COMPARATIVE PERFORMANCE ASSESSMENT OF COMPRESSED STABILIZED EARTH BLOCKS FOR SCHOOL BUILDING CONSTRUCTION IN SRI LANKA

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ABSTRACT

This study investigates the potential of Compressed Stabilized Earth Blocks (CSEBs) as a sustainable and cost-effective alternative to conventional construction materials for school buildings in Sri Lanka. CSEBs, made from locally available soil mixed with a small percentage of stabilizers such as cement or lime, offer numerous environmental and economic advantages. The research focuses on assessing the performance of CSEBs in terms of structural integrity, thermal comfort, and life cycle cost analysis, comparing them with traditional materials like cement blocks and fired bricks.

Laboratory analyses were conducted to evaluate the compressive strength of CSEBs. Additionally, a life cycle cost analysis & environmental impact analysis were performed to determine the economic feasibility & sustainability of using CSEBs in school construction. The results indicate that CSEBs, when properly manufactured and stabilized, meet the required standards for school building construction in terms of strength and durability. Moreover, CSEBs provide superior thermal comfort, reducing the need for artificial cooling and thus lowering operational energy costs.

The study concludes that CSEBs represent a viable and sustainable building material for school construction in Sri Lanka, offering both economic and environmental benefits. The adoption of CSEB technology could significantly contribute to the country's efforts to promote sustainable development and reduce the environmental impact of the construction sector. Further research is recommended to explore long-term performance under varying climatic conditions and to develop guidelines for the widespread adoption of CSEB construction in Sri Lanka.

Keywords: Compressed Stabilized Earth Blocks, Compressive Strength, Thermal Conductivity, Cost-effectiveness, Sustainability, Energy Efficiency, Durability

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Abbreviation	Description
CSEB	Compressed Stabilized Earth Block
NBC	National Building Code
HVAC	Heating Ventilation & Air conditioning
CSB	Cement Sand Block
HCFB	Hollow Core Fired Brick
CFB	Country Fire Bricks
ECB	Earth Concrete blocks
LSEB	Lime Stabilized Earth Block
PSEB	Polymer Stabilized Earth Block
BSEB	Bitumen Stabilized Earth Block
FASEB	Fly-ash Stabilized Earth Block
NPV	Net Present value
LCC	Life Cycle cost
LCCA	Life Cycle cost Analysis
UV	Ultra Violet
HAP	Hourly Analysis Program
HVAC	Heat, Ventilation and Air Conditioning
OM	Operation & Maintenance
CON	Construction
LKR	Sri Lankan Rupee
ICTAD	Institute for Construction Training and Development
BSR	Building Schedule of Rates