

STABILIZED ADOBE BLOCKS USING CONSTRUCTION AND DEMOLITION WASTE AS A SUSTAINABLE SOLUTION

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Construction and demolition waste, stabilized block, strength and durability

Introduction:

The growing environmental challenges have led to an increasing interest in sustainable engineering and construction. One of the most important issues related to ecology and environment in developing countries such as India is undoubtedly the generation of large volumes of solid wastes especially; construction and demolition waste (CDW) and its disposal. Undoubtedly, infrastructure creation, including housing is one of the largest industries globally. More importantly, in underdeveloped and developing countries (India), it is the second largest industry after agriculture with significant contribution to the national GDP (about 7%) and employment creation; there is a huge demand for residential and non-residential construction. CDW and other inert materials form approximately one-third of total municipal solid waste in the country. CDW is a growing problem not only in developing countries but also in developed nations, only difference being nature of its generation and handling, which is country dependent. There are many hurdles which cause difficulty in managing C&D wastes in India.

One of the effective means of disposal is to re-use and manage these materials again in construction activity in different ways so that construction becomes efficient, economical, and eco-friendly. One such attempt is being made through this work by preparing stabilized adobe blocks using natural soil and demolished masonry waste.

This present work aims to use locally available soil, construction and demolition waste, and cement as stabilizer for the preparation of mud blocks.

Objectives:

The main objective of this present work is to produce cement stabilized mud blocks using construction and demolition waste (CDW)

Specific objectives

1. To characterize of collected locally available soil and construction and demolition waste.
2. To determine the optimum combination of soil and CDW along with cement as stabilizer and water to achieve the engineering properties of adobe blocks.

- To study the strength and durability characteristics of prepared adobe blocks.

Methodology:

- The collection of construction and demolition waste from part of the superstructure is to be crushed, sieved, and stored in containers.
- Collection of locally available loamy soil and to be processed and stored in containers.
- Characterization of soil for its engineering properties
- Based on trial mixes, fixing stabilizer and water percentage to be added for preparation of blocks.
- The prepared blocks are to be tested for their mechanical strength and durability properties

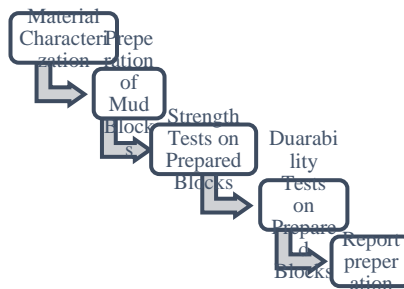


Figure: Details of work carried out

Results and Conclusions:



Figure: Preparation and testing of adobe blocks

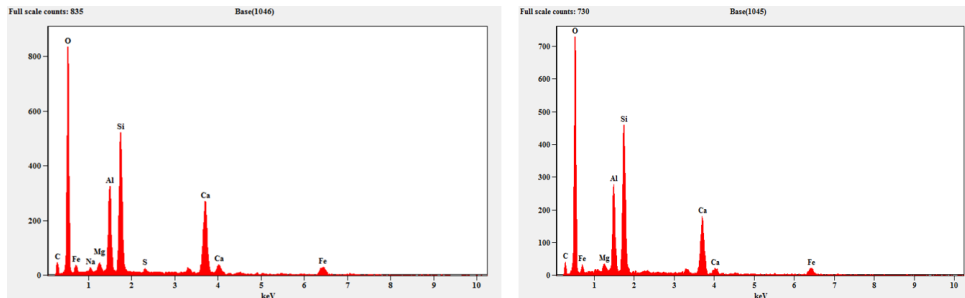


Figure: EDS plots of adobe block samples

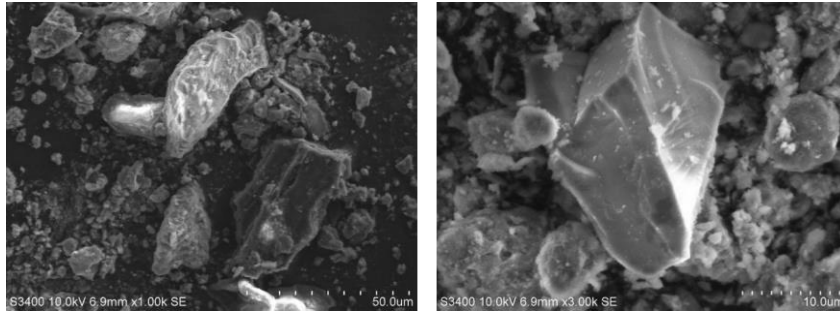


Figure: SEM analysis of block samples at 6000x resolution

Series of construction and demolition stabilized blocks exhibited better behaviour. Overall performance of stabilized adobe blocks prepared by utilizing construction and demolition waste as a replacement to natural soil, satisfies the required criteria for a masonry unit and shall be used as energy efficient, cost effective, sustainable construction masonry materials.

Scope for future work:

Use of different types of wastes agriculture waste etc. in rural areas for the preparation of stabilized blocks to manage solid waste management and recycling and economical construction.