Views on Seismic Research Role in Dealing with Multi-Hazard Extreme Event Environment

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Introduction

- Current environment faced by DOTs
  - Changing customer expectations
    - Global economy
    - E-commerce
    - Technological evaluation
  - What do customers expect?
    - Can go from A to B!
    - Need reliable, efficient, safe, and secure transportation
  - Constrained resources
Introduction

- NYSDOT transformation to meet changing customer demands
- Priorities to meet customer expectations
  - Improve mobility and reliability
  - Increase safety
  - Improve environmental conditions
  - Promote economic competitiveness
  - Strengthen security
Introduction

- Research should assist to meet the Department priorities
  - Improve the state-of-the-art
  - Bring state-of-the-practice closer to State-of-the-art
  - Asset and Response Management

- Committed to work closely with universities/researchers to meet the goals
In the current environment, we cannot separate individual vulnerabilities but should approach them in a unified fashion. Any or all affect mobility.

Bridge Safety Assurance
- Scour
- Earthquakes
- Collision
- Overloads
- Concrete Details
- Steel Details
- Security
Research Role

- **Research Focus**
  - Address DOT priority areas
  - Multi-hazard extreme-event approach
  - Infrastructure risk assessment
    - Based on event
    - Based on locality and structure
  - Post-Event Response
    - Maintain and manage mobility
      - Safety
      - Minimize loss to economy
      - Security
Research Role

- **Research Focus**
  - Post-Event Response (Contd.)
    - Hazard data collection and management
    - Damage data and image collection and management
    - Guidelines for inspection - customized for event and structure
    - Guidelines for retrofitting to make them operational
    - Prioritization and funding allocation guidelines based on risk assessment
    - Optimization of maintenance, repairs, and reconstruction based on risk assessment
Seismic Research Role

- Considerable research done in seismic area
- Should use the above knowledge to further the multi-hazard extreme-event research
- Review similarities and differences in structural performance due to seismic and other extreme events
- Develop management system to deal with all extreme events
- MCEER should focus on being a true multi-disciplinary center
  - Coordination between research funded by various agencies
  - Multi-hazard extreme event approach
NEES Facility for NYSDOT

- Use of large scale models for structural performance (including safety and security) to extreme events
- Verification of advanced technologies and use of innovative materials
- Verification of analytical methods
- Verification of guidelines and design procedures for key long-span bridges
- Accelerated testing
- Develop management tools
- Develop quick, cost-effective retrofit and inspection procedures
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