

Rheological performance and high stability of bitumen modified with surfactant, rubber (SBR/BR) and crumb rubber (CR) additives.

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ABSTRACT: In this contribution, the mechanical and physico-chemical properties of a new kind of modified bitumen are presented. The bituminous binder was modified in order to understand the effect on the structural properties of several compounds such as a stabilizing surfactant (S), a Polymer Blend (SBR/BR) and a crumb rubber (CR). Laboratory tests were focused on the characterization of bitumen modified with binary combinations of S-SBR/BR and S-CR additives and compared with binder as a reference. This work deals with the characterization conducted by using conventional as well as advanced methods on bitumens. Fundamental rheological tests, based on dynamic shear rheometer in the temperature range from -30 °C to +160 °C and advanced ¹H Magnetic Resonance Relaxometry analysis were used to evaluate the effect of modifiers on the bitumen structure. Rationalization of all the data was achieved with the aid of X-Ray Photoelectron experiments/

For determination of stability of the surfactant and Rubber, modified bitumen tube testing method was performed. Based on the result analysis, an improvement of the viscoelastic properties of surfactant-modified bitumen was ascertained. The addition of surfactant was crucial and it allowed using both SBR/BR and CR as modifiers to overcome physico-chemical drawbacks such as, e.g., sedimentation phenomena.