Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

HOW USED BANNERS FROM THE ADVERTISING INDUSTRY ARE REINVENTING CONCRETE: A CIRCULAR ECONOMY APPROACH

Sunhilde Cuc[1]*, Emil Gligor[2], Cristina Secan[1]

[1]Department of Textiles, Leather and Industrial Management, University of Oradea, 1 Universității Street, 410087 Oradea, România
[2]Faculty of Constructions, Cadastre and Architecture, University of Oradea, 410058 Oradea, România

Abstract

This article scrutinizes the potential utilization of recycled vinyl fibers sourced from flex banners as an environmentally sound and valuable constituent in concrete mixtures. The study aims to assess the efficacy of vinyl fibers with varying dimensions on the tensile and compressive strength of concrete, alongside exploring the feasibility of repurposing vinyl banners in sustainable concrete production, aligning with the tenets of a circular economy. The findings demonstrate that the inclusion of vinyl fibers in concrete, at a concentration of 2.5%, can induce a decrease in compressive strength of up to 0.95%, particularly accentuated in longer fibers. Meanwhile, all vinyl fiber-reinforced concretes exhibited higher tensile strength, ranging from 38-60% more than the control value, with longer fibers showing a more pronounced increase. The article emphasizes the advantages of integrating recycled vinyl fibers in concrete formulations, emphasizing enhanced durability and strength. It deliberates on the role of this practice in supporting a circular economy by diverting waste materials away from landfills. The outcomes of this study can aid in formulating economical and sustainable methodologies to augment concrete's mechanical properties while curbing the environmental repercussions of materials like flex banners.

Key words: circular economy, fiber-reinforced concrete, sustainability, vinyl banners

Received: February, 2024; Revised final: February, 2025; Accepted: March, 2025

* Author to whom all correspondence should be addressed: e-mail: sunhilde_cuc@yahoo.com