

UTILISATION OF PLASTIC WASTES IN MASONARY BLOCKS CONSTRUCTION

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ABSTRACT

In the era of energy crisis and resource exhaustion, availability of conventional materials and resources throughout whole year in proper amount is very difficult and hectic problem for the builders. The demand of these materials are increasing day by day, since the housing requirements exponentially increase time to time. There is an international concern over this problem and researchers are finding solution for this crisis. The concept of construction with green material is the solution to the problem and that's what well conceived in the research so that marginal materials and unskilled labour can employed for mass production of building blocks. Solid waste management is one of the concerns in our country. One of the suitable method to get rid of solid waste is to use the waste in some form (as fibers). In this way we can satisfactorily address the solid wastes and environmental issues and also the blocks made from these fibers posses great strength. One of the major advantages for the addition of fibers is that it can increase the tensile strength. It also improved the ductile property of block.

Keyword: - Crisis, Exhaustion, Exponentially, and tensile strength etc.

1. INTRODUCTION

The need of good quality housing is recognized as a very important responsibility, for the welfare of people in across all the countries. For any such mass housing construction, masonry is one of the important and essential component and these masonry walls are usually made up of building blocks. These building blocks, technically known as masonry units, are available in variety, as natural, semi natural or artificial in their origin. Great amount of work on these units have been done so far, especially on conventional brick, solid and hollow blocks of concrete which are made of conservative raw materials, i.e. building materials based on natural occurring resources. Some examples for these natural occurring resources are use of clay for making bricks, and sand obtained from rivers for making cement-sand blocks. The commercial utilization of these resources often leads to various environmental harms. Extensive sand mining can lower the river-beds and allow salt- water intrusion in land. Therefore, the development of as many alternative walling materials as possible will be of immense benefit to minimize the impact on the environment. One of the walling material is mud blocks made from earth. mud bricks or clay brick, has been used in the construction of shelters, houses etc. for thousands of years and approximately 30% of the population still live in earthen structures.

Unstabilised mud construction is associated with two major problems:

- Loss of strength on saturation and
- Erosion of soil due to the impact of rain.

These problems can be handled by the techniques of soil stabilization. By adding some industrial waste products like fly ash to it.

Compressed soil masonry blocks, formed using moist soil compacted mechanically to improve physical characteristics, have gained popularity over the past so many years. Advantages of earth in this way include better strength and durability as compare to adobe whereas maintaining considerably low embodied energy levels than substitute materials. However problems arise from the material's low tensile strength, brittle behaviour and deterioration in the presence of water. Stabilization by a hydraulic binder such as cement or lime or a combination of both can appreciably improve water resistance and strength to some amount. Although from that, baking of composite bricks with natural grain and fibre, left behind a porous structure which as a result enhances thermal and acoustical insulation of finished product.

Theoretical models were also developed on composite soil blocks reinforced with natural fibres subjected to shear. In almost all the above studies, the fibres used are sisal fibres, coconut fibres, vegetable fibres, straw, palm fibre etc.

2.LITERETURE REVIEW

Raw earth (soil, clay) was one of the first, oldest and most conventional building materials to be used by humans and Earthen architecture has a constant tradition dating back from at least 10,000 years. Mud-wall building are build throughout the world and mud construction techniques are still in use across the world . Up to 30% of the world's population contin- -ues to live in earthen construction. . Materials obtained from earth were also used in stone construction, for example as a ingredient of bedding mortars and plasters, and as a filler between stones. Approximately 55% of home build in India are still use raw earth for walls. Earth has been used in the construction of ancient houses for thousand years together with others natural materials such as wood and stone. The constructional terminologies used for the houses made of earth changes from area to area. For Cob walls, wet mud is used directly in wall construction. The well plugged mud is first made into a ball and the ball is placed properly using wooden mallet. The wall thickness can be 45cm or more. Each day the wall height is raised about .45 m.

