Transportation Infrastructure Analysis and Damage Assessment

Moderator: **Dr. John Fortune, DHS S&T IDD, john.fortune@dhs.gov, (202) 254-6622**

Panelist 1: Robert Abercrombie, Oak Ridge National Laboratory, abercrombier@ornl.gov, (865) 241-6537 / 574-4988

Panelist 2: Lee Glascoe, Lawrence Livermore National Laboratory, Glascoe1@llnl.gov, (925) 423-2922

Panelist 3: Andrzej Nowak, University of Nebraska (Lincoln), anowak2@unl.edu , (402) 472-1376

Scribe: Bill Plott, Analytical Research & Logistics, Inc., william.plott@associates.dhs.gov

Transportation Infrastructure Analysis and Damage Assessment

Introduction

Coordination among the nation's vast transportation system and its numerous components is critical to success.

Challenges exist in:

- Experimental design for accurate reflection of system complexity
- Disseminating the results to users
- Adoption of results and technology

Transportation Infrastructure Analysis and Damage Assessment

Problems

- Man made hazards to infrastructure include inadequate maintenance, overloads, collisions, vandalism, and terrorism
- Bridges are critical to transportation, national economy, response to disaster, etc.
  - About 30% of the 584,000 bridges in the nation are either structurally deficient or obsolete
  - Most bridges built in 1950s and 1960s are now near the end of their expected lifespan

Transportation Infrastructure Analysis and Damage Assessment

Potential Solutions

- Develop the factors for prediction of the remaining life in a structure
  - Establish key parameters for structure performance
  - Implement data in improved rational design codes, procedures for evaluation, repair and rehabilitation methods, etc .
- Collection of data on loading and unloading through instrumentation in order to predict failure
  - Loading and unloading of structures eventually leads to failure
  - Progress from scaled models to simple structural components to full size tests

Transportation Infrastructure Analysis and Damage Assessment

Potential Solutions

- Develop the means for evaluating the effects of dynamic shock events on structures and personnel
  - Modeling IED type explosions for development of fast-running tools to be transferred to owner-operators

Transportation Infrastructure Analysis and Damage Assessment

Challenges

- Boundary conditions are typically not as assumed in models
- Data collection from full scale testing is limited to one test to failure
- Numerous variables within complex systems
- Transferring the results to user communities for incorporation into improved design, retrofits, etc.

Transportation Infrastructure Analysis and Damage Assessment

Conclusions

- Partnerships are essential in the development of effective measures
  - Interactions with end-user communities for transfer of technology
  - Sources of data for model evaluation
- Public policy leaders need collaboration between stakeholders
- Including performance standards based on research data would improve the acquisition process