International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

Utilization of solid waste in manufacturing of brick

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Abstract - Solid waste is developing every day emerges as an eyesore. Plastic waste is nonbiodegradable waste that can not decompose and this creates water, land, and air pollution. Also, it is predicted that plastic waste will double after a decade as we use loads of grades of plastic in our each day life. We can recycle, and reuse plastic waste. Basically, in bricks, we used earth-based clay. Excessive use of the clay, suggests the quit result of useful resource depletion and environmental degradation. Hence at the manner to reduce the quantity of strong waste it could be used as the selection of the severa introduction materials. This venture evaluation the effective and sustainable approach to reuse of strong waste.

Key Words: solid waste brick, solid waste block, plastic waste brick, rubber waste brick,

1. Introduction

Solid waste manage is one of the pinnacle environmental issues worldwide. It is expected that greater than fifty-5 million heaps of family waste are generated in India annually; annual boom of round 5 percentage is anticipated. Heavy waste generated in small, medium, and big towns in India is anticipated to be 0.1kg, 0.3 – 0.0kg. 4 kg or 0.five kg in keeping with capita and day. Conventional manufacturing substances inclusive of concrete, brick, hole block, sturdy block, paver, and tile are crafted from contemporary-day grass reassets. This harms the surroundings because of the non-prevent exploration and depletion of natural reassets. Environmental problems are of growing hobby to decision-makers in politics, business, and society. As a result, predominant modifications are taking area in our tactics to lifestyles and paintings in phrases of keeping reassets and recycling waste via right manage. The use of sturdy wastes withinside the manufacture of fabric is one such cutting-edge effort. The cost of the manufacturing substances will increase day by day because of immoderate demands, shortage of uncooked substances, and immoderate strength consumption. From the angle of saving strength and keeping plant reassets, the usage of possibility additives in cloth manufacturing is now a worldwide concern. This calls for vital research and development paintings withinside the course of studies into new substances for the manufacturing of environmentally pleasant and sustainable manufacturing substances. The gift observe examines the viable makes use of of diverse strong residues withinside the manufacture of bricks.

1.1 Objectives

To prepare bricks from solid waste.

Determine the structural properties of bricks with solid waste like compressiv strength.

Compare the properties of solid waste bricks with conventional bricks.

To determine durability of solid waste bricks.

1.2 Material Used In Brick

Ordinary Portland cement (O.P.C.) (43 GRADE)
Water (Portable water)
Solid Waste (rubber, plastic, etc)

2. Proportioning of material

Initially we decided the material to be used for casting of bricks/blocks and accordingly we decided the proportion. The cement concrete ratio was decided as 1: 1.5: 3. Then the size of bricks/blocks was decided according to mould size. M20 Proportion (1:1.5:3) 1 is Cement, 1.5 is sand, 3 is Aggregate Density of Cement = 1440 kg/m^3 Density of Sand = 1660 kg/m^3 Density of Aggregate = 1400 kg/m^3 Density of Water = 1000 kg/m^3 Density = $\frac{Weight}{Volume}$ Volume = $\frac{Weight}{Density}$ Volume of Cement = $\frac{50}{1440}$ = 0.0347 m^3 Volume of Sand = 0.0347 x 1.5 = 0.052 m^3 Volume of Aggregate = 0.0347 x 3 = 0.104 m^3 Volume of Water =0.0347 x 0.030 m^3 Weight of Cement = Volume x Density = 0.0347 x 1440 = 49.96 kg Weight of Sand = 0.052 x 1600 = 83.2 kg Weight of Aggregate = 0.104 x 14.00 = 145.6 kg Weight of Water = 0.010 x 1000 = 10 lit. For 1 mould = Cement 2.5 Kg Sand 3.75 Kg Aggregate 7.5 Kg

Size of Cube	Cement	Aggregate	Sand
0.0018 m^3	0.26 kg	2.95 kg	1.11 kg
0.002016 m^3	0.338 kg	3.81 kg	1.44 kg

