2009 AASHTO Bridge Subcommittee Annual Meeting

Structural Assessment Reports for Contractor’s Means and Methods

Presented by:
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Technical Advisory 5140.28 made by the FHWA to bridge owners ("Construction Loads on Bridges", Issued August 8, 2007):

In the ongoing investigation of the collapse of the I-35W Bridge in Minneapolis, the National Transportation Safety Board has identified construction equipment and materials loading on the bridge as part of their review. While no conclusions have been reached, in an abundance of caution, we strongly advise the State Transportation Agencies and other bridge owners who are engaged in or contemplating any construction operation on their bridges to ensure that any construction loading and stockpiled raw materials placed on a structure do not overload its members.
Safety Recommendation made by the NTSB to AASHTO (“Collapse of I-35W Highway Bridge” Highway Accident Report, HAR-08/03, Published Nov. 14, 2008):

Develop specifications and guidelines for use by bridge owners to ensure that construction loads and stockpiled raw materials placed on a structure during construction or maintenance projects do not overload the structural members or their connections. (H-08-24)
Available capacity?

The existing deck beams could not carry this crane…
Available capacity?

The existing fascia deck beam could not carry the load from the crane outriggers…
Applied loads?

Congested construction sites…
Remaining capacity?

Deck repairs…
Concrete removal from existing columns…

Remaining capacity?
Remaining capacity?

Deteriorated beams…
Available capacity?

Girder erection…
What can government do?

- Define the deliverables
- Define the necessary engineering qualifications
- Define the acceptable loading level
- Define the documents to be used for determining member capacity
What can government do?

• Define the deliverables:
  Require that the contractor submit calculations, plans and details for:
  demolition, erection, allowed positions of equipment/stockpiles and
  the effects of those applied loads on the structural members, available
  member capacities.

• Define the necessary engineering qualifications:
  Require that a Licensed Structural Engineer seal the calculations, plans
  and details that cover the contractor’s work.

• Define the acceptable loading level:
  Require that the effects of the applied loads (due to the contractor’s
  means and methods) not exceed the available capacity at either the
  Operating Load level or the Inventory Load level.

• Define the documents to be used for determining member capacity:
  Require that the AASHTO “Manual for Bridge Evaluation” be used to
  determine the available capacity considering the existing condition.
In Response:

• Illinois DOT has developed a new special provision, “Structural Assessment Reports for Contractor’s Means and Methods”, which requires contractors to submit Structural Assessment Report(s) (SARs) to the Resident Engineer for approval.

• SARs shall demonstrate that the structural demands of the applied loads due to the contractor’s means and methods will not exceed the available capacity of the structure at the time the loads are applied. SARs shall be sealed by Licensed Structural Engineers.

• This special provision is an enhancement of other special provisions that were already in use, such as those for demolition and for erection of curved or complex steel structures.

• Development of the SAR special provision was led by our bridge office and included input from DOT construction personnel, contractors and consultants. Addressing the issues that were raised by this group improved the special provision and facilitated buy-in from the entire group.

• Five projects have been let with this special provision so far. More will be let in the coming months.
Responsibilities:

• Government:
  ▪ Determine the guidelines and criteria that must be followed by the contractors and engineers.
  ▪ For existing structures, provide:
    • the “As-Built” plans and the latest NBIS inspection report to the Phase II Engineers and the contractors.
    • the ratings and live load restrictions to the Phase II Engineers.

• Phase II Engineer:
  ▪ Review information provided by the state regarding the existing structure.
  ▪ Ensure that the proper notes are included on the contract plans (e.g., ratings, any live load restrictions, notes regarding poor condition of existing structure, etc.).
Responsibilities (cont’d):

• Contractor:
  ▪ Determine the intended means and methods of construction.
  ▪ Provide for SARs preparation by a Licensed Structural Engineer.
  ▪ Submit the SARs to the Resident Engineer for approval.
  ▪ Ensure that the approved SARs are followed.

• Contractor’s Licensed Structural Engineer:
  ▪ Review information regarding the existing structure provided by the state and by the contractor. Field verification of the current condition by the contractor’s structural engineer may be required.
  ▪ Verify that the structural demands of the applied loads due to the contractor’s means and methods will not exceed the available capacity of the structure at the time the loads are applied (considering existing condition).
  ▪ Provide sealed SARs that clearly show the work covered, allowed positions for equipment, allowed positions and magnitudes of stockpiled materials, calculations of the load effects, calculations of the available capacity, and any assumptions made.
QUESTIONS?
Additional information on SARs:

To download copies of our SAR documents:
- the special provision (GBSP 67)
- the memo to designers (ABD Memo 09.1)
- the Contractor Pre-Approval Requirements, please visit this Illinois DOT website:
  
  http://www.dot.il.gov/bridges/sar.html

For projects that have been let with the SAR special provision, copies of the plans and proposals can be downloaded at:
  
  May 2009 letting:
  http://eplan.dot.il.gov/desenv/051509/70721-001
  
  June 2009 letting:
  http://eplan.dot.il.gov/desenv/061209/60G38-168
  http://eplan.dot.il.gov/desenv/061209/64B74-265
  http://eplan.dot.il.gov/desenv/061209/72A76-173
  http://eplan.dot.il.gov/desenv/061209/74237-145