

Effect on Surface Temperature Reduction of Asphalt Pavements with Cement-Based Materials Containing Ceramic Waste Powder

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Abstract : The heat island phenomenon becomes one of the environmental problems. As countermeasures in the field of road engineering, cool pavements such as water retaining pavements and solar radiation reflective pavements have been developed to reduce the surface temperature of asphalt pavements in the hot summer climate in Japan. The authors have studied on the water retaining pavements with cement-based grouting materials. The cement-based grouting materials consist of cement, ceramic waste powder, and natural zeolite. The ceramic waste powder is collected through the recycling process of electric porcelain insulators. In this study, mixing ratio between the ceramic waste powder and the natural zeolite and a type of cement for the cement-based grouting materials is investigated to measure the surface temperature of asphalt pavements in the outdoor. All of the developed cement-based grouting materials were confirmed to effectively reduce the surface temperature of the asphalt pavements. Especially, the cement-based grouting material using the ultra-rapid hardening cement with the mixing ratio of 0.7:0.3 between the ceramic waste powder and the natural zeolite reduced mostly the surface temperature by 20 °C and more.

Keywords : ceramic waste powder, natural zeolite, road surface temperature, water retaining pavements

Conference Title : ICMSE 2016 : International Conference on Materials and Structural Engineering

Conference Location : Kuala Lumpur, Malaysia

Conference Dates : August 18-19, 2016