

HR-346 Image Analysis for Characterization of Material for Highway Construction

Key Words: Image Analysis, Air Void Analysis,

The major objective of this work was to evaluate the potential of image analysis for characterizing air voids in Portland Cement Concrete (PCC), voids and constituents of Asphalt Cement Concrete (ACC) and aggregate gradation in ACC. Images for analysis were obtained from a scanning electron microscope (SEM).

Sample preparation techniques are presented that enhance signal differences so that backscattered electron (BSE) imaging, which is sensitive to atomic number changes, can be effectively employed.

Work with PCC and ACC pavement cores sampled has shown that the low vacuum scanning electron microscope (LVSEM) is better suited towards rapid analyses. The conventional high vacuum SEM can also be used for ACC and PCC analyses but some distortion within the sample matrix will occur.

Images with improved resolution can be obtained from scanning electron microscope (SEM) backscatter electron (BSE) micrographs. In a BSE image, voids filled with barium sulfate/resin yield excellent contrast in both PCC and ACC. There is a good correlation between percent of air by image analysis and linear traverse.