### **Accepted Manuscript**

Hardened properties of concrete mixtures containing pre-coated crumb rubber and silica fume

Obinna Onuaguluchi, Daman K. Panesar

PII: S0959-6526(14)00656-8

DOI: 10.1016/j.jclepro.2014.06.068

Reference: JCLP 4463

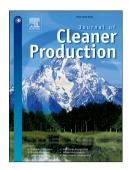
To appear in: Journal of Cleaner Production

Received Date: 27 January 2014

Revised Date: 3 June 2014 Accepted Date: 24 June 2014

Please cite this article as: Onuaguluchi O, Panesar DK, Hardened properties of concrete mixtures containing pre-coated crumb rubber and silica fume, *Journal of Cleaner Production* (2014), doi: 10.1016/j.jclepro.2014.06.068.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



#### ACCEPTED MANUSCRIPT

# Hardened properties of concrete mixtures containing pre-coated crumb rubber and silica fume

#### Obinna Onuaguluchi and Daman K. Panesar

Department of Civil Engineering, University of Toronto, 35 St. George Street, Toronto, ON M5S 1A4. Canada

\*Corresponding author: Phone: email: luchiobinna@yahoo.com

#### **Abstract**

Loss of mechanical strength and relatively high variability in durability performance are major factors preventing large-scale utilization of scrap tire waste in concrete. This study examines an approach to pre-treat crumb rubber in conjunction with the addition of supplementary cementitious materials in order to mitigate the loss of mechanical properties in rubberized concrete. The mechanical and durability properties of concrete composites containing as-received and limestone powder pre-coated crumb rubber at 0 %, 5 %, 10 % and 15 % fine aggregate substitution by volume are investigated. In addition, some mixtures also contain silica fume at 15 % cement replacement by volume. The results reveal that although the strength improvement due to coated crumb rubber alone was minor, the synergistic effect of coated crumb rubber and silica fume as cement replacement material enhanced the mechanical properties of mixtures significantly. Moreover, both as-received and pre-coated crumb rubber acted as an electrical insulator increasing the surface resistivity and chloride permeability resistance of concrete.

**Keywords:** Crumb rubber; concrete; mechanical strength; resistivity; chloride permeability

#### 1. Introduction

Presently, the recycling of waste by-products is an integral part of waste management policies in most countries of the world. The main benefits of waste recycling are reduction in environmental pollution and conservation of natural resources. For the construction industry, sustainability in

#### Download English Version:

## https://daneshyari.com/en/article/8105748

Download Persian Version:

https://daneshyari.com/article/8105748

<u>Daneshyari.com</u>