

Optimization of Carbon Nanotube Content of Asphalt Nanocomposites with Regard to Resistance to Permanent Deformation

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Abstract : This paper presents the results of the development of asphalt nanocomposites containing carbon nanotubes (CNTs) with high resistance to permanent deformation, aiming to increase the performance of asphalt surfaces in relation to the rutting problem. Asphalt nanocomposites were prepared with the addition of different proportions of CNTs (1%, 2% and 3%) in relation to the weight of asphalt binder. The base binder used was a conventional binder (50-70 penetration) classified as PG 58-22. The optimum percentage of CNT addition in the asphalt binder (base) was determined through the evaluation of the rheological and empirical characteristics of the nanocomposites produced. In order to evaluate the contribution and the effects of the nanocomposite (optimized) in relation to the rutting, the conventional and nanomodified asphalt mixtures were tested in a French traffic simulator (Orniéreur). The results obtained demonstrate the efficient contribution of the asphalt nanocomposite containing CNTs to the resistance to permanent deformation of the asphalt mixture.

Keywords : asphalt nanocomposites, asphalt mixtures, carbon nanotubes, nanotechnology, permanent deformation

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