International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 07 | July 2020 www.irjet.net p-ISSN: 2395-0072

An application on the Effect of Recycle Coated Crushed Brick and Non Coated Over Burnt Brick Aggregate with wire mesh on the Strength of Concrete

Amit[1], Shubh Kant Yadav[2]

[1]*Post Graduate Student in Civil Engineering, Department of Civil Engineering, IEC College of Engineering and Technology, Greater Noida-301306, Uttar Pradesh, INDIA*

[2]*Assistant Professor, Department of Civil Engineering, IEC College of Engineering and Technology, Greater Noida-201306, Uttar Pradesh, INDIA*

Abstract - *A wide assessment was driven for reusing of crushed concrete as coarse total for new improvements works. Properties of reused total and properties of reused total cement are shortened freely. In this assessment, the outcomes of assessments on some basic issues related with reusing of pulverized cement are consolidated, for instance, connection of reused square and stone total cement. To create an examination on solid which intertwine Over Burnt Brick and reused secured square total with wire work, solid waste not entirely in view of their abundance. 15%, 30% and 45% (M25, M30) solidification was used as midway replacement of trademark coarse total in concrete. From all of the results and test approach it is assumed that Concrete encircled with over expended square aggregate and reused secured square total with wire work, solid waste total showed accommodating execution as differentiated and the solid comprised of normal total got from close by resources. It reduces the cost of cement by lessening the total cost and conveys reasonable foundation structure. It has been seen that the usage of waste materials brings about the improvement of light weight concrete. Businesses of such waste materials won't simply hacked down the cost of improvement, anyway will in like manner contribute in safe exchange of waste materials.*

Key Words: **concrete, over burnt bricks, coated recycled aggregate, partial replacement coarse aggregate, wire mesh, waste materials, crushing loads.**

1.INTRODUCTION

Concrete is made by mixing concrete, sand, coarse total and water to conveyed material that can be framed into any shape. The critical volume concrete is stacked with total. The thought of total in solid declines its drying shrinkage properties and improves various properties, for instance, compressive quality, etc. Regardless, it is extreme to move, so neighborhood sources are relied upon to diminish the expense of transport, yet in light of land necessities this isn't available at all spots, as such it requires finding various sources and alternative from close by sources.

The various materials are used as a choice hotspot for normal coarse total, for instance, reused low quality crushed block, reused coarse total, coconut shell, reused plastic total, very much devoured block, etc. For this work select a jhama class block as a choice hotspot for course total.

This material was singled out the grounds that in block making, an expansive number of blocks are dismissed due to non-congruity is the bowed kind of block made because of high temperature control in the radiator. These dismissed blocks can additionally be likely wellspring of coarse total. As indicated by general definition concrete is a composite material so by abusing the condition for the comprehensive network, this paper shows the examination that is done on the solid when trademark coarse total isn't totally replaced by Jhama Class block total.

1.1 Recycled Brick as Concrete Aggregate

The word „brick" alludes to artistic workmanship unit which is produced by terminating clayey soil. Reused dirt brick" is characterized as the waste material that can be acquired from wrecked workmanship or non-standard disposed of items toward the finish of the assembling procedure.

1.2Wellsprings of Recycled Brick

There are two significant sources from which reused mud block can be acquired development and destruction waste, and dirt block/tile fabricating plants. Development and destruction squander (CDW) incorporates the undesirable extra material from any development movement which can be new development, redesign or destruction.

Recuperation of block units from workmanship worked with portland concrete mortar is unfeasible for re-use since the holding is excessively solid. Along these lines, they are generally squashed and utilized with the mortar polluting influence. A particular screening to acquire clay material is likewise conceivable. Clearly squander material from the assembling plants doesn't have this issue.

Today reused block is utilized as overlay material in tennis courts and following fields and as plant substrate. In structural building applications, it very well may be utilized in unbound frameworks, for example, seepage covers, sub base in street development, or fill material in banks. Then again, high-grade use, for example, a fixing in cement or black-top, is additionally conceivable. Squashed block total in portland concrete cement is known to be utilized in Germany in 1860. Methodical examinations on the utilization of squashed block total goes back to 1928. Be that as it may, the principal critical pragmatic application was after the Second World War in Germany where the urban communities were obliterated down to rubble. Roughly 11.5 million cubic meters of squashed block total were utilized to fabricate 175,000 abodes.

