## SHRP-2 R06G - Tunnel Showcase Event

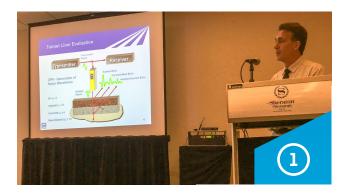


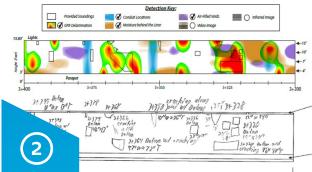


(pictured above)

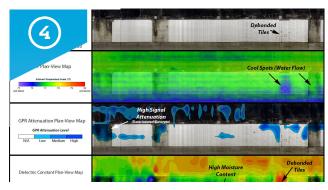
Penetradar being interviewed by local news outside the Liberty Tunnel discussing NDT for tunnel linings

Penetradar participated in the SHRP-2 Nondestructive Testing (NDT) for Tunnel Linings (RO6G) Showcase sponsored by PennDOT. Anthony Alongi, President of Penetradar, presented the NDT results of tunnel linings, which was then followed by a live demonstration of ground penetrating radar (GPR) technology in the Liberty Tunnel. DOT's and Tunnel owners from across the USA were present for the showcase to learn about state-of-the-art NDT methods for tunnel evaluation, which in addition to GPR also included High Resolution Imaging (HRI) and Infrared Thermography (IRT).









## Aspects of the **showcase** event

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## **PRESENTATION**

Anthony Alongi spoke about how GPR, IRT and HRI was effective in assessing the condition of tunnel linings by summarizing the results from Penetradar's analysis.

DEMONSTRATION

Members from DOT's (Department of Transportation) and tunnel owners across the country came to see and learn how NDT methods operated out in the field. 2

## NDT RESULTS & FINDINGS

Our results consisted of high-res imaging, infrared thermalimages, GPR measurement of attenuation and dielectric constants, and identification of areas of deteriorated liner, voids and moisture intrusion. Core samples, soundings and petrographic analysis showed results consistent with the GPR analysis. Comparing GPR delamination results with ground truth measurements, GPR detected 75% of the known delamination locations and 90% of the sound areas of concrete.

Penetradar's presentation and demonstration of NDT methods identified by SHRP R06G for tunnel evaluation showed that high-speed, non-destructive methods such as GPR, IRT and HRI can provide the critical information needed by engineers for design and maintenance in a cost effective and non-intrusive manner.