2010 STATE BRIDGE ENGINEERS’ QUESTIONNAIRE
(50 Responses)

Gusset Plates

1) How many trusses are in your state?
   2302 trusses owned by the state
   8202 trusses owned by local agencies

2) What percentage of trusses owned by your state have had a detailed gusset plate inspection and rating completed?
   69% of detailed inspections completed
   33% of ratings completed

3) What percentage of trusses owned by local agencies have had a detailed gusset plate inspection and rating completed?
   31% of detailed inspections completed
   19% of ratings completed

4) How many bridge postings/closings has your state had due to recent gusset plate findings?
   70 bridges

5) Assuming two gusset plates on either side of the members, how does your state treat the forces going into those plates?
   38 Apply half of total force to each gusset plate
   12 Proportion force based on (remaining) section area of each gusset plate
   2 Other – please explain. Both ways have been used.

6) For gusset plate rating, does your state apply the automatic 10% capacity reduction as proposed by the FHWA guidance?
   15 Yes
   21 No
   13 Other – please explain. Some states using a 15% reduction due to the age of the trusses, some states use a reduction based on section loss. (See website for further details)

7) Which software does your state use to rate gusset plates?
   2 SNAP-Gusset
   25 In-house spreadsheet
   2 Other state’s spreadsheet (Name of state: Michigan)
   23 Other – please explain: STAAD, MathCADD, RISA, Finite Element Analysis (See website)
8) How is inspection and load rating of local agency trusses with gusset plates accomplished in your state?

- 24 By state DOT
- 25 By consultant for state DOT
- 6 By local agency
- 22 By consultant for local agency
- 7 Other – please explain: Inspection done by local agency or consultant but rating performed by state or with state’s review. (See website)

9) Has your state performed any gusset plate repairs/replacements based on recent gusset plate inspections?

- 22 Yes
- 28 No

Inventory and Inspection

10) How many bridges are in your inventory?

- State 292,173 bridges
- Local 308,360 bridges

11) Who inspects State bridges? (please provide approximate percentage)

- State personnel 84%
- Consultants 16%

12) Who inspects Local Agency bridges? (please provide approximate percentage)

- Local Agency personnel 16%
- State personnel 38%
- Consultants 46%

13) How are State bridges inspected?

- NBIS only 7 states
- Element Level only with use of FHWA translator for conversion to NBIS ratings 2 states
- NBIS and Element Level (dual inspections) 38 states

  3 states use a mix of element level inspections and NBIS inspections depending upon the bridge type.

14) How are Local Agency bridges inspected?

- NBIS only 15 states
- Element Level only with use of FHWA translator for conversion to NBIS ratings 3 states
- NBIS and Element Level (dual inspections) 29 states

  In 3 states, local agencies use a mix of element level inspections and NBIS inspections depending upon the bridge type.
15) Would you support a combined FHWA / State DOT effort to modify the current NBIS based apportionment process using element level data?

- Yes: 32
- No: 13

Comments: (See website)

Ratings and Posting

16) How many emergency bridge postings has your state had over the past two years?
- 396 postings

17) How many emergency bridge closings has your state had over the past two years?
- 375 closings

18) At what level does your state post a bridge
- Inventory: 8
- Operating: 33
- Other – please explain: Varies (See website)

19) How does your state verify the actual mix of truck loads? (check all that apply)
- Fixed scale data: 25
- Portable scale data: 26
- Weigh-In-Motion data: 37
- Other – please explain: (See website)

20) What is your state’s level of confidence that your truck weight enforcement program adequately deters illegal overweight truck traffic on all roadways?
- Very high: 0
- High: 3
- Medium: 18
- Low: 19
- Very low: 9

Comments: (See website)

21) What is your state’s level of confidence that your truck weight enforcement program adequately deters illegal overweight truck traffic at posted bridges?
- Very high: 0
- High: 2
- Medium: 16
- Low: 21
- Very low: 10

Comments: (See website)
22) There is the potential for a new national legal load - a six axle, 97,000 lb. gross weight truck, which is the current 80,000 lb. truck with an additional 17,000 lb. axle that would make the current 34,000 lb. rear tandem a 51,000 lb. tridem. As a result, this vehicle would not meet the Federal Formula B.

As we become aware of this vehicle, which of the following impacts would apply to your state, assuming the load is made legal on each of the roadway systems listed (check all that apply)?

