

# STATE BRIDGE ENGINEER'S SURVEY



**June 11 – 15, 2017, SPOKANE, WASHINGTON**

Monroe Street Bridge, Spokane, Washington, built 1911, rehabilitated 2003

Photo By Adam Jones, Ph.D. (Own work) [CC BY-SA 3.0

(<http://creativecommons.org/licenses/by-sa/3.0/>), via Wikimedia Commons

# INTRODUCTION

- NEW SURVEY FORMAT
  - 6 Individual Surveys
    - Bridge Safety, Rehabilitation and Management
    - Research & Technology
    - Design (Part 1 & 2)
    - Bridge Components and Ancillary Structures
    - Construction
  - Branching Logic
    - Ability to skip groups of questions
    - Ability to skip groups
  - Survey Planet
    - Pros & cons



# INTRODUCTION

- GREAT PARTICIPATION
  - 18 States
    - 217 questions submitted
    - 340 questions after editing
  - Final Draft
    - 186 questions

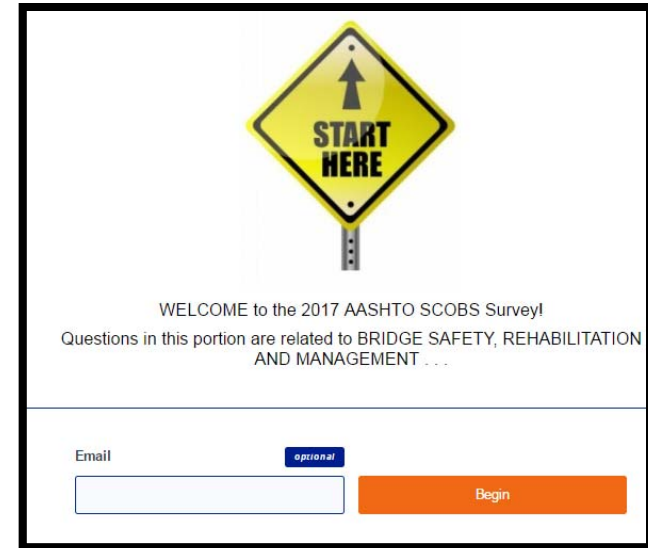
AASHTO SUBCOMMITTEE ON BRIDGES AND STRUCTURES  
ANNUAL STATE BRIDGE ENGINEERS SURVEY (2017)

**BRIDGE SAFETY, REHABILITATION AND MANAGEMENT SURVEY**

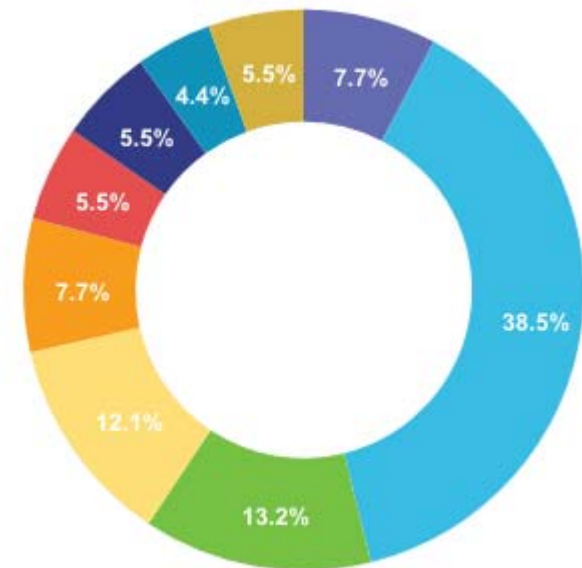
QUESTION NO.		QUESTION
TOTAL	MGMT	
1.	M1.	Person Responding to BRIDGE SAFETY, REHABILITATION AND MANAGEMENT Survey: Name: _____ E-mail Address: _____ Phone No.: _____
2.	M2.	State: Choose State.
3.	M3.	Does your agency have written requirements for material storage beneath bridges? <input type="checkbox"/> YES <input type="checkbox"/> NO  <b>IF ANSWERED <u>NO</u> TO PREVIOUS QUESTION, SKIP TO <u>M5</u>.</b> <b>IF ANSWERED <u>YES</u> TO PREVIOUS QUESTION, CONTINUE.</b>
4.	M4.	Which of your agency's construction contract specifications permit material storage beneath bridges? <input type="checkbox"/> Standard Specifications <input type="checkbox"/> Special Provisions <input type="checkbox"/> Project-Specific Special Provisions <input type="checkbox"/> Special Provision Copied Notes <input type="checkbox"/> Supplementary Specifications <input type="checkbox"/> Construction Manual <input type="checkbox"/> Other _____
5.	M5.	Do your agency's written requirements explicitly address flammable and/or combustible materials? (check all that apply) <input type="checkbox"/> No <input type="checkbox"/> Flammable <input type="checkbox"/> Combustible <input type="checkbox"/> Other _____
6.	M6.	To whom do the written requirements for material storage beneath bridges apply? (check all that apply) <input type="checkbox"/> Contractors <input type="checkbox"/> State <input type="checkbox"/> Air space lease holders <input type="checkbox"/> Other _____

