

PRINCIPLES OF INFRARED THERMOGRAPHY AND APPLICATION FOR  
ASSESSMENT OF THE DETERIORATION OF THE BRIDGE DECK AT THE "ZOO  
INTERCHANGE"

By John Zachar and Tarun Naik

Reference: CBU-1992-28

ABSTRACT

This paper details the principles of infrared thermography from the underlying theoretical considerations to the physical constraints involved with performing the test.

Infrared (IR) thermography testing may be conducted at any time of the day or night as long as heat transfer is taking place through the medium being examined. During the day, subsurface anomalies cause localized increases in heat absorption, so the surface above these areas registers warmer than the surrounding areas. At night, the anomalies cause the surface above them to dissipate heat faster than the surrounding solid areas, so they register cooler to the IR thermography.

An IR thermographic study of a freeway interchange in Milwaukee, WI. was conducted in late 1991. The study was designed to find delaminations and other pre-spalling subsurface anomalies that are not detectable by visual surface inspection. A pre-spalling condition occurs when the salt used to deice the road permeates the concrete and creates a corrosive environment around the top rebar mat. The resulting sub-surface cracking can be detected using IR thermography.