

Contribution to technological validation of an SMA with rubber

Summary

Constituting wearing course layers resistant to the actions of heavy vehicles under high temperature conditions, this work aims to contribute for the technological validation of a rubber modified SMA 12.5 (using the dry blending process) without draining of the bitumen, to be an alternative to the use of cellulose fibres and, with the possibility of improving the overall durability of the SMA mixture. The mixtures were evaluated for water sensitivity, permanent deformation, deformability, fatigue resistance and aging, at the Laboratory of Transport Infrastructures of the Instituto Superior Técnico - IST.

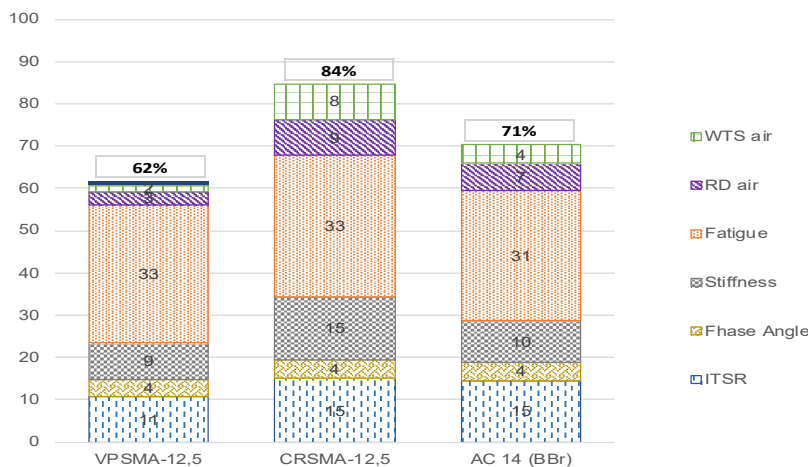
The ageing of the bituminous mixtures was carried out using the TEAGE (Tecnico Accelerated Ageing), a method developed at IST, which allows the simulation of ageing due to the exposure to environmental conditions in laboratory. In this work, the method was used to simulate seven years of exposure to the environmental conditions in the Huambo region, Angola. The rubber modified SMA proved to be a viable solution for paving applications, as the rubber prevents the bitumen draining, increases the mixture durability, improves the behaviour under high temperatures as well as under the environmental conditions of semi-tropical and tropical climates as the case of Angola. In this study, sponsored by ELEVO Group in Angola, was built an experimental track intended to understand possible problems related with production and construction compared to a conventional AC14, the type of bituminous mixture more commonly used in Angola for wear layer.

In the study carried out, the direct costs of conventional bituminous mixtures were also evaluated, to assess the expected influence of the incorporation of rubber. The analysis was carried considering the Angolan framework, including the average costs of purchasing raw materials, the estimated costs for application and the current public works management costs, for in addition to experiences developed for Portugal.

The drawn conclusion was that rubber modified SMA fits well the objective of constituting a wearing course resistant to heavy vehicles' actions under high temperature conditions, indicate too that the solution is technologically feasible, without any relevant manufacturing or construction problems, with a mechanical behaviour similar to the obtained by the laboratory study, presenting a valid solution for more effective and durable pavements in Angolan technology or any other reality.

Keywords

Surface layer, SMA, rubber, performance, durability, applicability.



Global performance indicator for CR SMA-12.5, VPSMA-12.5, and AC 14 (BBr).



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