in

Abstract: Around 5% of worldwide CO2 discharges originate from bond generation. Gas outflow is the consequence of fuel ignition and compound responses that occur in various phases of the procedure, principally in the clinker blazing stage. Amid the procedure of bond assembling, around 0.92 t of CO2 is discharged per ton of clinker delivered. This discharge for the most part originates from decarbonization of limestone, and the utilization of carbon energizes for warming (0.39 t). Normal CO2 outflows take up with processing procedures are 0.1 t of CO2 for each ton of concrete and originates from creation of power. As ecological, transportation and different limitations make the accessibility and utilization of waterway sand less appealing, a substitute or swap item for solid industry should be found. The materials utilized incorporate Ordinary Portland Cement, quarry-tidy, waterway sand and water. Bond, Quarry clean and River sand are tried for their physical attributes according to the significant measures. The outcomes demonstrated that 30% substitution of quarry tidy gives more quality and it is appropriate for field works.

1. Introduction

In the development of structures and different structures, concrete assumes a huge part and an expansive quantum of cement is being used. The development organizations utilized the common assets from long decades as crude materials specifically. Waterway sand is one of the constituents utilized as a part of the generation of traditional cement has turned out to be very costly because of inordinate cost of transportation from common sources furthermore rare.

Because of the persistent utilization of normal assets, for example, stream sand, the request increments definitely paying little mind to use. The expanding interest will proceed in future too. Vast scale consumption of these sources makes ecological issues moreover. The expansion of pozzolanic materials enhances the mechanical attributes of these lime mortars and contributes towards a higher strength. A further favorable position of lime pozzolan mortars is their lower ecological effect, when contrasted with concrete mortars, because of lower vitality utilization amid creation and CO2 retention via carbonation.[1]

1.1 Objective Of The Research

To study the maximum usage of quarry rock waste as fine aggregates in mixtures by replacement of natural sand.
To examine the effect quarry rock dust in the characteristic strength of concrete on compression strength test. [2]

1.2 Scope of project

To provide a most economical concrete.
It should be easily adopted in field.
Using the waste in a useful manner.
To reduce the cost of construction.
To make the maximum usage of locally available material.
Minimize the maximum demand of river sand

2. Quarry Rock Dust



Figure 1. Quarry Rock dust

The quarry Rock Dust can be characterized as buildup, following or other non-profitable waste material after extraction and handling of rocks to shape fine particles under 4.75mm. More often than not, Quarry shake clean is for the most part utilized as a part of interstates (in extensive scale) as surface completing material furthermore utilized for assembling of empty pieces. In remote nations the solid squares contain 40% - half of fines.

In prepared blend concrete regularly contains 25% - 30% of fine totals, made up of equivalent measure of quarry fines and sand.[3] However, the measure of sand stone and molten shake fines utilizing as a part of the way was constrained, which produces drying shrinkage and different issues. Quarry shake tidy solid encounters better sulfate and corrosive resistance and its penetrability is less, contrasted with that of customary cement.[4]

2.1 Need for quarry rock utilization

These residues are generally less than 1% of aggregate production. In the normal concrete, the introduction of quarry dust for mixing is limited due to its high fineness. And it is available at low cost and locally available material. It has almost similar properties including texture of river sand, but it has sharp and angular edges. It minimizes the maximum exploitation of river sand and thereby augmenting aquifer capacity, It also prevents the environmental degradation.[5]

2.2 Quarry waste

Quarry waste is gotten as a by-item amid the creation of totals through the devastating procedure of rocks in rubble crusher units. Utilizing quarry squander as a substitute of sand in development materials [6]would resolve the ecological issues brought about by the vast scale exhaustion of the normal wellsprings of waterway and mining sands. Typically quarry waste is utilized as a part of extensive scale as a surface completing material in expressways. [7]

Workability of crisp cement is expanded, while the unit weight and air content stay unaffected within the sight of quarry waste.[8] They additionally demonstrated that the utilization of quarry waste does not influence the compressive quality, ultrasonic heartbeat speed and flexible modulus of cement; The strength related properties of cement can be enhanced utilizing quarry squander as a part of the nearness of silica smoke.[9]

The compressive and part rigid qualities and solidness of cement including quarry waste were better as contrasted and the ordinary cement. Consequently, the effective usage of quarry waste in elite and self-combining cements could transform this waste material into a profitable asset.[10-17]

2.3 Properties of quarry dust

Normal stream sand is costly because of over the top cost of transportation from characteristic sources. Additionally expansive scale exhaustion of these sources makes ecological issues. [18-22]As ecological transportation and different requirements make the accessibility and utilization of stream sand less appealing, a substitute or trade item for solid industry should be found. Waterway sand is most regularly utilized fine total as a part of the creation of solid represents the issue of intense deficiency in numerous territories. [23-30]