2. LITERATURE REVIEW

In this part we have discussed the particular materials which are a great part of the time used for referencing the solid and target realities of the various makers by using the different materials by writing audit.

Gopinandan Dey and Joyanta Pal (2013) [1] they look at that Use of Brick Aggregate in Standard Concrete and Its Performance in Elevated Temperature. in this paper a deliberate exertion has been made to check the attainability of utilization of block total made of locally accessible block in standard cement (M25 to M55 according to IS:456-2000). High water retention (12% to 20% by mass) of block total is a significant issue to utilize it in the genuine work, along these lines an endeavor has been made to propose a sensible answer for genuine field application. A test study has been led to check different quality boundaries, usefulness and imperviousness to fire of block total cement. It is seen that standard cement can be made with squashed block total which are additionally having generally excellent warmth opposition up to a temperature of 6000C.

A.Siva (2017) [2] have played out that Experimental Investigation on Partial Replacement of Fine Aggregate Using Crushed Spent Fire Bricks. This task clarifies about the substitution of fine totals by mostly squashed spent fire blocks. In this manner fluctuating level of fine totals by squashed went through fire blocks with differing level of 10%, 15%, 20% and 25% and ideal level of substitutions is made and quality and usefulness boundaries are examined. The usefulness of cement gets diminished with the expansion of the squashed spent blocks. From the test outcomes, squashed spent fire blocks substituted for fine totals invigorate a greatest at 20% when contrasted with regular cement. At that point the ideal level of substitution of fine totals by squashed spent fire blocks are utilized in mix as incomplete substitution in concrete and the ideal level of the mix is gotten.

Riaz Bhanbhro, Irfanullah Memon, Aziz Ansari (2014) [3] completed investigations dependent on properties assessment of solid utilizing nearby utilized blocks as coarse total and announced that Due to present day prerequisites for living and created development businesses, the old structures (as a rule built with block brick work) are crushed and are supplanted with new current structures. In this paper endeavor has been made to utilize nearby utilized blocks as coarse total. Solid blocks made with nearby reused blocks are thrown and tried for by and large weight of solid, dampness content, powerful modulus of flexibility and compressive quality (nondestructive and damaging techniques). The outcomes demonstrated that solid got from reused totals achieved lower quality than standard cement. The normal mass thickness of cement made with reused totals was seen as 1912 kg/m3 and same for the ordinary cement was found as 2280 kg/m3. The mass thickness of reused total cement was determined to be 16% less when contrasted with ordinary cement.

Kasi Rekha, M. Potharaju (2015) [4] Utilized the development flotsam and jetsam as reused totals in the creation of cement. The reused block total (RBA) concrete was utilized for the creation of poor quality reused total appropriate for solid creation. The aftereffects of an exploratory examination on the impacts of high temperatures on the properties of a standard RBA solid blend made in with 25% of squashed mud blocks as the coarse total. The solid shapes were casted with squashed earth block and stone total. The examples of both RBA and Granite total (GA) concrete were exposed to temperatures going from 100o C to at a timespan C for span of Three hours. He utilized the Natural squashed 20 mm single estimated rock total in the examination so correlations could be made with the squashed mud block total. The gathered reused block were then squashed down to the 20 mm and 10mm total physically. The RBA was then covered with concrete slurry (1:4 proportion) to decrease its water ingestion before utilizing them in concrete. The compressive quality of both the cements before 1000o C and after introduction to high temperatures was contrasted with evaluate the relative execution. The outcomes indicated that RBA concrete preformed better than GA concrete at high temperatures.

Salmaliza Salleh, Md Ghazaly Shaaban (2014) [5] detailed an exploratory program to investigate the impact of utilizing impacted copper slag from shipyard fix and upkeep as substitution of fine totals in the sand-concrete block. 20 solid shapes of concrete sand block blends were created with various impacted copper slag proportion running from 0% (for the control blend) to 60%. All the sand-concrete block blends were tried for their compressive quality, thickness and water retention at day 28 of air restoring. There was a 16.28% improvement in the compressive quality of block with 20% substitution of

copper slag as fine totals in examination with control blend. Be that as it may, the expansion of higher level of impacted copper slag as fine totals brought about decrease of compressive quality yet the thickness was expanded. Likewise, the water retention diminished as copper slag proportions in block expanded. Subsequently, it was prescribed that 0% to 20% of impacted copper slag might be utilized as a substitution of fine totals so as to get a decent quality and low thickness of sand-concrete block.

