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Analysis of volumetric properties of bituminous mixtures using cellular phones and image processing techniques

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Abstract: This study aims to develop the microanalysis of the bituminous mixtures using cellular phone images (CPI) and image processing techniques (IPT). A new methodology and scheme was developed for faster and accurate procedure to compute volumetric design parameters; voids in mineral aggregate (VMA), voids in total mix (VTM), and voids filled with asphalt (VFA) using CPI and IPT instead of the conventional methods. Five types of cellular phones with different camera resolutions were used to analyze the horizontal cross section (face) of hot mix asphalt slices. A cellular phone digital mapping frame for microstructure of the bituminous mixture for data collection was designed and implemented. New models for computations of volumetric design parameters (VMA, VTM, and VFA) were developed. Results showed that the best cellular phone for microanalysis of the bituminous mixture is type D, even though it does not have the highest resolution, and the best height of capturing the images is 35 cm.