As of now India has taken a noteworthy activity on building up the foundations, for example, express roadways, control ventures and mechanical structures and so on., to meet the prerequisites of globalization,[13] in the development of structures and different structures concrete assumes the legitimate part and a substantial quantum of cement is being used. Waterway sand, which is one of the constituents utilized as a part of the generation of ordinary cement, has turned out to be exceptionally costly furthermore rare. In the setting of such a somber air, there is huge interest for option materials from mechanical waste.[14]

3. Materials and methods

The materials utilized incorporate Ordinary Portland Cement, quarry clean, waterway sand and water. Concrete, Quarry clean and stream sand are tried for their physical qualities according to the important models. The Mortar solid shapes of size 50mm are utilized for the assurance of compressive quality.[15] Two control blends are set up with waterway sand as fine total and quarry tidy as fine total. The readied mortar is filled in 50mm block shape and compacted utilizing a table vibrator. The examples are inundated in water for curing. Examples are removed from curing tank at assigned ages (7, 14 and 28 days) and tried for their compressive quality.[16-19]

3.1 Methodology

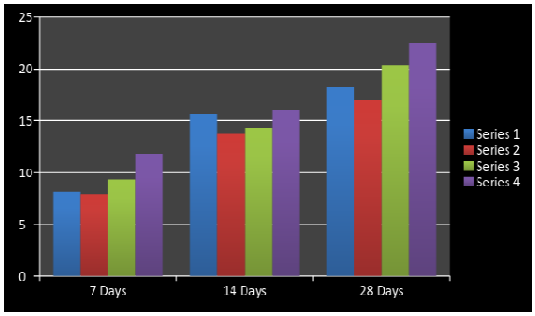
- Tested the material properties as per IS procedures.
- Mix design for concrete proportion has been developed as per IS: 10262-2009.
- Casted and cured the concrete specimens as per IS procedures.
- The property of fresh concrete was tested as per IS: 1199-1959.
- The characteristic strength of hardened concrete specimen was tested as per IS: 456-2000.
- Find the optimum replacement of optimum replacement.
- Compare the results of conventional concrete and half replacement concrete

4. Results And Discussions

4.1 Compressive Test



Figure 2. Compressive test



Series 1 - Conventional
Series 2 - 10% of Quarry dust
Series 3 - 20% of Quarry dust
Series 4 - 30% of Quarry dust.

Figure 3. Compressive test bar chart

4.2 Split Tensile Test



Figure 4. Split Tensile Test

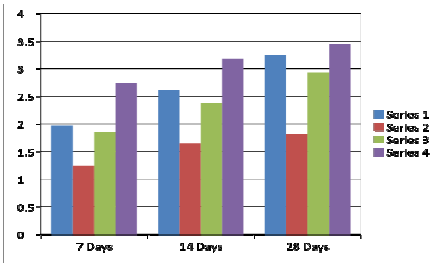


Figure 5. Split Tensile Test Bar chart

5. Conclusions

It is tentatively confirmed that 30% substitution of quarry tidy gives more quality and it is pertinent for field works. Characteristic stream sand, if supplanted by hundred percent Quarry Rock Dust from quarries, may once in a while give equivalent or superior to anything the reference concrete made with Natural Sand, as far as compressive and flexural quality studies. Contemplates reported here and somewhere else have demonstrated that the quality of Quarry Rock Dust cement is relatively 10-12 percent more than that of comparative blend of Conventional Concrete Thus, it can be inferred that the supplanting of characteristic sand with Quarry Rock Dust, as full substitution in cement is conceivable. Be that as it may, it is prudent to do trial throwing with Quarry Rock Dust proposed to be utilized, keeping in mind the end goal to touch base at the water substance and blend extent to suit the required workability levels and quality necessity. In any case, more research studies are being made on Quarry Rock Dust solid important for the down to earth use of Quarry Rock Dust as Fine Aggregate.

References

[1] Vijayaragavan S.P., Karthik B., Kiran T.V.U., Sundar Raj M., Robotic surveillance for patient care in hospitals, Middle - East Journal of Scientific Research, v-16, i-12, pp-1820-1824, 2013.

[2] Vijayaragavan S.P., Karthik B., Kiran Kumar T.V.U., Sundar Raj M., Analysis of chaotic DC-DC converter using wavelet transform, Middle - East Journal of Scientific Research, v-16, i-12, pp-1813-1819, 2013.

[3] Sundararajan M., Optical instrument for correlative analysis of human ECG and breathing signal, International Journal of Biomedical Engineering and Technology, v-6, i-4, pp-350-362, 2011.

[4] Kiran Kumar T.V.U., Karthik B., Improving network life time using static cluster routing for wireless sensor networks, Indian Journal of Science and Technology, v-6, i-SUPPL5, pp-4642-4647, 2013.