George Rowland Otoko (2014) [6] did examines dependent on utilization of squashed earth blocks as total in concrete and announced that The chance of utilizing squashed dirt blocks as total in bituminous blends. Two block totals were squashed from unused blocks, one reused block total (RBA) and the other, rock total; and the properties contrasted and one another. Physical and mechanical properties of the totals utilized in the black-top solid (AC) were then decided. Test outcomes indicated that AC examples of unused and reused block total outflanked examples made with rock totals, primarily as a result of the high porosity and harshness of the outside of squashed dirt block totals, which can ingest more bitumen and give better holding in black-top solid (AC). RBA has numerous ecological advantages that make them appropriate elective totals in development.

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper.

3. MATERIALS AND TEST

A.GENERAL:- In this examination an endeavor has been made to think about the impact of recycle brick & non coated over burnt bricks with wire mesh on properties of concrete. The methodology took after, tests directed for determination of configuration blend is examined in this part .

1) Specific gravity Test :

- Specific gravity Test for cement
- Specific gravity Test for fine aggregates
- Specific gravity Test for coarse aggregates

2) Water absorption Test

- Water absorption Test for fine aggregates
  - Test for coarse aggregates
  - Sieve analysis
  - Surface moisture Test
  - Bulk density Test
  - Water adsorption
  - Fineness of cement Test .

MATERIAL USED:-

A) Materials:-

a) Cement:

Cement is a fine, grey powder. It is mixed with water and materials such as sand, gravel, and crushed stone to make concrete. The cement and water form a paste that binds the other materials together as the concrete hardens. Ordinary Portland cement having 28 days compressive strength of 46 MPa (ASTM 1994) was used for preparation of all concrete cubes. By using one type of cement, the effect of varying the types of coarse aggregate in concrete is investigated.

TABLE:-I Properties of cement

S. No.	**Characteristics**	**Values obtained**	**Standard values**
1	Normal consistency	35%	
2	Initial Setting Time	45 min	Not less than 30 min.
3	Final Setting Time	486 min.	Not Greater than 600 min.
4	Specific Gravity	3.12	
5	Fineness	4.8	

b) Fine Aggregate:

The sand utilized for the trial modified was privately obtained and adjusted to Indian Standard Specifications IS: 383-1970. The sand was first sieved through 4.75 mm strainer to expel any particles more noteworthy than 4.75 mm and afterward was washed to evacuate the residue.

c) Coarse Aggregate:

The wrecked stone is commonly utilized as a coarse total. The idea of work chooses the most extreme size of the coarse total. Locally accessible coarse total having the most extreme size of 20 mm was utilized in our work. The totals were washed to expel residue and soil and were dried to surface dry condition. The totals were tried according to Indian Standard Specifications Seems to be: 383-1970.

d) Bricks

Just one sort of unused earth blocks of 240x115x70 mm working sizes was utilized in the examination before the blocks were squashed down into a coarse total, their uniaxial compressive quality was recorded for correlation with the total delivered by pulverizing them down to coarse total. The compressive quality of the entire block is seen as 12.75 MPa.

e) Recycle block

To improve functionality of reused block total solid, some reused block total were covered with concrete glue and some were covered with polymer concrete glue. To expand the thickness of covering, sometimes twofold covering were applied. On account of concrete glue covering, totals were covered with a concrete glue of W/C=0.5. From the outset, concrete glue was made in a blend machine and afterward totals were included and blended for around five minutes. At that point we could use as substitution of coarse total.

f) Wire work

Solid structure must be appropriately fixed and afterward wrapped with satisfactory layers of chicken wire. At the point when manufactured filaments for concrete were first presented it was quite far fetched about utilizing it in the solid blend the strands then again is three dimensional in addition to the fact that they protect from side to side they help hold the solid combine through and through. That is on the grounds that they are added to the blend while it is stacking and the strands spread consistently all through the blend. Something else about the filaments is how they are cut. They are not only a solitary strand, on the off chance that you pull one separated it nearly appears as though a little rope stepping stool. The filaments help the blend both while it is setting up and after it gets hard. It lessens settling breaks plastic, shrinkage splits, it brings down the porousness, increment effect and scraped area opposition and give obliterate obstruction.

