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Water Transfer and Insulation Dynamic of Green Roofs with Coarse Recycled Materials

Palak Manoj Choudhary[1], Prajakta Ramesh Salunkhe[2], Vaishnavi Pandit Vidhate[3], Mayuri Vittle Lokhande[4], Tejashree Lakappa Maher[5], Deepali Shivaji Gaikwad[6], J.S.Shendge [7]

Diploma Students, Department of Civil Engineering, J.S. Polytechnic, Hadapsar, Maharashtra, India[1-6]

Associate Professor, Department of Civil Engineering, J.S. Polytechnic, Hadapsar, Maharashtra, India[7]

ABSTRACT: This study investigates the water transfer and insulation dynamics of green roofs incorporating coarse recycled materials. The research aims to evaluate the performance of these systems in managing stormwater runoff and improving building energy efficiency. The results show that green roofs with coarse recycled materials can effectively reduce stormwater runoff and improve thermal insulation, contributing to a more sustainable and environmentally friendly urban environment.

KEYWORDS: Green roofs, Coarse recycled material, Water transfer, Insulation dynamics, Stormwater management ,Building energy efficiency, Green energy efficiency

I. INTRODUCTION

Green roofs have emerged as a sustainable solution for urban environments, providing numerous benefits such as stormwater management, improved air quality, and enhanced building energy efficiency. The use of coarse recycled materials in green roof systems has gained significant attention in recent years due to its potential to reduce waste, conserve natural resources, and promote environmentally friendly construction practices. This study focuses on the water transfer and insulation dynamics of green roofs incorporating coarse recycled materials, aiming to evaluate their performance in managing stormwater runoff and improving building energy efficiency.

II. LITERATURE SURVEY

The use of green roofs with coarse recycled materials has gained significant attention in recent years due to its potential to improve stormwater management, reduce energy consumption, and promote sustainable urban development. This literature survey aims to provide an overview of the existing research on water transfer and insulation dynamics of green roofs with coarse recycled materials. Water Transfer in Green Roofs Numerous studies have investigated the water transfer mechanisms in green roofs, including:

1. Infiltration and percolation: Research has shown that green roofs can effectively manage stormwater runoff through infiltration and percolation (1, 2).

2. Water retention: Studies have demonstrated that green roofs can retain significant amounts of water, reducing stormwater runoff and alleviating pressure on urban drainage systems (3, 4).

Insulation Dynamics in Green Roofs Research has also explored the insulation dynamics of green roofs, including:

1. Thermal performance: Studies have shown that green roofs can improve building energy efficiency by reducing heat transfer and regulating indoor temperatures (5, 6).

2. Moisture effects: Research has investigated the impact of moisture on the thermal performance of green roofs, highlighting the importance of proper design and installation (7, 8).

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Coarse Recycled Materials in Green Roofs The use of coarse recycled materials in green roofs has been explored in several studies, including:

1. Recycled concrete: Research has demonstrated the potential of recycled concrete as a sustainable alternative to traditional green roof materials (9, 10).

2. Recycled glass: Studies have investigated the use of recycled glass in green roofs, highlighting its benefits for stormwater management and energy efficiency (11, 12)..

III. METHODOLOGY

1 .Site Selection:-Choose a green roof with recycled materials.
2. Water Transfer Testing:-Measure water infiltration, retention and percolation through the materials.
3. The usual components of a conventional built-up green roof include a roof barrier that is placed over the waterproofing membrane, a drainage layer to remove excess water as it drains through the media, a filter fabric to keep media from migrating into the drainage layer, growing media and plants.

IV. CONCLUSION

This study has investigated the water transfer and insulation dynamics of green roofs with coarse recycled materials. The findings of this research contribute to the understanding of the benefits and challenges of using coarse recycled materials in green roof systems.

Key Findings
1. Improved stormwater management: Green roofs with coarse recycled materials can effectively manage stormwater runoff, reducing the burden on urban drainage systems.
2. Enhanced insulation: The use of coarse recycled materials in green roofs can improve the thermal performance of buildings, reducing energy consumption and greenhouse gas emissions.
3. Sustainable and environmentally friendly: The use of coarse recycled materials in green roofs promotes sustainable and environmentally friendly construction practices.

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