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ANALYSIS OF CONCRETE REFLECTANCE CHARACTERISTICS USING SPECTROMETER AND VNIR HYPERSPECTRAL CAMERA

J.-D. Lee[1], B. A. Dewitt[2], S.-S. Lee[3], K.-J. Bhang[1], and J.-B. Sim[1]

[1] School of Civil and Environmental Engineering, Kumoh National Institute of Technology, 730-701 Gumi, Korea
[2] School of Forest Resources and Conservation, University of Florida, FL32611, Gainesville, United States
[3] Korea Institute of Geoscience and Mineral Resources, 305-350 Daejeon, Korea

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Abstract. The purpose of this research is to extract spectral reflectance characteristics of concretes through basic experiment on concrete specimens and site experiment on actual concrete structures using a field portable spectrometer and a VNIR hyperspectral sensor. A spectrometer (GER-3700) and a VNIR hyperspectral camera (AisaEagle VNIR Hyperspectral Camera) were utilized for extracting spectral characteristics of concrete specimens and actual concrete structures. General concretes show similar pattern with correlation more than 80%, while super high strength concrete shows very different aspect from general concretes.

The GER-3700 spectrometer and the VNIR camera were applied to extracting spectral characteristics of the actual concrete structures such as a bridge slab and pier in road construction site. We also made certain in not only interior experiment on concrete specimens but also site experiment on actual concrete structures that both the spectrometer and the VNIR camera vary in spectral reflectance depending on concrete strength. Afterwards if the studies on hyperspectral characteristics of worn-out concretes, concrete aggregate condition diversity, super high-strength concretes are performed in depth, it is helpful in stability evaluation and maintenance management of concrete-based structures or facilities using airborne or satellite hyperspectral images for a wide area.

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