

Bridge Deck Evaluation

Air-Launched Horn Antenna for Bridge Deck Analysis

The Project

In a collaborative effort between GSSI and the Maine Department of Transportation, both a 1.5 GHz ground-coupled antenna and a 2 GHz air-launched horn antenna were used to comparatively evaluate the condition of an asphalt overlaid bridge deck located in Lewiston, Maine.



Project Description

The bridge deck, a portion of the Veterans Memorial Bridge, was suspected by the Maine DOT to be considerably deteriorated. The bridge, which was constructed in 1971, had been repaired numerous times and was scheduled for rehabilitation. This presented an excellent opportunity for evaluating the 2 GHz horn antenna for bridge condition assessment.

GPR data was first collected along the bridge deck in lines parallel to the direction of traffic using the 1.5 GHz ground-coupled antenna. The profile lines were perpendicular to the transverse direction of the upper-most rebar. These data lines were acquired at two foot spacing by simply walking the cart-based BridgeScan system across the bridge in the direction of traffic.



Similar data lines were also acquired using the 2 GHz air-launched horn antenna. The 2 GHz antenna was mounted to the rear of a van and suspended approximately 18 inches above the bridge surface. A wheel-mounted DMI provided distance information to the radar control unit.

The vehicle was driven across the bridge aligning the antenna as close as possible to the paths used by the ground coupled antenna.



Top of bridge deck (left)
View of underside of bridge deck (bottom)



**The World Leader in
Subsurface Imaging™**

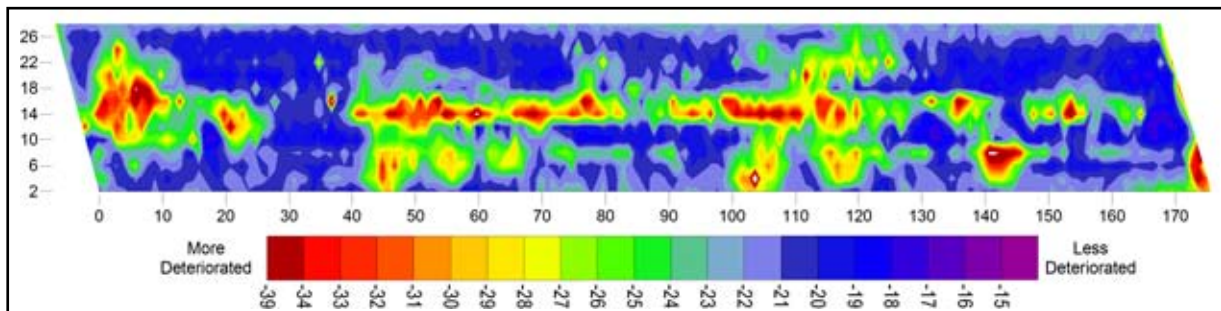
Courtesy: Maine Dept. of Transportation
Augusta, Maine USA

Bridge Deck Evaluation

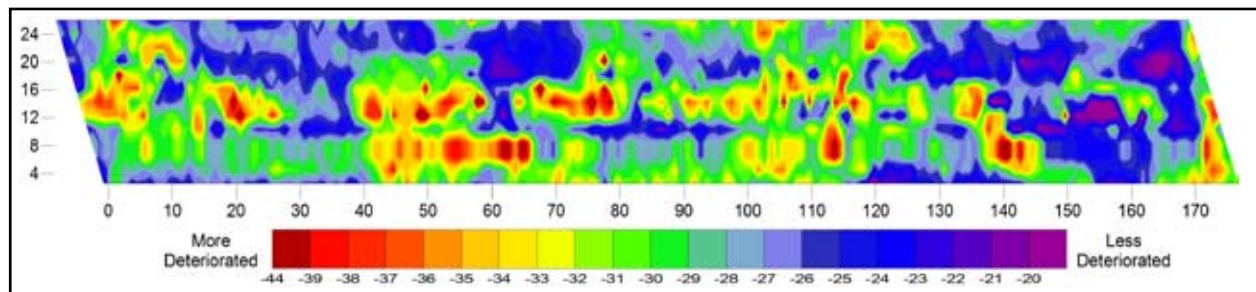
Outcome

The GPR data was processed with GSSI's RADAN software using the Bridge Assessment Module. The results were used to produce color-coded deterioration maps of the bridge deck. Results from the 1.5 GHz ground-coupled antenna and 2 GHz air-launched horn antenna demonstrated excellent correlation. In addition, the deterioration maps from both antennas were compared with visual data obtained from top-side and bottom-side visual inspections and exhibited excellent correlation.

The Maine DOT further confirmed the correlation by hammer sounding and by opening the bridge deck to expose the actual areas of deterioration requiring repair. Consequently, it was concluded that the 2 GHz air-launched horn antenna is an effective tool for the condition assessment of bridge decks while also allowing for faster data collection and a safer working environment.



1.5 GHz ground-coupled antenna data



2 GHz air-launched antenna data



The World Leader in
Subsurface Imaging™

Contour maps created using Surfer® by Golden Software