



University of Mississippi

Geophysical Signatures of Compromised Zones within Earthen Embankments and Levees



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Prevent, Protect, Respond, Recover

Homeland Security Challenge:

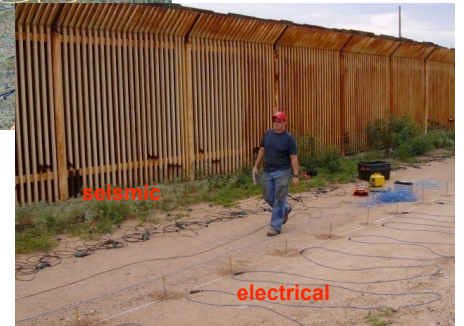
The Homeland Security Presidential Directive of 7 May 2007 classified dams and levees as one of the 18 critical infrastructure and key resource sectors. The United States has over 100,000 miles of levees protecting cities, towns and property from damaging flood water. Many of these levees are aging and are in need of repair or replacement. The DHS Science and Technology (S&T) Directorate's Levee Strengthening and Damage Mitigation Program require the capability to identify potential problem zones along levees. This is consistent with one of the representative technology needs of the DHS S&T Directorate's Infrastructure Protection Integrated Product Team - i.e., provide early warning capabilities for early detection and notice of potential levee failures (DHS 2009).

Research Project Solution:

The objective of this research project is to develop ground-based geophysical tools and technologies to assess the integrity and monitor earthen dams and levees. The research shall include a field component, a laboratory component, and a numerical modeling component. The research will focus on three ground-based geophysical techniques which will be optimized for rapid dam and levee assessment. These techniques include: i) seismic refraction tomography; ii) electrical resistivity tomography; and iii) passive seismic monitoring. The seismic and electrical methods are considered as advanced screening tools capable of delineating and classifying the degree of mechanical integrity of a levee and/or its foundation. Field experiments shall establish protocols for the optimal use of orthogonal geophysical techniques (seismic and electrical) to identify compromised earthen dams and levees.

National Implications:

The urgency of dealing with aging earthen dams and levees is a concern of nearly every state in the nation. This research project will provide an expanded set of geophysical tools and technologies that can be used to assess the integrity and monitor earthen dams and levees to detect areas of potential seepage and stability. It should also result in a set of protocols for the optimal use of orthogonal geophysical systems (seismic and electrical) to detect compromised earthen dams and levees.



Visual Inspection Ground Geophysics



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