

HR-358 Evaluation of Microcracking and Chemical Deterioration in Concrete Pavements

Key Words: PCC, Microcracking, Sulfates, Alkali-Silica

ABSTRACT

The major objective of this research project was to investigate the chemistry and morphology of portland cement concrete pavements in Iowa. The integrity of the various pavements was evaluated qualitatively, based on the presence or absence of microcracks, the presence or absence of sulfate minerals, and the presence or absence of alkali-silica gel(s).

Major equipment delays and subsequent equipment replacements resulted in significant delays over the course of this research project. However, all these details were resolved and the equipment is currently in place and fully operational. The equipment that was purchased for this project included: (1) a LECO VP 50, 12-inch diameter, variable speed grinder/polisher; (2) a Hitachi S-2460N variable pressure scanning electron microscope; and (3) a OXFORD Instruments Link ISIS microanalysis system with a GEM (high-purity germanium) X-ray detector.

This study has indicated that many of the concrete pavements contained evidence of multiple deterioration mechanisms; and hence, the identification of a single reason for the distress that was observed in any given pavement typically had to be based on opinion rather than empirical evidence.