[5] Karthik B., Kumar T.K., Dorairangaswamy M.A., Logashanmugam E., Removal of high density salt and pepper noise through modified cascaded filter,

Middle - East Journal of Scientific Research, v-20, i-10, pp-1222-1228, 2014.
[6] Karthik B., Kiran Kumar T.V.U., EMI developed test methodologies for short duration noises, Indian Journal of Science and Technology, v-6, i-SUPPL5, pp-4615-4619, 2013.
[7] Vijayaragavan S.P., Karthik B., Kiran Kumar T.V.U., Privacy conscious screening framework for frequently moving objects, Middle - East Journal of Scientific Research, v-20, i-8, pp-1000-1005, 2014.
[8] Vijayaragavan S.P., Karthik B., Kiran Kumar T.V.U., A DFIG based wind generation system with unbalanced stator and grid condition, Middle - East Journal of Scientific Research, v-20, i-8, pp-913-917, 2014.
[9] Arul Selvi S., Sundararajan M., A combined framework for routing and channel allocation for dynamic spectrum sharing using cognitive radio, International Journal of Applied Engineering Research, v-11, i-7, pp-4951-4953, 2016.
[10] Arul Selvi S., Sundararajan M., SVM based two level authentication for primary user emulation attack detection, Indian Journal of Science and Technology, v-9, i-29, pp--, 2016.
[11] Kanniga E., Sundararajan M., Kanembedded control of sub cyclic Ac chopperwith high speed and low switching losses, Advanced Materials Research, v-717, i-, pp-579-584, 2013.
[12] Kanniga E., Sundararajan M., Modelling and characterization of DCO using pass transistors, Lecture Notes in Electrical Engineering, v-86 LNEE, i-VOL. 1, pp-451-457, 2011.
[13] Kanniga E., Selvaramarathnam K., Sundararajan M., Embedded control using mems sensor with voice command and CCTV camera, Indian Journal of Science and Technology, v-6, i-SUPPL.6, pp-4794-4796, 2013.
[14] Lakshmi C., Ponnavaikko M., Sundararajan M., Improved kernel common vector method for face recognition, 2009 2nd International Conference on Machine Vision, ICMV 2009, pp-13-17, 2009.
[15] Lakshmi C., Sundararajan M., Manikandan P., Hierarchical approach of discriminative common vectors for bio metric security, 2010 The 2nd International Conference on Computer and Automation Engineering, ICCAE 2010, v-2, i-, pp-784-790, 2010.
[16] Venkataganesan K.A., Mohan Kumar R., Brinda G., The impact of the determinant factors in the career satisfaction of banking professionals, International Journal of Pharmacy and Technology, v-8, i-3, pp-17431-17436, 2016.
[17] Sambantham M.C., Venkatramaraju D., Human resources management (HRM) practices in multinational companies with reference to knowledge transfer, International Journal of Pharmacy and Technology, v-8, i-3, pp-18565-18571, 2016.
[18] Suganthi S., Senthilkumar C.B., A study on stress management of the staff of the co operative banks of Tamil Nadu, India, International Journal of Pharmacy and Technology, v-6, i-4, pp-7529-7533, 2015.
[19] Thooyamani K.P., Udayakumar R., Khanaa V., Cooperative trust management scheme for wireless sensor networks, World Applied Sciences Journal, v-29, i-14, pp-253-258, 2014.
[20] Nivethitha J., Brindha G., Management of Non-Performing Assets in Virudhunagar District Central Co-Operative Bank-An Overview, Middle - East Journal of Scientific Research, v-20, i-7, pp-851-855, 2014.
[21] Ramachandran S., Venkatesh S., Performance measurement and management system-inter company case Study approach-Tamilnadu, India, Middle - East Journal of Scientific Research, v-20, i-9, pp-1162-1174, 2014.
[22] Mathew S., Brindha G., Medical tourism â€“ An avenue to attract foreign patientsin Indian hospital industry, a study conducted in Chennai city, International Journal of Applied Engineering Research, v-9, i-22, pp-7508-7513, 2014.
[23] Mathew S., Brindha G., An empirical study on competency mapping â€“ A tool for talent management, International Journal of Applied Engineering Research, v-9, i-22, pp-7348-7354, 2014.
[24] Mathew S., Brindha G., Quality of work life among the women it professionals in Chennai city, International Journal of Applied Engineering Research, v-9, i-22, pp-7434-7442, 2014.
[25] Mathew S., Brindha G., Level of stress and its impact on job satisfaction among the employees of Air India limited, Chennai, International Journal of Applied Engineering Research, v-9, i-22, pp-7549-7559, 2014.
[26] Brindha G., Emerging trends and issues in human resource management, Middle - East Journal of Scientific Research, v-14, i-12, pp-1727-1730, 2013.
[27] Nivethitha J., Brindha G., Virudhunagar district Central Co-Operative Bank- An overview, Middle - East Journal of Scientific Research, v-12, i-12, pp-1663-1667, 2012.
[28] Brindha G., Revamp of educational system-promoting entrpreneurship in India, Middle - East Journal of Scientific Research, v-12, i-12, pp-1668-1671, 2012.
[29] Brindha G., Current role of human resources in health sector, Middle - East Journal of Scientific Research, v-12, i-12, pp-1649-1656, 2012.
[30] Brindha G., A new approach for changes in health care, Middle - East Journal of Scientific Research, v-12, i-12, pp-1657-1662, 2012