

TRAINING AND FIELD VERIFICATION FOR HAND-HELD THERMOGRAPHIC INSPECTION TECHNOLOGIES

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ABSTRACT

The goal of this research is to investigate new technologies for the condition assessment of concrete, to help ensure bridge safety and improve the effectiveness of maintenance and repair. The objectives of the research were to evaluate the capability and reliability of thermal imaging for the detection of delaminations in bridge components. This research included field testing to validate inspection guidelines developed during earlier phases of the research which describe the necessary minimum environmental conditions for successful application of the technology.

This thesis presents the results of the investigation, focusing on the use of thermal cameras as a bridge inspection tool for the detection of delaminations. The delaminations are caused by subsurface cracking, normally associated with corrosion damage in concrete. The delaminations result in local variations in surface temperature that are measured and imaged by the thermal camera. Field testing was conducted as a part of a training activity in different states across the US, as well as systematic verification testing intended to verify the performance of the technology.

Application demonstrated during the research included the detection of delaminations in bridge decks, in the soffit or underside of bridge components, in piers and abutments, and in fiber reinforced polymer (FRP) overlays. The study indicated that this technology was effective for detecting delaminations when the developed guidelines were met.