4.RESULT AND DISSCUSSION

4.1 CONSISTENCY OF CEMENT TEST

The Normal Consistency of Cement is characterized as that level of water required to deliver a bond glue of standard consistency. The essential point is to discover the water content required to create a bond glue of standard consistency as indicated by the May be: 4031 (Part 4) – 1988. The control glue had ordinary consistency of 37%.

4.2 WORKABILITY OF CONCRETE

A slump test can be utilized to quantify the workability of concrete. Each bunch of concrete should be tried for consistency instantly subsequent to blending, by one of the techniques depicted in IS: 1199-1959.

Table 4.1 Workability of Concrete Containing over burnt bricks / recycle bricks (M-25)

S.No.	Percentage of Variation	Slump in (mm) over burnt bricks	Slump in (mm) recycle bricks
1	0	76	82
2	15	85	73
3	30	110	60
4	45	130	64

Table 4.2 Workability of Concrete Containing over burnt bricks / recycle bricks (M-30)

S.No.	Percentage of Variation	Slump in (mm) over burnt bricks	Slump in (mm) recycle bricks
1	0	75	85
2	15	90	75
3	30	115	70
4	45	150	63

4.3 Compressive Strength of Concrete Cube Sample

In spite of the fact that the pressure test on concrete is easy to do, the test outcome is trying to reason as far as genuine quality which is impact by many components. Huge numbers of the imperative properties of concrete like the modulus of flexibility, protection from shrinkage, and crawl and sturdiness enhance with the expansion in compressive quality.

4.3.1 Compressive Strength of Concrete M-25 Grade on recycles bricks with wire mesh

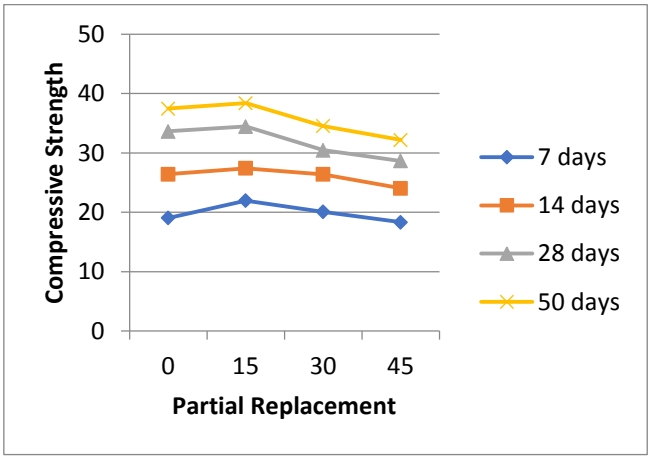

Fig. 4.1 Compressive Strength Reading for M-25 Grade having Normal Composition with recycle bricks with wire mesh different Composition

4.3.2 Compressive Strength of Concrete M-25 Grade on over burnt bricks with wire mesh

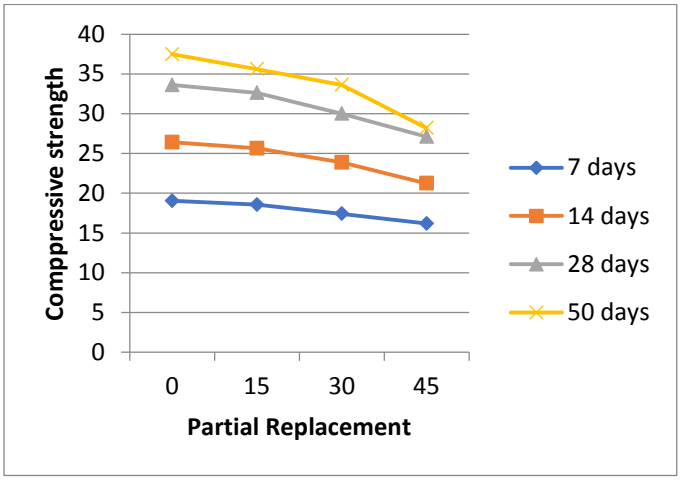

Fig. 4.2 Compressive Strength Reading for M-25 Grade having Normal Composition on over burnt bricks with wire mesh different Composition