<table>
<thead>
<tr>
<th>Effect</th>
<th>Interstate</th>
<th>State Routes</th>
<th>Local Routes</th>
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<tbody>
<tr>
<td>Force effects exceed the effects of current legal loads of your state</td>
<td>40</td>
<td>40</td>
<td>41</td>
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<tr>
<td>Will need to determine required load posting for affected bridges,</td>
<td>38</td>
<td>42</td>
<td>44</td>
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<tr>
<td>install proper signage and/or establish appropriate detours</td>
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<tr>
<td>May require bridge strengthening, including repair, rehabilitation, or</td>
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<tr>
<td>replacement</td>
<td>37</td>
<td>39</td>
<td>40</td>
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</table>

Other Effects –please explain: [See website]

23) Does your state have any current research that would evaluate the impacts of heavier loads on bridges?

14 Yes
36 No

24) Based on the configuration described in question 22, would your state support the proposed 97,000 lb truck effort?

9 Yes
40 No
25) Does your state perform load ratings of bridge decks?

28 Yes (check all that apply)
   6 All decks (new and existing)
   1 New decks only
   16 Only when the deck is deteriorated enough to warrant a rating
   12 Timber
   1 Reinforced Concrete
   1 Post-tensioned
   6 Other – please explain: (See website)

22 No (check all that apply)
   18 Not current policy
   3 Would like to but can’t due to lack of resources
   6 Other – please explain: (See website)

26) Does your state perform load ratings of substructures?

33 Yes (check all that apply)
   2 All substructures (new and existing)
   0 New substructures only
   29 Only when the substructures are deteriorated enough to warrant a rating
   5 Timber
   3 Reinforced Concrete
   7 Steel
   6 Other – please explain: (See website)

17 No (check all that apply)
   17 Not current policy
   3 Would like to but can’t due to lack of resources
   6 Other – please explain: (See website)

27) Which substructure types does your state find most challenging to design / evaluate using current methods / software?

4 Spread footings
8 Pile-supported footings
14 Pile-Bent piers and abutments
15 Drilled shafts
13 Integral abutments
6 Other – please explain: (See website)

28) Which software does your state use to perform load ratings?

28 Virtis
16 BRASS
7 LARS
19 In-house
29) Which software does your state use to perform LRFD bridge design?

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<td>13</td>
<td>Opis</td>
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<tr>
<td>19</td>
<td>MDX</td>
</tr>
<tr>
<td>19</td>
<td>Merlin-Dash</td>
</tr>
<tr>
<td>18</td>
<td>In-house</td>
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<tr>
<td>35</td>
<td>Other – please explain: There are numerous software packages available and being used (See website).</td>
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30) Which software does your state use to evaluate overload permit vehicles?

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<tbody>
<tr>
<td>9</td>
<td>SuperLoad</td>
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<tr>
<td>21</td>
<td>Virtis</td>
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<tr>
<td>11</td>
<td>BRASS</td>
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<td>2</td>
<td>LARS</td>
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<td>24</td>
<td>In-house</td>
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31) In your opinion, what is the most important issue that your load rating software currently does NOT address? Curved girders, concrete and steel box girders, culverts, and complex bridges (See website)

**Dead Load and Live Load Distribution**

32) When using the approximate live load distribution factors in Article 4.6.2.2 for normal beam slab bridges, what statement best describes your state’s findings?

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<tr>
<td>19</td>
<td>Exterior girder design predominately governs</td>
</tr>
<tr>
<td>17</td>
<td>Interior girder design predominately governs</td>
</tr>
<tr>
<td>12</td>
<td>Neither exterior nor interior girder design predominately governs</td>
</tr>
<tr>
<td>2</td>
<td>Do not check exterior girder design</td>
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33) Has your state made any modifications to the current live load distribution factors in Article 4.6.2.2?

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<tr>
<td>7</td>
<td>Yes</td>
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<tr>
<td>42</td>
<td>No</td>
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If “Yes”, please describe those modifications. (See website)
34) How does your state distribute the weight of railings and sidewalks to the girders?
   
   29 Distributed to all girders equally
   7 Distributed to three girders
   1 Distributed to the four girders
   12 Other. Please describe: 60% to exterior girder and remaining 40% to interior girders, 50% to exterior girder and remaining 50% to interior girders (See website for other methods)

Culverts

35) Does your state have a formal procedure to inspect culverts that are not defined as a bridge according to NBIS (less than 20 ft)?
   