# INTRODUCTION

- RESPONSE
  - 45 Agencies responding!
  - 90% participation
- WORKLOAD
  - 275 staff hours
    - Edit questions
    - Prepare surveys
      - .pdf version
      - Survey Planet
    - QA/QC
    - Coordination
    - Summarize results
    - Prepare presentation



A screenshot of a survey welcome screen. At the top center is a yellow diamond-shaped sign with a black border, featuring a black arrow pointing upwards and the text 'START HERE' in bold black letters. Below the sign, the text reads: 'WELCOME to the 2017 AASHTO SCOBs Survey!' followed by 'Questions in this portion are related to BRIDGE SAFETY, REHABILITATION AND MANAGEMENT ...'. At the bottom, there is a form with an 'Email' label, a text input field, and a small blue button labeled 'optional' next to it. To the right of the input field is a large orange button labeled 'Begin'.





# 1. STORAGE UNDER BRIDGES

- Does your agency have written requirements for material storage under bridges?
  - Yes – 4 (8.9%)
  - No – 41 (91.1%)



# 1. STORAGE UNDER BRIDGES

- Which of your agency's construction contract specifications permit material storage beneath bridges?
  - Standard Specifications – **1 (25.0%)**
  - Special Provisions
  - Project-Specific Special Provisions – **2 (50.0%)**
  - Special Provision Copied Notes
  - Supplementary Specifications
  - Construction Manual
  - Other – **1 (25.0%)**

# 1. STORAGE UNDER BRIDGES

- To whom do the written requirements apply?
  - Contractors – **4 (100.0%)**
  - State Employees – **1 (25.0%)**
  - Air Space Lease Holders – **3 (75.0%)**
  - Other
- Does your agency have written guidelines for bridge inspectors to look for material storage concerns under or adjacent to bridges during their biennial inspections?
  - Yes – **1 (25.0%)**
  - No – **3 (75.0%)**

## 2. PARKING UNDER BRIDGES



Bridges and Tunnels of Allegheny County, PA  
© 2001 Bruce S. Cridlebaugh



## 2. PARKING UNDER BRIDGES

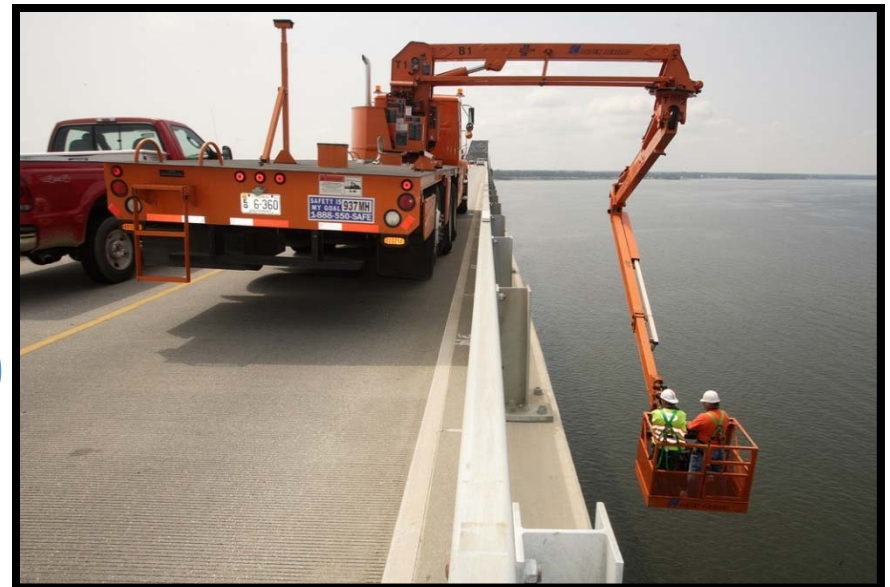
- What types of vehicles are permitted to park under your agency's bridges? (check all that apply)
  - Passenger Vehicles – **30 (66.7%)**
  - Buses – **22 (48.9%)**
  - Tractor Trailer Trucks – **19 (42.2%)**
  - Box Trucks – **20 (44.4%)**
  - Single Unit Tanker Trucks – **16 (35.6%)**
  - Parking Not allowed  
under bridges – **8 (17.8%)**
  - Other – **14 (31.1%)**