Table -1: Proportion

2.1 Test carried on solid waste specimen:

Visual inspection test

Compressive strength test on UTM

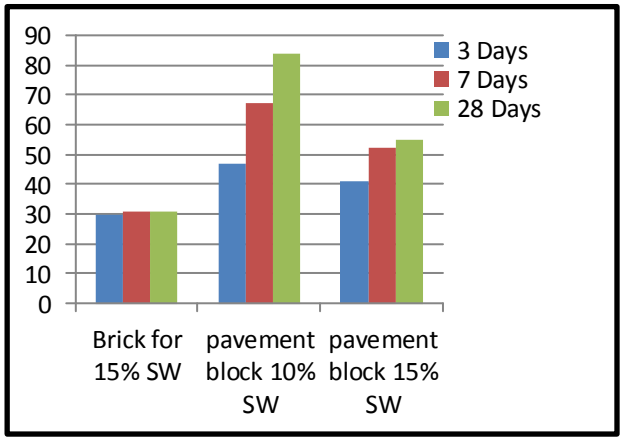

Chart -1: Compressive Strength on UTM on 3-7-28 Days

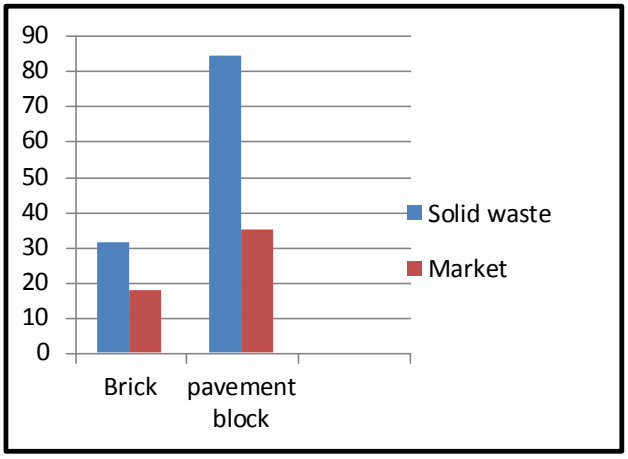

Chart -1: Compressive Strength on UTM 28-Days

2.2 Rate Analysis:

Sr. No	Item	Quantity	Unit s	Unit rate Rs - ps	Amount Rs - ps
1	Solid Waste (Collection & Transportation)	1	Kg	0.80	9.5
2	Cement	0.3	Kg	10.5	3
3	Labour	lump-sum	-	-	10
TOTAL			Rs.23.5		

Table-2: Estimation of each Solid Waste Paving Block

Therefore for each Solid Waste paving Block = Rs. 23.5

Sr. No	Item	Quantity	Unit s	Unit rate Rs - ps	Amount Rs - ps
1	Solid Waste (Collection & Transportation)	1	Kg	0.80	9.5
2	Cement	0.3	Kg	10.5	3
3	Labour	lump-sum	-	-	3
TOTAL			Rs.15.5		

Table-3: Estimation of each Concrete Brick

Therefore for each Concrete brick = Rs. 15.5

As the cost of concrete block and paving block is more the use of **solid waste block can provide to be economical.**

3. Conclusions

According to the discussion of results the following conclusions are derived by this study:

1. The solid waste brick consist of waste materials and therefore cost is very low compared to conventional bricks.

2. Since, the waste materials are used; it reduces landfills and pollution problems. And Good amount of cement and artificial sand can be saved which will result in reduction in carbon footprints and lead to preservation of natural resources.

3. The compressive strength of brick is more than that of conventional brick.

4. The brick has a lesser water absorption than conventional brick. So it can be a better alternative building material.

5. Using the solid waste brick in a building, the total cost will be reduced from 20% to 25%.

6. As we know that the cost of a conventional brick is 8 Rs/brick. The manufacturing cost of a solid waste brick is less than the cost of a conventional brick of the same size. So this brick is more economical than conventional brick.

7. The use of innovative technology not only strengthened construction but also increased the life of the building as properly as will assist to enhance the surroundings and additionally create a supply of income.

8. Lastly, we are able to finish that using Recycled stable waste in creation fabric that's the exceptional alternative for

the disposal of stable waste & in the long run reduces the pollutants of the Environment.

9. It is was hoping that during close to destiny we can have strong, durable, and green homes with a purpose to relieve the earth of all varieties of waste fabric.

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