   28 Yes
   22 No

   If “Yes”, what is the minimum size inspected?
   
   Varies from 3’ to 14’ (See website)

   What is the maximum inspection interval?
   
   Varies from 2 years to 10 years (See website)

36) Has your state implemented LRFD design for concrete box culverts?
   
   28 Yes
   22 No

   If “Yes”, what software is used? CANDE, BRASS, In-house, BOXCAR (See website).

37) Has your state developed or adopted LRFD design tables for box culverts?
   
   9 Yes
   41 No

38) Has your state developed or adopted LRFD design tables for pipe culverts?
   
   11 Yes
   39 No
Staffing

39) Given the downturn in the economy and state budgets, how difficult has it been for your state to recruit experienced Bridge Engineers?
   12 Hard, with little success
   7 Hard, with some success
   13 Moderate
   4 Easy
   14 Don’t know, state hiring freeze in place

40) Given the downturn in the economy and state budgets, what percentage of work has been assigned to consultants in the following areas?
   (Averages from the 50 responses)
   - Bridge Design: 41%
   - Bridge Construction Inspection: 26%
   - Bridge Inspection: 20%
   - Fabrication Shop Inspection: 39%
   - Load Rating: 32%
   - Manuals: 34%
   Other – please explain: (See website)

41) During the past year, how much have your total bridge consultant fees changed?
   11 states reported a 9% average increase
   3 states reported a 23% average decrease
   39 states reported “No change”

LRFD Design Specifications

42) Does your state have a policy for compliance with the 400 kip load found in Article 3.6.5 (Vehicular Collision Force: CT) for existing structures?
   19 Yes
   31 No
43) Has your state developed /used a TL-5 barrier which can be used to protect substructure elements against the 400 kip load for truck collisions?

   15    Yes
   34    No

44) Does your state require a Strength II design check using a live load based on your state’s design permit truck?

   16    Yes
   32    No

   If “Yes”, please describe that design permit truck (gross weight, axle loads, and axle spacing): (See website for various configurations)

45) How does your state address the seismic forces referenced in Article 3.10.9.2 Seismic Zone 1?

   37    Bearings and anchorages only
   14    Substructure elements too
   6     Other. Describe: (See website)

46) Article 3.6.5.3 refers to Section 13 for collision forces on bridge rails. Does your state apply those same forces to wingwalls on u-shaped abutments?

   21    Yes
   28    No

47) Does your state have any policy for dynamic message sign loads on sign support structures?

   21    Yes
   29    No

48) Has your state experienced any fatigue cracking on sign structures that carry dynamic message signs?

   15    Yes
   35    No

Scour

49) Does your state reduce the total HEC-18 calculated scour if non-granular, stiff cohesive soils are present in the substructure boring data?

   13    Yes
   33    No

   If “Yes”, please explain: (See website)
50) Does your state have a method to calculate scour at closed abutments?
   7    Yes
   39   No

   If “Yes”, please explain: *(See website)*

51) Does your state apply HEC-18 to calculate abutment scour (either Froehlich or HIRE equation) at new bridges with open abutments that sit behind riprap-lined slopewalls?
   18   Yes
   28   No

   Comments: *(See website)*

**Materials**

52) Does your state allow the use of Welded Wire Reinforcement (mesh) for transverse reinforcement in precast, prestressed, concrete girders?
   20   Yes
   28   No

53) Does your state use weathering steel for certain bridges?
   44   Yes
   6    No

54) In the past two years, how have painting costs for existing bridges changed in your state?
   19   Costs have increased
   7    Costs have decreased
   23   Costs have not changed

**Preventive Maintenance**

55) Does your state currently have a FHWA certified “Comprehensive Bridge Management System”?
   29   Yes
   20   No

   If yes, do you use the BMS to identify preventive maintenance activities?
   18   Yes
   10   No

56) Would your state support an effort to develop a “Best Practices” AASHTO guide for preventive bridge maintenance?
   48   Yes
   2    No
57) Would your state support the use of Federal HBP funds based on this AASHTO Guide for Preventive Maintenance as an option to the use of a FHWA certified system?

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<td>11</td>
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To view detailed responses to this year's State Bridge Engineers’ Questionnaire go to: