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## Wavelet-based characterisation of asphalt pavement surface macro-texture

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**Abstract:** This paper utilized wavelet analysis to characterize the macro-texture properties of asphalt pavements. The study included Circular Texture Meter (CTMeter) measurements collected from several asphalt pavement sections in the state of Ohio. The asphalt pavements consisted of two mix designs (Superpave and Marshall), three aggregate types (dolomite, limestone, and gravel), and two binder grades (PG 70-22 and PG 64-22). The wavelet approach was used to determine the wavelength ranges and energy content that affect the macro-texture properties of asphalt pavements. In addition, the normalized wavelet energy (NE) parameter was utilized to characterize the overall pavement surface macro-texture. The CTMeter data allowed for obtaining six wavelet decomposition levels, namely d1 through d6, with wavelengths up to 56 mm. The analysis revealed that the macro-texture properties of smooth pavement sections are mainly affected by sub-band levels d1 through d4 (i.e., both fine and coarse aggregates), while the macro-texture properties of the rough pavement sections are mainly affected by sub-band levels d3 and d4 (i.e., coarse aggregates). Similar trends in macro-texture properties were observed between NE and the conventional Mean Profile Depth (MPD). However, the variations in the macro-texture properties were better captured using the NE than the MPD. Therefore, it was concluded that the wavelet approach is better suited to characterize the macro-texture properties of asphalt pavements.