

Characterisation of high-performance cold bitumen emulsion mixtures for surface courses

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The primary aim of this study is to investigate the enhancement of Cold Asphalt Emulsion Mixtures (CAEMs) using binary and ternary blended fillers (BBF and TBF), including an in-depth assessment of the microstructure. Ordinary Portland cement (OPC), fly ash (FA) and ground granulated blast furnace slag (GGBS) were used for the BBF while silica fume (SF) was added to the BBF to obtain TBF. The mechanical and durability results indicated that the TBF was more suitable than the BBF for the production of CAEMs. The microstructural assessment indicated that the effect of BBF on the internal microstructure of CAEMs was slightly negative and more noticeable in CAEMs containing FA. It is proposed that the addition of SF to BBF mixtures can eliminate the delay in formation of hydration products caused by the bitumen emulsion. Overall, the research suggests that the use of BBF-CAEMs might be appropriate for pavements in cold climate whereas TBF-CAEMs would be effective in road pavements exposed to severe conditions both in hot and cold climates.