NCHRP Project 20-05 Synthesis Topic 48-13: Resilience in Transportation Planning, Engineering, Management, Policy, and Administration

Introduction

Page description:

NCHRP Topic 48-13 Survey Questionnaire

This synthesis effort gathers information on the current resilience practices within transportation planning, engineering, management, policy and administration. With the emergence of climate change concerns along with continuing and significant natural and man-made disruptive events, new practices and policies have been developed with the intent to ameliorate and respond rapidly to potential future incidents and system failures. The objective of this synthesis study is to document resilience efforts and how they are organized, understood, and implemented within transportation agencies' core functions and services.

Resilience and business continuity practices in the transportation sector have been promoted and encouraged through multiple efforts by federal agencies, non-governmental organizations (NGOs), state and regional authorities, and the private sector. The Federal Highway Administration (FHWA) has included resilience considerations since the passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21) legislation in 2012 by Congress. Additionally, the Fixing America's Surface Transportation (FAST) Act builds upon MAP-21 with the requirements of the transportation planning process to improve the resiliency of the transportation system. Finally, recent regulations require asset management plans and mitigation plans for facilities repeatedly requiring repair and reconstruction due to emergency events. This survey seeks to better understand how highway agencies are addressing these business practices.

Resilience is affiliated with risk assessment in that resilience is often viewed as the inverse of risk, meaning the lower the expected risk to a system, the more resilient the system is. The National Infrastructure Advisory Council (NIAC) also recognized the importance of resilience in critical infrastructure sectors and developed a report with recommendations for incorporating resilience in the transportation sector. In addition, with the passage of MAP-21, state transportation agencies are to develop risk based asset management plans. This questionnaire is part of the effort in NCHRP Synthesis Topic 48-13 to document resilience efforts and how they are organized, understood, and implemented within transportation agencies' core functions and services including planning, engineering, construction, maintenance, operations and administration. The questionnaire includes 14 questions and should take less than 15 minutes to complete.

As mentioned previously, different definitions of resilience have been developed in many sectors. However, the transportation sector is currently using The National Academies definition and referring to resilience as “the ability to prepare and plan for, absorb, recover from, or more successfully adapt to actual or potential adverse events.” Resilience is normally associated with the ability to function through a direct threat (e.g. cyber, bridge strike, etc.), or natural threat (e.g. flood, rockfall, etc.), and the speed by which an asset/site or system can return to full functionality. Risk is defined as the potential for loss or harm due to a direct or natural event and its adverse consequences. Risk based asset management is the planning process of identifying the components of risk and resilience to estimate the potential financial loss to an
There is a direct relationship among risk and vulnerability assessment; planning, programming and budgeting; operations and maintenance; and asset management. The figure below provides an overview of the relationship between all these sectors.

Please feel free to paste links to webpages and reports in the open boxes of question responses.

Please complete the questionnaire via SurveyGizmo by March 27, 2017.
Any additional materials should be sent to:
Aimee Flannery, Ph.D., P.E. Email: aimee.flannery@aemcorp.com Phone (703) 328-2423

Please provide your contact information if you would like access to the final report when it is complete.

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1. Which best describes the type of agency for which you are providing responses?
   - State Department of Transportation
   - Planning Organization
   - Transit Authority
   - Other - Please Specify:

2. Please specify the size of your organization (i.e. small, medium, or large) and/or the population served.

3. What is your area of expertise? Please select all that apply:
   - Planning
   - Engineering
   - Construction
   - Maintenance
   - Operations
   - Emergency and event response
   - Administration
   - Asset Management
   - Policy
   - Other - Please Specify:
4. What transportation modes is your agency directly responsible for operating or managing? Please select all that apply:

- [ ] Roads
- [ ] Freight Railroads
- [ ] Transit
- [ ] Ports and Waterways
- [ ] Aviation
- [ ] Pipelines
- [ ] Intermodal and Multimodal Facilities
- [ ] Other - Please Specify

5. Has your agency developed or adopted a definition for resilience?

- [ ] No
- [ ] Yes

- [ ] If yes, please provide definition or reference for adopted definition:

6. Does your agency have specific metrics to assess and/or measure resilience?

- [ ] No
- [ ] Yes

- [ ] If yes, please provide known metrics:


7. Has your agency incorporated resilience practices into existing programs?
   - No
   - Yes

Which programs? Select all that apply:
   - Asset Management
   - Maintenance
   - Operations
   - Planning
   - Design
   - Other - Please Provide:

8. If your agency incorporates **proactive** and/or **reactive** resilience practices, please provide examples below.

   **Proactive**: assess vulnerabilities and risk for asset improvement to prevent or reduce damage and disruption from future events (as part of planning and design of existing infrastructure);

   **Reactive**: develop plans for system recovery after event.
9. Does your agency have a plan to respond to/recover from disruptive events on their system/network or assets?
   - [ ] No
   - [ ] Yes
   - [ ] If yes, please provide examples:

10. Has your agency performed vulnerability and/or risk assessments to any particular threats?
    - [ ] No
    - [ ] Yes
    - [ ] In Process
    - [ ] If yes, please provide list of threats:

11. At what level does your agency perform vulnerability and/or risk assessments?
    - [ ] System-wide level (e.g. state-wide or region wide)
    - [ ] Site-specific or Asset level (e.g. HWY 101 at milepost 31; bridge structure F-21-XX)
    - [ ] Facility level (e.g. Traffic Management Center)
    - [ ] Modal level (e.g. Bus-Rapid Transit system)
Select all vulnerability and/or risk assessments that apply:

- Roadway prism (pavement and embankment)
- Drain pipes
- Bridges
- Culverts
- Tunnels
- ITS
- Buildings
- Signs and signals
- Grade crossings
- Port and waterway facilities
- Aviation facilities
- Multimodal and intermodal facilities
- Pipelines
- Other, Please Provide: 

12. Does your agency have guidance or procedures on incorporating consideration of climate change vulnerability in planning, project development, and/or engineering design?

- No
- Yes

- If yes, please elaborate: 

13. Does your agency use any specialized models/software for incorporating and/or evaluating resilience practices?
   - No
   - Yes
   - If yes, please provide the names of the models/software:

14. In what resilience areas would your agency like additional information, best practices, and training?
   - Resilience Metrics and Assessment Methods
   - System, Site and/or Asset Criticality Assessment
   - Asset Inventory
   - Geospatial Location of Assets
   - Capital Costs
   - Maintenance Costs
   - User Costs
   - Asset Conditions
   - Deterioration Curves or Models
   - Asset Performance Metrics
   - Expected Benefits from Mitigations
   - Asset Vulnerability
   - Anticipated Risks from Multiple Hazards
   - Other, Please Provide:
15. Has your agency incorporated benefit/cost analysis into their transportation resilience practices?
   □ Yes
   □ No
   □ If yes, how?

16. Has your agency allocated or set aside funding to improve transportation system resilience through maintenance, operations, planning, design and/or construction of projects?
   □ No
   □ Yes
   □ If yes, please provide revenue sources (e.g. Federal transportation formula funds, FHWA ER, FEMA Hazard Mitigation Funding, local/state transportation taxes and fees, other):

17. Would your agency be interested in participating in a case study to reflect your use of resilience practices?
   □ Yes
   □ No

18. Please provide contact information and the type of case study envisioned.

Thank You!

The survey is complete. Thank you for your participation!