### 3. UNREGULATED ACCESS

- Other than provisions for Emergency Vehicles on Interstate Highways included in the FAST Act, does your agency have statutes or provisions to allow emergency vehicles (for example, fire trucks or ambulances) unregulated access on State and Local routes?
  - Yes – **22 (48.9%)**
  - No – **23 (51.1%)**

# 4. SAFETY INSPECTIONS

- If your agency has developed procedures or criteria that have been approved by FHWA to perform bridge (not culvert) safety inspections beyond the 24 month requirement, what percentage of bridges are inspected based upon this extended criteria?
  - **N/A – 30 (66.7%)**
  - <5% – 3 (6.7%)
  - 5% - 15% – 6 (13.3%)
  - 16% - 25% – 3 (6.3%)
  - **>25% – 2 (4.4%)**
  - Other
  - No response – 1 (2.2%)



# 5. POST-TENSIONED STRANDS

- When attempting to identify corroding post-tensioning strands which are embedded in concrete (either internal tendons or anchorage zones of external tendons), what methods are employed by your agency?
  - N/A – 7 (15.6%)
  - Visual insp. for signs of corroding PT (e.g. cracking in conc., corrosion stains on the conc., spalling of the conc. cover, etc.) – 34 (75.6%)
  - Visual obs. after conc. removal (drill into anchorage only) – 11 (24.4%)
  - Visual obs. after conc. removal (drill into tendon only) – 10 (22.2%)
  - Non-destructive evals (NDE) in metal ducts (e.g. GPR, Impact Echo, radiography, etc.)
  - Non-destructive testing inside metal ducts not evaluated. – 7 (15.6%)
  - NDE in plastic ducts. – 4 (8.9%)
  - Non-destructive testing inside plastic ducts not evaluated. – 5 (11.1%)
  - Acoustic emission monitoring for wire breaks. – 4 (8.9%)
  - Electrical isolation and monitoring.
  - Other. – 3 (6.7%)
  - No response – 2 (4.4%)

## 6. BRIDGE INSPECTION

- With which of the National Bridge Inspection Program's 23 Metrics does your agency have difficulty complying?

6. Insp. Freq. – Routine; Lower risk bridges – **19 (42.2%)**

7. Insp. Freq. – Routine; Higher risk bridges – **13 (28.9%)**

10. Insp. Freq. – Fracture Critical Member – **8 (17.8%)**

11. Insp. procedures – Frequency criteria – **5 (11.1%)**

**13. Insp. procedures – Load Rating – 13 (28.9%)**

14. Insp. procedures– Post or Restrict – **6 (13.3%)**

15. Insp. procedures – Bridge Files – **6 (13.3%)**

18. Insp. procedures – Scour Critical Bridges – **5 (11.1%)**

23. Inventory – Timely Updating of Data – **5 (11.1%)**

No response – **7 (15.6%)**

**Other metrics were only cited as difficulties for fewer than 10% of agencies.**

# 7. CORROSION RESISTANCE

- In the marine environment or other corrosion-prone environment, what material does your agency recommend for use in primary superstructure members?
  - Prestressed concrete beam with carbon steel strands – **27 (60.0%)**
  - Prestressed concrete beam with stainless steel strands – **2 (4.4%)**
  - Prestressed concrete beam with carbon fiber strands – **2 (4.4%)**
  - Post-tensioned concrete girder with carbon fiber strands and grouted tendons – **1 (2.2%)**
  - Post-tensioned concrete girder with stainless steel strands and grouted tendons – **1 (2.2%)**
  - Post-tensioned concrete girder with carbon steel strands and flexible filler – **5 (11.1%)**
  - Stainless steel (A1010) – **2 (4.4%)**
  - Metallized A709/A992 non-weathering grade steel – **11 (24.4%)**
  - Galvanized A709/A992 non-weathering grade steel – **9 (20.0%)**
  - Other – **16 (36.4%)**



## 8. CORROSION RESISTANCE

- In the marine environment or other corrosion-prone environment, what type of reinforcement does your agency recommend for use in substructures?
  - Uncoated A615 or A706 reinforcing steel – 9 (20.0%)
  - Epoxy-coated A615 or A706 reinforcing steel – 26 (57.8%)
  - Galvanized A615 or A706 reinforcing steel – 6 (15.6%)
  - Stainless reinforcing steel – 12 (26.7%)
  - A1035 reinforcing steel – 1 (2.2%)
  - Carbon Fiber Reinforced Polymer (CFRP) reinf. – 2 (4.4%)
  - Other Fiber Reinforced Polymer reinforcement (e.g., aramid, glass, basalt) – 2 (4.4%)
  - Other – 9 (20.0%)