4.3.3 Compressive Strength of Concrete M-30 Grade on recycles bricks with wire mesh

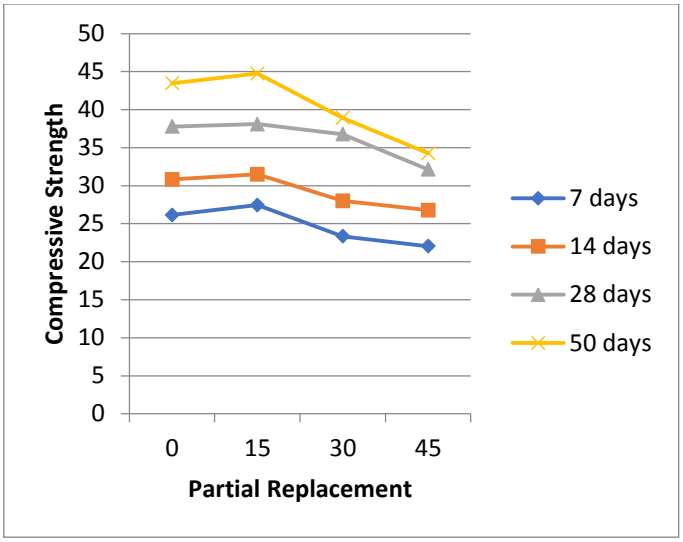

Fig. 4.3 Compressive Strength (N/mm2) having recycle bricks with wire mesh Different Composition

4.3.3 Compressive Strength of Concrete M-30 Grade with over burnt briCKS WIRE MESH

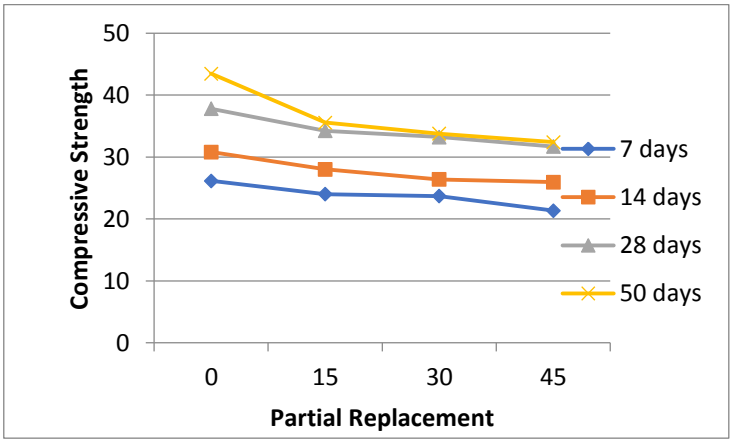

Fig. 4.4 Compressive Strength (N/mm2) having over burnt bricks with wire mesh Different Composition

4.4 Tensile Strength of Concrete Cylinder

The split tensile strength of concrete material is attempted by making barrel of size 150mm x 300 mm and is reliably cured for 28 days testing. Totally 45 chambers were threw for standard M25 & M30, grade and for 15%, 30% and 45% by weight fractional replacement of recycle aggregate & non coated over burnt bricks aggregate for coarse aggregate.. Three illustrations are attempted and the ordinary regards are taken as tensile strength of concrete. The estimations of split tensile strengths are showed up in table.

Tensile Strength of Concrete Cylinder with M-25 Grade with wire mesh

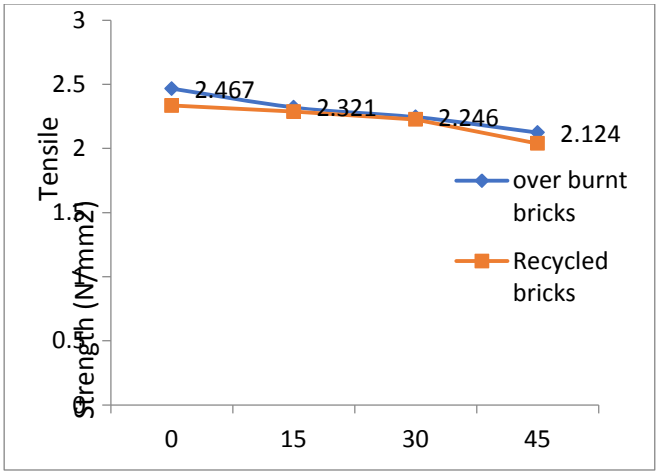

Fig.4. 5 Tensile Strength Results of M-25 Grade having Different Composition of over burnt / recycle bricks

