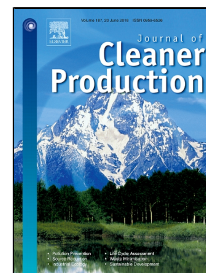


Accepted Manuscript

Mechanical and healing properties of asphalt mixes reinforced with different types of waste and commercial metal particles



Harith Ajam, Breixo Gómez-Meijide, Ignacio Artamendi, Alvaro Garcia

PII: S0959-6526(18)31304-0
DOI: 10.1016/j.jclepro.2018.04.262
Reference: JCLP 12843
To appear in: *Journal of Cleaner Production*

Received Date: 23 June 2017
Revised Date: 27 April 2018
Accepted Date: 28 April 2018

Please cite this article as: Harith Ajam, Breixo Gómez-Meijide, Ignacio Artamendi, Alvaro Garcia, Mechanical and healing properties of asphalt mixes reinforced with different types of waste and commercial metal particles, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.04.262

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.

Mechanical and healing properties of asphalt mixes reinforced with different types of waste and commercial metal particles

Harith Ajam^{a,b}, Breixo Gómez-Meijide^a, Ignacio Artamendi^c, Alvaro Garcia^{a*}

^a Nottingham Transportation Engineering Centre [NTEC], Department of Civil Engineering, University of Nottingham, Nottingham
NG7 2RD, United Kingdom

^b University of Babylon, Babil, Iraq

^c Technical & Development Department, Moordale House, Hulland Ward, Ashbourne, Derbyshire, DE63ET
United Kingdom

* Corresponding author. Tel: +44 (0) 0115 95 13914. E-mail addresses: alvaro.garcia@nottingham.ac.uk

Abstract:

Improper disposal of metal waste in landfills is one of the primary means by which metals, mainly produced in different industrial sectors, reach the soil and ground water. These can migrate to surrounding ecosystems and bio-magnify in plants and animals endangering human food chain. At the same time, the addition of metal particles in asphalt mixes produces a series of beneficial effects, such as enhancing their mechanical performance, durability and electrical conductivity making possible applications, such as ice/snow melting and cracks healing by electromagnetic induction. The present investigation assesses and compares the use of two different types of waste metal fibres (recovered from old tyres and shavings from machining industry) and two other types of commercial particles (steel wool and steel grit) regarding their effect on volumetric, mechanical and healing properties of asphalt mixes. Results showed that, with a proper design, the improvement in such properties by using waste metals is comparable to that obtained by using commercial particles. It was also found that fibres from old tyres are especially suitable for low structural layers (base and sub-base), while the use of metal shavings is particularly recommendable in superficial course layers.

Keywords: metal waste, asphalt, mechanical properties, induction heating, healing

Abbreviations:

ITS - Indirect Tensile Strength
ITSR – Indirect Tensile Strength Ratio
ITSM – Indirect Tensile Stiffness Modulus

PTV – Pendulum Test Value
HR – Healing Ratio

Download English Version:

<https://daneshyari.com/en/article/8094476>

Download Persian Version:

<https://daneshyari.com/article/8094476>

[Daneshyari.com](https://daneshyari.com)