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Utilization of Waste Material for the Manufacturing of Bricks

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ABSTRACT: Due to the characteristics of bricks, bricks are one of the most common building materials. Many attempts have been made by blowing rubber bands, such as rubber, paper, plastic, and cloth. The waste is recycled from various types of waste into waste bricks. Many successfully processed waste materials and their effects on the physical and mechanical properties of bricks are discussed. The performance of bricks made from scrap.

KEYWORDS: Waste Management, Waste Recycling, Building Material

I.INTRODUCTION

The increasing popularity of environmentally friendly use of these bricks are cheap and heavy building materials in construction. Recycling waste from a variety of building materials such as textiles, paper, rubber, rubber, plastics and other wastes, because these wastes are mainly used for building exterior and interior walls. Due to the large number of finished products in construction, the brick industry in the technical industry is most suitable for collecting solid waste.
Various attempt were made to incorporate various waste material in bricks production such as textile laundry plastic, paper, rubber, chewing gum, etc. this highlights are the effects of various waste material on the bricks property like physical and mechanical properties.

The material are used in manufacturing of waste material bricks:-

1) Chewing gum
2) Water
3) Rubber
4) Papers
5) Textile material
6) Plastic

Accumulation of material:-
Accumulation of material in the basic and important step in any project, also the material which is used in a project should not cause any demand to the environment material were used to make building bricks.

Chewing Gum:-
The key ingredient used in making bricks comes from the specially. Formulated gum based using the industrial waste, which them binds the bricks together and high durability.

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Water:-

Water is an important ingredient of paper Crete as it is involved in the chemical reaction with cement. Potable water should be for both soaking and mixing of paper Crete. It should be free organic matter and the pH value should be between 6&7.

Paper:-

Paper is a natural polymer which consist of wood cellulose is made of unit of monomer glueose, although containing several hydroxyl group, cellulose in water insoluble. The reasons in the stiffness of the chain and hydrogen bounding between two (OH) groups on adjacent chains. The chain also pack regularly in place to from hard, stable crystalline region that give more stability and strength.

Rubber:-

The quality of bricks plays a key roes in the strength of structure, the addition of raw materials like epdm rubber and stone dust will improve the strain of bricks and also improve environment conditions.

Plastic:-

The plastic brick used for further in construction project due to its high weight and economic purpose. The plastic used in the many form in the construction like bricks, tiles, road construction etc. when plastic use for these construction the structures will be more economics and it have enough strength, durability.

II.LITERATURE REVIEW

The research paper and literature collected on the various topics is listed below

Mond monish (1982):- They investigate that huge quantities of construction and demolition waste are generated every years in the developing countries like waste is a very serious problem because it requires huge space for its disposal and very little demolished waste is recycled and reused

Algin et al (2007) :- Investigated that cotton waste and lime stone powder waste combination to be used in the production of economical new brick material

Dr. A.M. Pande (2003):- Dr.A.M.Pande investigated that rice husk ash which are the waste product of agricultural Industry can as material in concrete which not only improve also leads to the proper disposal of these material resulting the impact of these material on environment

Shah et al (2009):- A addition of natural fiber jute fiber and banner fiber 0.5% separately in fly ash brick mix Proportion give favourable compressive strength. Use of fly ash and natural fiber help to reduce environmental degradation.

Arya R Kansal (2016):- Utilization of waste paper to produced eco-friendly bricks, research of physical character is tics of paper bricks.

III.EXPERIMENT PROCEDURE

According to the research, up to now, there is no hard and fast made for format mix design of papercrete, and in that respect no hard procedure for casting the brick. Thus, in this research, same laboratory test were performed to obtain some mechanical properties of papercrete.

After collecting all the material, a mould was prepared of size 19*9*9cm. joints were made without any hole or gap to avoid any leakage.

There are four different operations are involved in the process of manufacturing of the bricks.

1) Batching
2) Mixing
3) Moulding
4) Drying

Batching:-

The ingredient are accurate and precise measurement of material for making cement is known as batching. Weight batching in the accurate methodology used globally of measuring the materials. For significance mix in manufacturing of bricks.

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Mixing:-

The material are chewing gum, rubber, plastic, textile material, paper and then it to be mix together with adding sufficient amount of water is added to the mix it is get good uniform colour. Work at site with use of bricks making is most important in manufacturing of bricks.

Moulding:-

The mould is placed at the ground and standard size of brick mould is 19*9*9 cm. apply the oil to the mould and placed the waste material in the mould and compacting the waste material mixer in the mould. After 5 minutes mould is removed from the bricks, and there placed in sunlight. Within two days bricks will be harder.