5.4.2 Tensile Strength of Concrete Cylinder with M-30 Grade with wire mesh

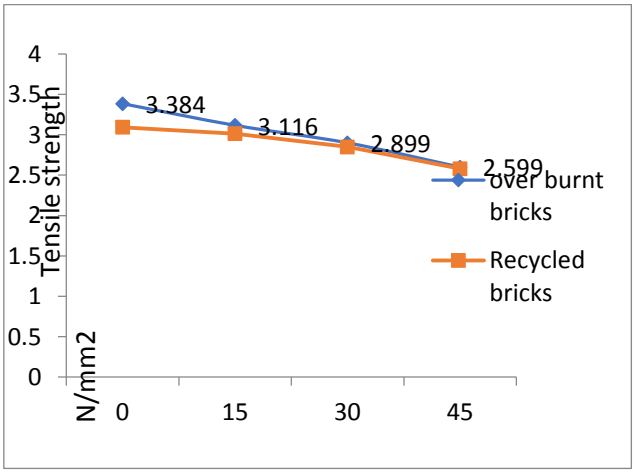

Fig.4. 6 Tensile Strength Results of M-30 Grade having Different Composition of over burnt / recycle bricks with wire mesh

4.5 Flexural Strength of Concrete

Flexural power additionally called as modulus of break. In this test works absolutely 45-beams of size 700 x 100 x 100 are casted of M25 & M30, grade and for 15%, 30% and 45% by weight fractional replacement of recycle aggregate & non coated over burnt bricks aggregate for coarse aggregate. At that point analyze the estimations of both plan blends. The flexural estimations of various blends are shown

4.5.1 Flexural Strength Test with M-25 Grade with wire mesh

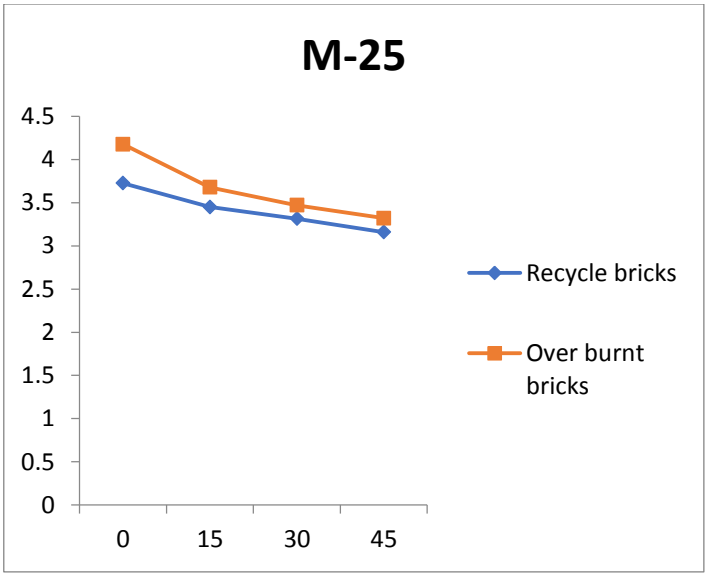

Fig.4. 7 Flexure Strength results of M-25 Grade having Different Composition of over burnt / recycle bricks

5.5.2 Flexural Strength Test with M-30 Grade with wire mesh

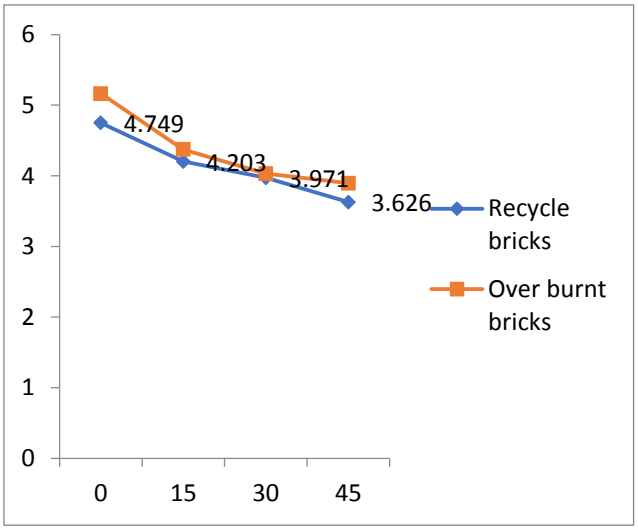

Fig.4. 8 Flexure Strength results of M-30 Grade having Different Composition of over burnt / recycle bricks

