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Andrea Graziani, Carlotta Godenzoni, Fabrizio Cardone, Maurizio Bocci

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Effect of curing on the physical and mechanical properties of cold-recycled bituminous mixtures

Andrea Graziani[1], Carlotta Godenzoni[2*], Fabrizio Cardone[3], and Maurizio Bocci[4]

[1] *Assistant Professor, Università Politecnica delle Marche, Via Brecce Bianche, Ancona, Italy , a.graziani@univpm.it*

[2] *PhD Candidate, Università Politecnica delle Marche, Via Brecce Bianche, Ancona, Italy, c.godenzoni@pm.univpm.it*

[3] *Assistant Professor, Università Politecnica delle Marche, Via Brecce Bianche, Ancona, Italy , f.cardone@univpm.it*

[4] *Professor, Università Politecnica delle Marche, Via Brecce Bianche, Ancona, Italy , m.boccii@univpm.it*

* Corresponding author, Tel.: +39 071 220 4507; fax: +39 071 220 4510.

E-mail address: c.godenzoni@pm.univpm.it (C. Godenzoni)

Abstract

Cold recycling of bituminous pavements is an effective way to reduce cost of pavement maintenance. Depending on composition, cold-recycled mixtures with a wide range of mechanical properties can be produced. However, regardless of composition, a distinctive feature of cold-recycled mixtures is the requirement for a curing period to develop the long-term mechanical properties. The main objective of this study was to characterize the curing process of cold-recycled mixtures by analysing the rate at which mixture properties evolve over time and their value in the long-term cured state. The study was focused on two mixtures with a fixed dosage of bituminous emulsion (3.3 %) and two cement dosages (1 % and 2.5 %). Moisture loss by evaporation, ITS and ITSM were measured over time (100 days), considering two curing temperatures (25 °C and 40 °C). The evolution of such properties was modelled using two asymptotic regression models. Results showed that the Michaelis-Menten model effectively describes the evolution of material properties over time, the relation between water loss and mechanical properties and the relation between ITSM and ITS. Cement dosage had a important impact on the long-term values of material properties, whereas curing temperature mainly influenced the rate of curing.

Key Words: *Cold recycling, curing, moisture loss, indirect tensile strength, indirect tensile modulus, Michaelis-Menten model.*