Cement Sand Brick using Plastic & Facemask

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Abstract- Plastic waste is a non-biodegradable waste which cannot decompose and this creates water Land pollution and air Pollution. Also, while we burn the plastic waste in Dumping Ground, the percentage of plastic waste is increasing rapidly. It is estimated that the plastic waste will double after a decade as we use hundreds grades of plastic in our daily life. Due to plastic does not composed biologically, amount of plastic waste in our surrounding is steadily increasing As a civil engineer we have to innovate something new related to this, which is a boon for civil Engineering. So, here we try to do something innovative as "CEMENT SAND BRICK USING PLASTIC AND FACEMASK. The proposed sand bricks which is made up by adding plastic bottle waste in crush form in sand brick may to reuse the plastic waste as one of the additive material of bricks, and to help to the disposal the problem of plastic waste Basically in bricks we Used earth based clay. Due to excessive use of the clay, it shows the result of resources depletion and environmental degradation. In plastic waste we consider Drinking Water Bottles (polyethylene terephthalate), Carry Bags, Bottles Caps, house hold Articles (High Density Polyethylene), Milk Pouches, Sacks, Carry Bags, Bin Linings. Cosmetics and Detergent Bottles (Low Density Polyethylene), Bottle Caps and Closures. Wrappers of Detergents, Biscuit (Poly Propylene), Electricals Fittings, Handles and Knobs (Ures Formaldehyde), Casting, Bonding fibers (Polyester resin) etc. In this, we get to crush the plastic waste into fine particles. We use stone dust as fine aggregates (size below than 4.75mm). Now, we mix crushed plastic waste, sand and cement pour into mould and form bricks. We observed that the Characteristics of bricks and tiles is far much better than normal bricks and tiles as minimum water absorption, highly Compressive strength, smooth surface, unbreakable, less weight etc. The water absorption and efflorescence however showed excellent performance, In the face of COVID-19 outbreak, we are living through truly unprecedented times. One of the areas where guidance continuous to evolve includes face coverings and masks In particular face masks has become widespread and a common tool used in preventing the spread of pandemic These masks eventually land up in oceans and land-fills. These masks will take as long as 450 years to break down and negatively impact marine wildlife and Ecosystem. More than 1.5 billion disposable face masks will wind up in the world's oceans this year polluting the water with tons of plastic and endangering marine wildlife, according to a Hong Kong-based environmental group. With each mask weighing three to four grams, the situation could lead to 6,800 plus tons of plastic pollution that will take as long as 450 years to break down. In addition to the harmful effects of micro-plastic and nano-plastic particles, elastic ear loops pose a possible entanglement risk for wildlife

Keywords: Plastic Waste Face Mask Sand, Plastic Bricks, Water absorption, Efflorescence

BACKGROUND & INTRODUCTION

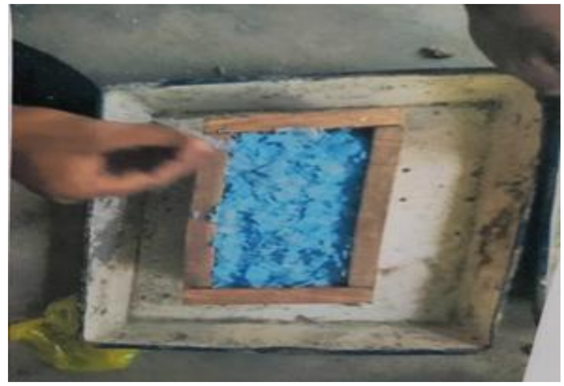
The building construction sector is one of the main components of the global economy directly accounting for 6% of global GDP [1]. Concrete is arguably the most widely used construction material in the world. At about 20 billion metric tons or around 2.5 metric tons per person on an annual basis in 2013 [2] it is being consumed at an ever-increasing rate. The consumption of materials in general and construction material in particular has driven the growth of the economy. An indicator of this growth is the consumption of cement. Since 2010, India's consumption has increased from 2.05 billion tons per year to 2.35 billion tons with a high of 2.7 billion tons' in 2014. In the same period, the world consumption of cement has increased from 3.64 billion tons to 4.65 billion tons. Construction is also one of the largest employment generators in most countries -being highly labor-intensive. In a world where developed countries like the USA, Canada, Europe, Japan, and Australia, etc. have more or less reached a point of saturation, the future growth in construction is bound to come from fast-developing economies of countries like China, India, south-east Asia, South America, and Africa. In the developed world, the investment in repair and replacement of existing infrastructure will outpace new construction. With the growing threat of climate crisis, the construction sector is going to face the challenge of reducing its carbon footprint of about 25-40% emission out of which 7-8% is contributed by the manufacturing of cement alone. There are efforts to make the entire construction sector achieve net-zero carbon by 2050 by way of the use of green materials in construction and renewable energy in the operation of buildings. [3]Overall municipal solid waste (MSW) generation will increase to 3.40 billion metric tons by 2050 from around 2.01 billion tons currently as per a World Bank report. In 2016, the world produced 242 million tons of plastic waste which was 12 percent of all municipal waste.

