S&T Stakeholders Conference

Transportation Challenges

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June 2-5, 2008

PARTNERING FOR A SAFER NATION
Transportation today

- Our nation has built a vast surface transportation system of roads, bridges, railways, waterways, and tunnels
  - Facilitates international and domestic commerce and access
  - Depend upon it to maintain our way of life
Transportation today

- The flow of people and goods is enormous:
  - In 2004:
    - the nation moved about 5 trillion ton miles of freight; and
    - 5 trillion passenger miles of people

- Impacts of loss
  - FHWA reported that a loss of a critical bridge or tunnel could exceed losses of $10 billion
Infrastructure vulnerability

- Natural Hazards/Accidents

  - 1971 San Fernando *Earthquake*, damaged 60 bridges in California

  - 1997 Chicago *Flood*, the damaged wall of a utility tunnel beneath the Chicago River opened into a breach which flooded facilities throughout Chicago
Infrastructure vulnerability

- Natural Hazards/Accidents

  - 1987 Schoharie Creek *Bridge Collapse*, part of NY’s busiest highway, due to aging, extreme winds, and flooding

  - 2007 Elevated I-580 *overpass collapse* in Oakland, CA, due to an exploding gasoline tanker
Infrastructure vulnerability

- **Terrorism**
  - *Hammersmith Bridge Bomb* - bridge was damaged by a IRA bomb
  - *Tigris River Bridge* - an explosion from a suicide attack on a bridge in Baghdad
IGD Approach

- Layered defense
- Maintain function for critical transportation components
- Avoid cascading effects
- Resilience
IGD Projects

- Advanced surveillance systems

Current
- Develops surveillance technologies to more effectively monitor critical infrastructure in urban areas (Innovation & Transition)

Future
- Enable detection of subtle changes against a wide-area background environment, and incorporating advanced sensors
- Affordable, automated monitoring and surveillance technologies to detect underwater threats in harsh environments
IGD Projects

- Protective measures

Current
- Physical tests and numerical analysis of blast effects and vulnerabilities on tunnels, bridges, dams, and levees
- Hardening structures, potentially using composite techniques

Future
- Researching advanced materials for construction of transportation infrastructure
- Advanced materials that will enable infrastructure that can withstand all hazards
IGD Projects

- Rapid Response Technologies

Current
  - Rapid repair of levees
  - Tunnel plug for fire, HAZMAT, flooding

Future
  - Protective sealing materials to mitigate the damage to a storage tank or railcar from a puncture or small-caliber weapon impact
Other IGD efforts

- IGD plans to conduct various workshops in the near future
  - Aging Infrastructure
  - Infrastructure of the future

- International Collaboration
  - US/UK Collaborative workshop on tunnels, bridges, and stadia
  - US/Sweden workshop on tunnels and bridges