2.1 Advantages and disadvantages

The technical characteristics of earth as a building material have both advantages and disadvantages depending on the requirements, applications and the context:-

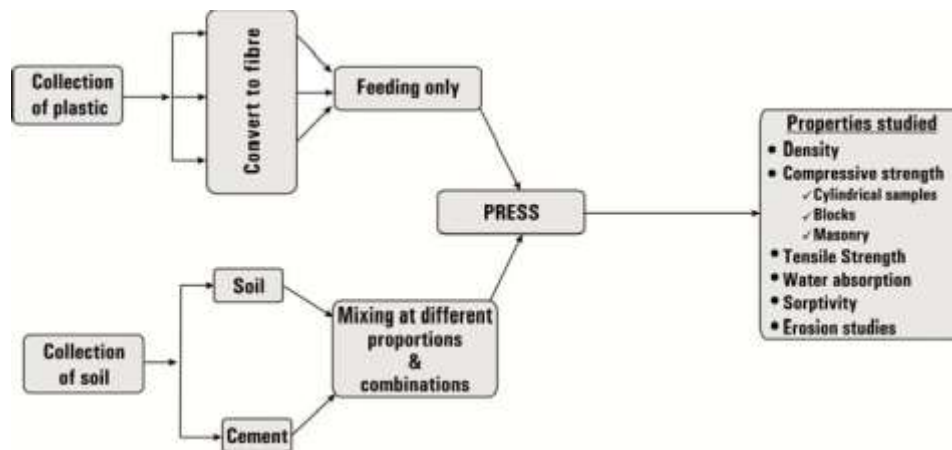
- It is the most easily available and cheap material found everywhere. Making it the most accessible and economical natural material for making building materials, such as bricks.
- It is easy to work with, requires less skilled labour
- It offers a very high resistance to fire
- Earth is recyclable and environment friendly construction material .
- Liability to volume changes mainly in the case of clayey soils.
- Low mechanical and strength characteristics necessitating larger wall thickness and loss of strength on saturation.
- High maintenance and low durability due to water penetration, erosion of walls at level by splashing of water from ground surfaces, attack by termites and pests. Many failures have been reported after seasonal flooding in many cities.
- Requires lot of water while construction and after construction for curring of walls.

3. METHODOLOGY

The factors that can influence the quality and the performance of the soil blocks. They are listed below.

- Type of soil
- Type and quantity of fibers
- Length of fibers

The methodology to be followed in the detailed investigation is shown Fig below.



4.MATERIALS

Waste management mainly depends on the knowledge of materials and their properties. Some commonly used material are-

- Ordinary Portland cement (OPC, 43grade) as Chemical stabiliser
- Plastic Bottle fibres (Bottle fibre)
- Carry bag Fibres (kit Fibre)
- Clay - 6%
- Slit -42%
- Sand -52%
- Water -14%

5.CONCLUSION

The main conclusions of this research work are listed in this section. The study on the influence of composition and block making mechanism on mud blocks described here basically come under four stages :-

- Density of the block
- Strength of the block
- Water absorption and sorptivity
- Erosion and Mix proportion of the block

5.1 Density

- The density Measured of the specimens was found to vary from 1.848 to 1.958g/cc. Producing a stabilized mud block.
- If we keep cement content same the on increasing the moulding pressure , the dry density increases.
- The effect of fibre content was less on the density of block

5.2 Compressive strength

- If we Compare raw soils blocks to fibre reinforced cement soil blocks the an increase of 20 to 121% in compressive strength is observed
- Cement content of 7.5% by weight of the dry Soil total weight is required to meet the minimum requirement of strength.
- Up to 20% - 50% increase in the compressive strength was observed, when the moulding pressure was increased from 1.25 to 7.5MPa
- The plastic fibres chopped from carry bags perform better than that from plastic bottles in terms of

compressive strength.

5.3 Split Tensile strength

- As cement content increases for the same moulding pressure the tensile strength of the block also increases.
- The addition of fibre increases the split tensile strength

5.4 Water absorption

- Addition of Fibre results in increase in the water absorption. As percentage of fibre increases water absorption increases.
- On increasing the moulding pressure on blocks water absorption decreases.
- The blocks made up of plastic bottle fibre have more water absorption as compared to bag fibre blocks.

6. References

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BIOGRAPHIES



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