## 9. CORROSION RESISTANCE

- Has your agency developed policies, standards, or specifications for the use of corrosion resistant prestressing strands in Prestressed or Post-tensioned members, i.e., carbon fiber reinforced polymer (CFRP) strands, another FRP strand type, or stainless steel (SS) strands?
  - Yes – **7 (15.6%)**
  - No – **38 (84.4%)**

# 10. INNOVATIVE MATERIALS

- Has your agency developed policies, standards, or specifications for the use of flexible filler (i.e. microcrystalline wax) in lieu of grout for post-tensioned members?
  - Yes – **2 (4.5%)**
  - No – **43 (95.5%)**

# 11. BRIDGE DETERIORATION

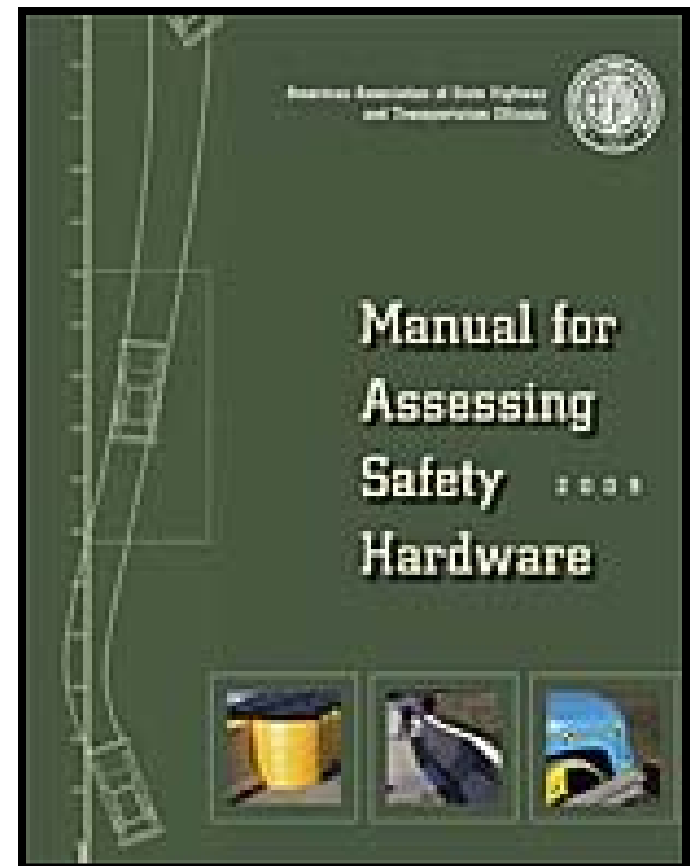
- What is the average age (in years) of a bridge that is replaced in your agency primarily due to deterioration?
  - < 40 years
  - 40 – 45 years
  - 46 – 50 years – **2 (4.4%)**
  - 51 – 55 years – **5 (11.1%)**
  - 56 – 60 years – **10 (22.2%)**
  - 61 – 65 years – **4 (8.9%)**
  - 66 – 70 years – **9 (20.0%)**
  - **71 – 75 years – 4 (8.9%)**
  - **> 75 years – 6 (13.3%)**
  - No response – **4 (8.9%)**

# 12. VEHICULAR COLLISION

- If your agency is designing crash walls to protect piers located within 30 feet of the roadway for a vehicular collision in accordance with LRFD 3.6.5.1, select the vehicular collision load for which your agency currently designs these piers?
  - N/A – 7 (15.6%)
  - 600 kips (6<sup>th</sup> Edition and later) even if qualifies as exempt – 5 (11.1%)
  - 600 kips (6<sup>th</sup> Ed. and later) except as exempt – 27 (60.0%)
  - 400 kips (5<sup>th</sup> Edition and earlier)
  - Agency specified force or agency specified exempted process – 2 (4.5%)
  - Other – 2 (4.5%)
  - No response – 1 (2.3%)

# 13. MASH

- Does your agency have bridge railing details that are crash-tested as per MASH?
  - Yes – **8 (17.8%)**
  - No – **37 (82.2%)**





# 14. ABC

- Does your agency have policy, details, or specifications related to Accelerated Bridge Construction (ABC)?
  - Yes – **21 (46.7%)**
  - No – **24 (53.3%)**
- What decision-making tool does your agency use to help determine that a specific project is appropriate for ABC?
  - FHWA – ABC Analytic Hierarchy Process (AHP) – **5 (23.8%)**
  - FHWA Questionnaire – **1 (4.8%)**
  - CALTRANS Questionnaire – **1 (4.8%)**
  - Agency-developed questionnaire or tool – **13 (61.9%)**
  - Other – **5 (23.8%)**

# QUESTIONS



Andrew M. Zickler, PE  
[complexbridgehelp@vdot.virginia.gov](mailto:complexbridgehelp@vdot.virginia.gov)