Drying:-

After moulding process the bricks content some amount of moisture in it ….
The brick are laid in stacks…
The period of draying may be 3to10 days ….
The draying yards are also prepared on higher level than the normal ground for the prevention of bricks from rain water

Picture: Papercrete Bricks After Casting

Advantage of bricks prepared by waste material

1. Allow recycling of waste plastic.
2. Exotic shapes are possible for decoration purposes.
3. They should be sufficiently economical with potential to easy recycling.
4. If brick covered with aluminium foil perhaps glued with epoxy they would with stand UV Much better
5. They are thinner and lighter as compare to convention brick.
6. It's also less energy intensive than recycling the plastic into other forms.
7. The brick have superb heat insulating properties.
8. The brick made from waste material helps in cleaning the environment.

Disadvantages of bricks prepare from waste material

1. Lesser fire resisting qualities as compared to the conventional bricks.
2. It requires extra inclusion of detail when extra decorative addition are required.
3. Mortar would not stick, unless they are designed with specialized rough surface. Even when, mortar is not expected to stick reliably.
4. Plastic is flammable it would need to pay any application construction codes.

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5. Plastic may appear storage, but it would deform under pressure it would limit its utility in any typical weight bearing application.

IV.RESULT AND DISCUSSION

After casting the bricks they were analysed for using as a brick. For this, various test were conceded out to confirm the properties to brick and the result of the test were analysed by the exciting and standard result.

The following test were carried out to check the strength of bricks.

1) Hardness

In this test, a scratch is tried to make on the brick surface with the help of a finger Nat. it no impression is left on the surface of the brick is taken and enough hard.

2) Shape and size

In this test, a brick is closely observed. It should be is standard size and its shape should be truly regular with Sharpe edge and corners for this purpose. Brick of standard size **(19*9*9cm)** are selected at random and they are scratch length wise, along with the wide and along with the height.

3) Soundness

In this test, two bricks are taken and they are struck, with each other, the brick should not break and a clear ringing sound should be produced.

4) Water absorption test

A brick is dried is weighted it is then immersed in water for a period of 24h difference in weight indicates the amount of water absorbed by the brick, it should not, in any case, exceed 20% of the weight of dry brick for first class.

$$\text{Water absorption (\%)} = \frac{W_2 - W_2}{W_1} * 100$$

V.CONCLUSION

1) Based on the results of this study, follow-up studies of this study show that the brick-making technology used for waste is effectively acceptable, and brick-making will harden within two days after preparation. It is recommended to use the brick outside the building.
2) As per research the bricks should not absorb water more than 20%. The water absorption capacity of paper Crete brick was found to be more than 20%, which makes it not suitable for waterlogging and external walls. However, by providing a waterproof coating it can also be used as external wall.
3) The weight of the waste materials brick was 1/3rd to 2/5thlesser than the conventional clay brick. Due to less weight of waste materials bricks, the total dead load of the building will be reduced.
4) Due to lesser weight and more flexibility, these bricks are potentially ideal material for earthquake prone regions.
5) Since, this brick mainly consists of waste material, it will reduce the landfills and pollution. Hence, the overall cost is very low as compared to conventional brick. It has been seen that by using Waste material bricks in a building construction, the total cost was reduced from 20% to 50%.

REFERENCES

1) Abdul g. Lime , azni itris ,calvin, h.k.wong , abdul.a.samad , megat johari , m.m.noor ,aminuddin m, bakri 2004incorporation of sewage sludge in clay bricks and its characteristics journal of waste management and research 22:226:233

2) Eduardo a, dominguez, rosa ullman1996. Ecological bricks made with clay and steel dust pollutant general of applied by clay science 11:237:249.

3) Eliche quesada, d.c.martinezgarcia, m.l martinez-cartas, m.t.cotes-polomino, l perez-villarejo, n.cruz-perez, f.a.corpas-iglesias 2011. The use of different forms of waste in the manufacture of ceramic bricks applied clay science, 52:270:276.

4) Leshima,v.a and pivner,a.l ceramic wall material using glass waste, waste material vol.59 , nos, 9-10-2002

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 4.988

| Volume 4, Issue 4, April 2021 |

5) The national bricks research center reducing fuel consumption in bricks manufacturing section ten august 26,2003
6) Shih, pai-haung, wu, zong-zeng and hunf-lung, characteristics Of Bricks Made From Waste Material, Vol. 24,1043-1074, 2004
7) Arora, A. and U.V.Dave, 2013. Utilization of E-waste and plastics bottle waste in concrete. International journal of student research in technology and management, 1(4):398:406
8) Rai, B.S.T, Rushad, B. Kr and S.K duggal. 2012. Concrete with plasticize ISRN civil engineering, 2012:1-5.
9) Rajas and R.chauhan, 2014. An experimental study on strength behaviour of cement concrete with use of plastics fiber, National conference on advcance in engineering and technology pp:30=34
10) Rant S.P, R.V Ralegoankar and S.A mandavgane, 2011, Development of Sustainable construction material using industrial and agriculture solid waste.