2010 AASHTO Bridge Subcommittee Annual Meeting

Structural Assessment Reports for Contractor’s Means and Methods

Update

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

State Transportation Agencies and other bridge owners are strongly advised 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)
Illinois Bridges:

Available capacity?

The existing deck beams could not carry this crane...
The existing fascia deck beam could not carry the load from the crane outriggers...
Illinois Bridges:

Applied loads?

Congested construction sites…
Illinois Bridges:

Deck repairs...

Remaining capacity?
Illinois Bridges:

Concrete removal from existing columns…

Remaining capacity?
Illinois Bridges:

Remaining capacity?

Deteriorated beams…
Illinois Bridges:

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:
  Contractor must submit calculations, plans and details for planned work (demo, erection, locations of equipment/stockpiles, etc.).

• Define the necessary engineering qualifications:
  Licensed Structural Engineer must seal calculations, plans and details that cover the contractor’s work (loads, force effects, available member capacities).

• Define the acceptable loading level:
  Effects of the applied loads cannot exceed the available capacity at either the Operating or Inventory Load level as designated in the contract plans.

• Define the documents to be used for determining member capacity:
  AASHTO “Manual for Bridge Evaluation” must be used.
In Response:

- IDOT’s new special provision, “Structural Assessment Reports for Contractor’s Means and Methods” requires contractors to submit Structural Assessment Report(s) (SARs) to the Resident Engineer for approval.

- SARs must show structural demands of applied loads will not exceed available capacity of the structure. SARs shall be sealed by Licensed Structural Engineers.

- An enhancement of other special provisions already in use (demolition, erection of curved or complex steel structures).

- Our bridge office, DOT construction personnel, contractors and consultants all worked to develop special provision (improved the special provision and buy-in).

- About 18 projects have been let with this special provision so far. More will be let in the coming months.
Responsibilities:

• Government:
  Determine guidelines & criteria for contractors and engineers. For existing structures, provide:
  • “As-Built” plans and latest NBIS inspection report
  • ratings and live load restrictions.

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

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

• Contractor’s Licensed Structural Engineer:
  Review information provided by state and by contractor. May need to
  field verify current structure condition.
  Verify structural demands of applied loads will not exceed the
  available capacity at the time the loads are applied (consider existing
  condition).
  Provide sealed SARs (with loads, allowed positions for equipment &
  stockpiled materials, load effect calculations, available capacity
  calculations).
Update

Implementation:

• SARs special provision has been included on a variety of projects by various owners.

• Selling point made to contractors: inclusion of the special provision requires all contractors bidding on a project to provide for engineering in the construction phase. Each bidder has benefits and costs of bringing in engineering expertise.

• Insurance companies for all parties are interested in addressing liability. The required documentation for SARs provides for the assignment of responsibilities. The owners are willing to invest in this enhancement.
Update

Implementation (cont’d):
Contractors, consultant structural engineers and construction personnel have all become more familiar with what is needed on a SARs project. Completeness of SARs submittals is continuing to improve.

Contractors were concerned about potential work delays while waiting for SARs approval by our bridge office.
  • IDOT Standard Specifications:
    bridge office has up to 30 days to review submittals.
  • Our target goal:
    review submittals within 10 days.
  • Average actual turn-around time:
    typically 9 days.
Quick turn-around has reduced concerns about delays.
Update

What we have learned:

The quality of the SARs submittals has been good since these have been prepared by pre-qualified consultant structural engineers. The quality of the submitted demolition plans on SARs projects has generally been better than on non-SARs projects.

Responsibility for the effects of the means and methods of construction is more clearly defined when this special provision is used. As the representative of one bridge owner said, knowing that an engineer had structurally evaluated the contractor’s construction plans “made sleeping a whole lot easier.”
**Update**

The next step:
Issue a memorandum requiring use of the SARs special provision on the majority of Illinois projects – most likely on all those which are stage constructed or are over traffic (including roadways, railroads or navigable waterways).
QUESTIONS?
Additional information on SARs:

Our SAR documents:
• the special provision (GBSP 67)
• the memo to designers (ABD Memo 09.1)
• the Contractor Pre-Approval Requirements, may be downloaded at:
  http://www.dot.il.gov/bridges/sar.html

Example plans and proposals for two current projects that were let with the SAR special provision may be downloaded at:
  http://eplan.dot.il.gov/desenv/073109/98910-127
  http://eplan.dot.il.gov/desenv/011510/70428-186