V. CONCLUSIONS

Following are the salient conclusions of the study :-

1. In this exploratory assessment we have used over expended/reuse obstructs as divided replacement (15, 30 and 45%) of coarse total an elective material of cement for M25, and M30 review of

cement and from different tests on new and established solid we have closed after outcomes.

2. The Normal Consistency of Cement is depicted as that degree of water required to pass on a bond glue of standard consistency. For assertion reason, regular consistency is taken as the water content at which vicat's unclogger enters up to a state of 5 to 7 mm from the base of the vicat's casing. At the point when we add water to the bond, the glue begins cementing and gets quality. The central point is to discover the water content required to make a security glue of standard consistency as showed by the May be: 4031 (Part 4) – 1988. The control stick had ordinary consistency of 37%.
3. Slump displays that the functionality diminishes with the augmentation in the paces of 15, 30, and 45% of over used squares/reuse blocks with the M-25, and M-30 review of cement.
4. Compressive Strength result at 7, 14, 28 and 50 days are lower than with the utilization as fragmentary replacement of reuse obstructs/over devoured hinders by coarse total (10% to 30% of Composition) with the M-25 review of cement. we should assessment out to 15, 30 and 45 % fragmentary replacement, to be comprehend that 15% deficient replacement has higher to appear differently in relation to 30 and 45% of midway replacement of coarse total by completed devoured squares and moreover 30% partial replacement has higher to lesser than 15 and 45% utilized as inadequate replacement of coarse total by reuse obstructs in solid model.
5. Compressive Strength result at 7, 14, 28 and 50 days are lower than with the utilization as midway replacement 15, 30 and 45% of reuse hinders by coarse total with the M-30 survey of cement. We should relationship out to 15, 30 and 45 % partial replacement, to be understand that 30% deficient replacement has higher to appear differently in relation to 15 and 45% of midway replacement of coarse total by reuse squares, and moreover 10% midway replacement has higher to diverge from 30 and 45% of fragmentary replacement of coarse total by completed expended obstructs in solid model.
6. Tensile Strength has reduce with utilized as fragmentary replacement of coarse total by reuse/over exhausted impedes with the degree of 15 to 45%, lower than show up particularly concerning the age of 28 days with M-25 survey of cement.
7. Tensile Strength has lower than with utilized as fragmented replacement of coarse total by completed devoured/reuse squares when extends portion of over expended/reuse total with the degree of 15 to 45%, show up unmistakably in association at 28 years of age days with M-30 audit of cement.
8. Flexural quality has higher than with the utilized as fragmentary replacement of coarse total by completed expended/reuse squares, when grows estimations of over devoured/reuse squares 15 to 45%, show up differently in association with other creation column cases with the age of 28 days with M-25 audit of cement.
9. Flexural quality has reduce with utilized as fragmentary replacement of coarse total by completed expended/reuse squares, when manufactures estimations of steel slag 15 to 45%, show up contrastingly in association with other creation shaft cases with the age of 28 days with M-30 survey of cement.

REFERENCES

1. Apebo N. S., Agunwamba J. C., Ezeokonkwo,J. C" The suitability of crushed over burnt bricks as coarse aggregates for concrete" International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 1, January 2014.

2. Tanvir Hossain, Md. Abdus Salam, Mohiuddin Abdul Kader, Pervious concrete using brick chips as coarse aggregate: An experimental study, Journal of Civil Engineering (IEB), 40 (2) (2012) 125-137,2011.

3. Kasi Rekha, M. Potharaju, "Residual Compressive Strength of Recycled Brick Aggregate Concrete at High Temperatures" International Journal of Emerging Technology and Advanced Engineering, Volume 5, Issue 1, January 2015.

