

## **Ground Penetrating Radar and Infrared Thermography Bridge Deck Surveys in Southwest Wisconsin**

*Infrasense, Inc. recently completed high-speed condition surveys of 28 bridge decks in Wisconsin's Southwest region. A suite of nondestructive tests were performed, including ground penetrating radar surveys, infrared thermography scanning, and impact echo testing.*

Milwaukee, Wisconsin ([PRWEB](#)) October 27, 2016 -- Infrasense, Inc., a national leader in nondestructive evaluation of transportation infrastructure, has recently performed high-speed condition surveys of 28 bridge decks in Wisconsin's Southwest region. A suite of nondestructive tests were performed, including ground penetrating radar surveys, infrared thermography scanning, and impact echo testing. These tests provide a condition assessment of the reinforced concrete bridge decks without the need for lane closures.

Since 2007, Infrasense has surveyed more than 650 bridge decks across Wisconsin using its multi-phase approach. After completing a quick and simple preliminary (Level 1) analysis, many are found to be in good condition and require no further analysis. Those found to have more significant deterioration levels are mapped in detail (Level 2), providing data to accurately plan, program, and budget maintenance and rehabilitation. The Level 2 maps and quantities are reported as WisDOT standard pay items for deck preparation: Type 1, Type 2, and Full Depth.

Ground penetrating radar (GPR) data is collected to estimate rebar depth and corrosion conditions. The GPR data is collected in a series of lines spaced 3 feet transversely across the width of the deck, with each line representing a cross sectional slice of the deck at a particular offset. Decks in good condition consist of strong and uniform radar reflections from the rebar. GPR data with weak and inconsistent reflections indicate rebar-level deterioration in the bridge deck.

The infrared data is collected in a series of passes across each deck, with each pass covering a deck width of between 12 and 15 feet. During the survey, selected areas that appear delaminated in the IR image are manually sounded to confirm the presence of delamination. Because many of these decks have overlays, the reinforcing can be 4-5 inches from the surface, and sounding is not always capable of detecting delamination at this depth. For those locations where the delamination cannot be confirmed by sounding, testing is carried out using the Impact-Echo method. By analyzing wave frequencies through the concrete, the impact-echo equipment is capable of detecting delamination at any depth throughout the thickness of the deck.

Many agencies apply GPR and IR separately as tools for bridge deck assessment, or use only one preferred method. Each method has specific strengths and weaknesses, and Infrasense uses a combination of both to create a more effective bridge deck condition assessment. By combining IR and GPR surveys, the maximum amount of information can be obtained for the least cost. Decks with concrete overlays are common in Wisconsin, and illustrate how GPR and IR methods complement each other. Infrared surveys are effective in detecting overlay debonding, while GPR is effective in detecting rebar-level delamination. Combining GPR and IR methods becomes economical when applied with a two-level survey approach.

About Infrasense, Inc.

Since 1987, Infrasense, Inc. has applied state-of-the-art technologies to address the most difficult challenges in subsurface scanning. Infrasense's engineers are able to nondestructively extract critical information from a diverse range of structures. In addition to providing ongoing subsurface evaluation services to clients across the



country, the firm has also conducted numerous research programs to advance the field of subsurface detection and non-destructive evaluation.



**Contact Information**

**Lori McCormick**

Infrasense, Inc.

<http://www.infrasense.com>

+1 (781) 281-1686

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