Resiliency in Transportation Decision Making

Panel on Environmental and Resilience Issues
Future Interstate Study Committee

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FHWA’s policy on Resilience

• FHWA Order 5520: Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events

  • Establishes FHWA policy and responsibilities related to preparedness and resilience to climate change and extreme weather events
  • Signed: December 15, 2014
  • See: http://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm
Integrating Climate Resilience

Goal: Mainstream consideration of climate change vulnerability and risk in transportation decision making

Planning
- Long Range Transportation Plans
- Asset Management Plans

Project Level
- Environmental Processes
- Engineering
- Design

Operations and Maintenance
- Emergency Relief
- Snow Removal Programs
Developing Tools, Resources, and Guides

**Planning**
- Vulnerability Assessment Framework (2013)

**Project Level**
- HEC 25: Highways in the Coastal Environment (October 2014)

**Operations & Maintenance**
- Climate Change Adaptation Guide (November 2015)
FHWA & CLIMATE RESILIENCE

Research

- Gulf Coast 2 Study
- Vulnerability Pilots
- Hurricane Sandy Project
- Engineering Assessments Study
- Green Infrastructure Pilots

Resources

- Vulnerability Assessment Framework
- Guidance (HEC-25 & 17)
- Synthesis Document
- Green Infrastructure Techniques for Coastal Highway Resilience

Project Development Approaches for Climate and Extreme Weather Resilience (2016)
Relevant Recent Legislation

- Moving Ahead for Progress in the 21st Century (MAP 21)
  - Requires risk-based asset management plans
  - Evaluation of facilities that have been repeatedly repaired or replaced
  - Added eligibility of “protection against extreme events” to funding programs
- Fixing America’s Surface Transportation Act (FAST ACT)
  - Formalizes resilience consideration into transportation planning
Published October 2016
- Implements MAP-21 provisions
- Includes consideration of climate and extreme weather risk in asset management plans
- Added new section (23 CFR 667) that addresses MAP-21 Section 1315(b) - evaluation of facilities repeatedly repaired or replaced
Resilient infrastructure can mean lower net costs. Examine both costs and benefits of decisions

- **Benefits of resiliency:**
  - Higher initial costs, lower maintenance costs, reduced disruption

- **Cost of ignoring resiliency:**
  - More frequent maintenance cycles, replacement
  - Traffic delays, economic losses
Asset Management

Statewide 23 CFR §667 Evaluation

- Implements MAP-21 requirement (Section 1315(b))
- State DOTs required to conduct evaluations to determine reasonable alternatives to roads, highways, and bridges repeatedly repaired or replaced due to and emergency events
Consideration of evaluations

- DOTs to consider results of evaluation when developing projects
- FHWA will periodically review the DOTs compliance.
- Provision is independent of ER program and does not guarantee ER eligibility
- DOTs make evaluations available to FHWA upon request
- FHWA may consider results when making project development decisions
New Transportation Planning Rule (May 2016) adds:

- Metropolitan Transportation Plan must assess capital investment and other strategies that reduce the vulnerability of existing transportation infrastructure to natural disasters (23 CFR 450.324(f)(7)).
- MPOs recommended to consult with agencies and officials responsible for natural disaster risk reduction when developing Plan and TIP (23 CFR 450.316(b)).
- New planning factor on improving the resiliency and reliability of transportation system (23 CFR 450.206(a) and 23 CFR 450.306(b)).
NEPA and Climate Change

• New Climate Change Guidance issued by CEQ (August 2016) requires new Environmental Assessments and Environmental Impact Statements to consider:
  – The impacts of climate change on the proposed project
  – Cumulative impacts of transportation project on an environment vulnerable to the effects of climate change
NEPA and Climate Change

• Already required by several states
• Likely to remain and issue due to risks to infrastructure and public interest
• Litigation?
• Climate change and Resiliency consideration included in **ER program manual** and **ER order**

• Consider before replacing “in kind”
  – Up to current design standards?
  – Justification for betterment?
Emergency Relief: Justifying Betterments

Texas SH 91 at Shawnee Creek, June 2015
Observations

• Resiliency is critical to future performance of the system
• Need integration across planning and project decision making processes
• Recent legislation and regulations point to more consideration, not less
  – Long term performance, management
  – Preservation, efficient use of funds, choosing wisely
  – Considering effects at the system and project level
• We are not starting from scratch, learn from recent work
• Climate data will become better, more actionable
• Economic arguments are often most persuasive, need to develop better methods