4. Rashid, M. A., Hossain,T. and Islam M. A." Properties of higher strength concrete made with crushed brick as coarse aggregate" Journal of Civil Engineering (IEB), 37(1), pp-43 52, 2009.

5. Bhattacharjee, E., Nag, D., Sarkar, P. P. and Haldar,L," An Experimental Investigation of Properties of Crushed over Burnt Brick Aggregate Concrete" International Journal of Engineering Research and Technology, Volume 4, Number 1, 2011, pp. 21-30.

6. George Rowland Otoko, "Use of crushed clay bricks as aggregate in concrete", International Journal of Engineering and Technology Research Vol. 2, No. 4, pp. 1 - 9, April 2014.

7. Jafar Bolouri Bazaz, Mahmood Khayati, Navid Akrami, Performance of concrete produced with crushed bricks as the coarse and fine aggregate, IAEG Paper number 616 2006.

8. Gopinandan Dey and Joyanta Pal, Use of Brick Aggregate in Standard Concrete and Its Performance in Elevated Temperature, IACSIT International Journal of Engineering and Technology, Vol. 5, No. 4, August 2013.

9. Tariq Ali, Nouman Iqbal, Md Zeeshan, Md Zulfiqar Ali Khan, Evaluation of the Compressive strength of Concrete for partial replacement of Over Burnt Brick Ballast Aggregate, International Journal of Science and Modern Engineering (IJISME) December 2013.

10. Mohammad Abdur Rashid, Md. Abdus Salam, Sukanta Kumar Shill ,Md. Kowsur Hasan, Effect of Replacing Natural Coarse Aggregate by Brick Aggregate on the Properties of Concrete, DUET Journal Vol. 1, Issue 3, June 2012.

11. Fadia S. Kallak, Use Of Crushed Bricks As Coarse Aggregate In Concrete, Tikrit Journal of Eng. Sciences,Vol.16,No.3, September 2009.

12. Ksenija Janković, Dragan Bojović, Dragan Nikolić, Ljiljana Lončar, Zoran Romakov, frost resistance of concrete with crushed brick As aggregate, Architecture and Civil Engineering Vol. 8, No 2, pp. 155 – 162 2010.

13. Sathish Kumar R., "Experimental study on the properties of concrete made with alternate construction materials", International Journal of Modern Engineering Research, Vol. 2, Issue. 5, pp-3006-3012 Sept.-Oct. 2012.

14. Bureau of Indian Standards: IS- 10262-1982, "Indian Standard Recommended Guidelines for concrete mix design", 1982.

15. Bureau of Indian Standards: IS- 1489 (Part 1): 1991, "Indian Standard Portland-pozzolana cement specification", Part 1 fly ash based (Third revision), 1991.

16. Bureau of Indian Standards: IS- 2386-1963 (Part-I), "Indian Standard methods of test for aggregates for concrete", 1963.

17. Bureau of Indian Standards: IS- 2386-1963 (Part-IV), "Indian Standard methods of test for aggregates for concrete", Part-IV Mechanical properties, 1963.

18. Bureau of Indian Standards: IS- 383-1970, "Indian Standard Specification for coarse and fine aggregates from natural sources for concrete (second revision)", 1970.

19. Bureau of Indian Standards: IS- 456-2000, "Indian Standard Plain and reinforced concrete code of practice (fourth revision)", 2000.

20. Bureau of Indian Standards: IS- 516: 1959, "Methods of Test for Strength of Concrete," New Delhi, 2003.

21. Bureau of Indian Standards: IS- 5515:1983 Specification for compaction factor apparatus, 1983.

22. Bureau of Indian Standards: IS- 9103-1999, "Specification for concrete admixture", 1999.

23. Punamia B.C., "R.C.C. Designs", Laxmi publications (P) Ltd, New Delhi, pp. 09- 16. 2006.

BIOGRAPHIES

Amit ,Post Graduate Student in Civil Engineering, Department Of Civil Engineering, IEC college of engineering and technology, Greater Noida-201306, Uttar Pradesh, INDIA

Shubh Kant Yadav, Assistant Professor, Department of Civil Engineering, IEC college of engineering and technology, Greater Noida-201306, Uttar Pradesh, INDIA