



TOP TEN

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Research Area 3: Innovative Infrastructure for Europe 2030

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Evaluation of Additives for the Improvement of Low Noise Asphalt Mechanical Performances

Environmental noise pollution negatively affects human life and health. For this reason, it has become a priority for Switzerland to reduce road noise by applying measures on the source. One of the most efficient methods consists of semi-dense asphalt. The major issue in using semi-dense asphalt is that the acoustic and mechanical service life does not usually exceed 10-12 years. To tackle this problem, four mixtures have been assessed, with the aim of improving the service life and replace conventional polymer-modified bitumen (CH-E) binders used for semi-dense asphalt. The tested mixtures considered various additives: recycled plastic (GiPave®); complex polymer (MR6®); natural asphalt base (Gilsolflex®) and a liquid (B2Last®). A comprehensive evaluation of the mechanical behaviour of semi-dense asphalt has been performed by applying the Marshall test (flow and stability); gyratory compactor; indirect tensile strength ITS; water sensitivity ITSR; Contabro; stiffness modulus IT-CY and cyclic compression test. Further evaluation of the neat binder PmB 45/80-65 and B50/70 with the different types of additives based on penetration, ring and ball, Fraass, and elastic recovery tests also provided some interesting information. The research results indicate that some additives can be considered as an alternative to PmB used in semi-dense asphalt, or even improve its mechanical properties. The influence of the additives on the material properties has been especially observed for stiffness modulus, cyclic compression test and elastic recovery. Finally, it can be argued that some of the tested additives are suitable alternatives to replace polymer-modified bitumen.