MATERIAL USED

A. CEMENT
B. SAND
C. WASTE PLASTIC
D.WATER
E. DISPOSABLE MASK

Process of Casting Plastic Sand Brick(mask)

- First, we need to collect the waste surgical mask
- Then, we crush the plastic waste in small particle by crushing machine and surgical mask were cut to small piece with scissors
- Then, the small particles crush into fine size particles
- The ratio of (plastic, mask), cement and sand which we wis 1.2-1
- which we use in manufacturing of bricks tiles is sieved for a size less than 4.75mm using sieve analysis
- The fine particles of plastic waste and mark in mixed with come and sand.
- Then, we can mix it properly and make a mix
- Then, we poured the mix into Moulds
- Then keep it the mould for dry and demould it on a stay
- The weight of the brick is 2.7Kg



Compression Strength test (BS 5628: Part 1: 1992)
In this test, the cubical brick specimen is placed in the compression strength testing machine. After placing it we will apply the load on the brick without any shock.

The load will be increased at a rate of 140kg/cm2 min continuously till the specimen's resistance to increasing load breaks down and it cannot withstand any greater load further. Recording the maximum load applied to the brick specimen and the appearance and type of failure is also noted along with any unusual features.

COMPRESIVE STRENGTH= MAXIMUM LOAD APPLIED SPECIMEN AREA COMPRESSIVE STRENGTH = F/A Where, F- Maximum load applied (KN) A - Specimen Area (mm2

RESULT OF COMPRESSIVE STRENGTH TEST

Table: compressive strength for 1:3 plastic to sand ratio, Plastic Sand Brick (Mask)

Plastic Sand Brick (1:3 Ratio)	Maximum Load (KN)	Compressive Strength (N/mm2)
Specimen 1	95	5.5
Specimen 2	105	6.1
Specimen 3	100	5.8
Average	100	5.8

SIGNIFICANCE OF THE STUDY

The onset of COVID-19 established a new set of health advisories, the need to practice social distancing, washing hands frequently, and the absolute and unarguable requirement to wear a mask. Wearing of masks is now the new normal, blurring all divides. To further emphasis the importance, it has been made a punishable offence not to wear one. More importantly, its sign of civic responsibility for all citizens, not wearing one is a mark of irresponsibility. These play an important role in present situation and once they are disposed off they cause problems to the environment in form of land and marine pollution. To overcome these problems, it is necessary to study the effects of these wastes and find a way to recycle and reuse these left over masks before it is too late to do so.

CONCLUSION

The proposed project presented above intends to resolve in reducing the plastic waste disposal problem as it utilizes the waste even in its finest form and converts that useless material into a useful construction material. Extruder machine plays a prominent role in the conversion of waste plastic into its melted form. Alsa, extruder does not possess any threats the environment and hence can be used without any restriction. It also helps in reducing the wage of natural resources which are utilized during the manufacturing of burnt bricks, also it reduces the pollution which is generated from kiln during brick manufacturing. The final end product can be used as brick, which is having a higher strength than conventional beck. Also, the water absorption capacity is higher in comparison to conventional brick with lower weight. Its uses are not restricted as only brick, it can even be utilized as a building block by increasing the dimension of the mould. Also, it reduces the use of wire used for fencing Floor tiles, sleepers, etc. can also be produced from it. This brick also turns out to be economical than conventional brick, by reducing the cost of incinerators for burning purpose and landfills

The addition of disposal mask with increased cement content has showed massive increase compressive strength

The compressive strength of the Bio-Medical Waste blocks has increased by about

As there is notable increase in compressive strength, these blocks can be used in construction of Load-Bearing as well as Non Load-Bearing walls

The BMW blocks have shown considerable increase in block density compared so Standard Concrete Blocks.

The water absorption percentages have decreased with time and satisfy the need of IS 2385 (Part 1): 2005.

The BMW blocks have shown good results in Field Test after 28 days of curing period

The addition of disposable masks has significantly improved the engineering properties of the Concrete Blocks. From this study it can be concluded that using I part of Disposable Masks in Solid Concrete Blocks not only reduces Marine and Land pollution but also shows substantial results and the blocks thus obtained are economical, environmental friendly and technically sustainable.

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