ASCE-INDOT
STRUCTURAL SUBCOMMITTEE
MEETING NO. 40 MINUTES
April 24, 2008

The meeting was called to order at 9:05 am by Steve Weintraut. Those in attendance were:

Anne Rearick	INDOT, Structural Services
Naveed Burki	INDOT, Structural Services
Tony Uremovich	INDOT, Structural Services
Ron McCaslin	INDOT, Structural Services
Greg Klevitsky	INDOT, Structural Services
Bill Dittrich	INDOT, Program Development
Brian Harvey	INDOT, Program Development
Keith Hoernschmeyer	Federal Highway Administration
Mike McCool	Beam Longest & Neff, LLC.
Burleigh Law	HNTB Corp.
Mike Obergfell	USI Consultants, Inc.
Don Bosse	Prestress Services, Inc.
Troy Jessup	R. W. Armstrong
Andy Schad	Gohman Asphalt Company
Michael Matel	Butler, Fairman and Seufert, Inc.
Steve Weintraut	Butler, Fairman and Seufert, Inc.

In addition to the attendees, these minutes will be sent to the following:

George Snyder	INDOT, Structural Services
Jim Reilman	INDOT, Construction Management
Tony Zander	INDOT, Materials and Tests Division
Mike Wenning	American Structurepoint, Inc.
Jason Yeager	Gohman Asphalt Company
Dick O'Connor	RQAW Corporation

A meeting agenda had previously been distributed and the following items were discussed:

1. The February 7, 2008, meeting minutes were approved as written, and have been placed on the INDOT website.

2. Troy Jessup and Don Bosse were welcomed as new members to the group.

3. The semi integral end bent details have not been approved by the INDOT Standards Committee. Tony Uremovich will contact Ron Walker, who is a member of the Standards Committee, to resolve the problems associated with the material that is attached to the back of the end bent.

4. No progress has been made with regards to the LRFD code's torsional requirements for the hammerhead portion of the pier. INDOT will continue to look into this matter and Anne Rearick will let the group know if INDOT will revise or waive this requirement. Mike McCool will contact Leap Software to discuss this item.

5. Kurt Heidenreich sent an e-mail to the group, through Steve Weintraut, asking for its assistance with regards to slab design and the interpretation of the LRFD code and the Indiana Design Manual (See Attachment No. 1). The group discussed each item and is summarized as follows:

   Item 1 The reinforcing bars in the slab can be cut in the compression zone, but temperature and shrinkage reinforcing steel should be continuous. Whenever possible, it is good practice to stagger bar cutoffs and laps.

   Item 2 It was felt that as long as the sidewalk and railing are constructed after the concrete deck has been poured and has gained design strength, the dead load of these two items should be able to be distributed equally across the width of the bridge regardless of the bridge type. Sections 60-2.06 and 61-5.01 of the Indiana Design Manual address this issue.

   Item 3 Per Indiana Design Manual 61-4.04 and AASHTO 9.7.1.3., the transverse reinforcement in the slab for concrete beam bridges must be placed perpendicular to the beams for skews larger than 25 degrees. For reinforced concrete slab bridges, it appears that for a skew angle of less than 45 degrees, the transverse reinforcement is permitted to be placed parallel to the skew per Section 62-3.13 and Figure 62-3C of the Indiana Design Manual.

   Item 4 The Indiana Design Manual should be followed when dealing with load combinations that involve the Michigan Truck Train and the Toll Road loading. The Strength II loading combination is for permit loads in which Toll Road and the Michigan Train loadings are met.

   Item 5 Anne Rearick will check if there are any design examples that have been done for reinforced concrete slab bridges which used the Indiana Design Manual.

6. Tony Uremovich passed out a mark-up of the pavement ledge detail (INDOT Standard Drawing E 609-RCBA-07). Tony had inserted all the comments that he had previously received and had noted the person responsible for the comment. The group reviewed all the comments and asked that Tony provide a revised version of this detail at the next meeting for final group approval.

7. INDOT is currently in the process of incorporating the precast, prestressed, concrete Hybrid Bulb-T beams into the Design Manual. It was observed that using draped strands for these beam types is the most economical. It was suggested that keeping the top flange width similar to the beam depth is a good practice. The wider top flange provides better stability for the beam. It was suggested that Don Bosse, Troy Jessup, Burleigh Law and Tony Uremovich provide assistance in incorporating the various Hybrid Bulb-T beam sections into the Design Manual.

8. The need for standard drawings for the steel interior diaphragms of Hybrid Bulb-T beams was discussed. Mike McCool volunteered to start getting these details together. Burleigh Law will provide Mike with some typical sections.

9. The deck overhang design for concrete beams was discussed. It was concluded that Section 61-2.02(01) of the Indiana Design Manual was in agreement with Section 4.6.2.1.6. of the AASHTO LRFD code pertaining to the application of the wheel or patch loading.

10. Keith Hoernschmeyer reported that a draft list of the eligible bridges in the historic bridge preservation program has been published. The "select" and "non-select" criteria is currently out for public comment. This information can be viewed at http://www.in.gov/INDOT/7035.htm.

11. No update was provided for LRFD training.

12. Section 3.6.5.2 of the AASHTO LRFD code addresses a 400 Kip collision load with substructure elements. To avoid designing for this load, the designer needs to protect the structure in accordance with Section 3.6.5.1 and Table A13.2-1. It was felt that placing a significant number of these concrete barriers on many projects may become more of a safety issue to the traveling public than the possibility of a substructure collapse due to a collision load. INDOT will look further into this issue. Anne Rearick will contact AASHTO regarding this matter, and Keith Hoernschmeyer will check with other states to determine how they are addressing this requirement.

13. Mike Obergfell had previously passed out to the group members photographs of prestressed concrete box beams with diagonal and horizontal surface cracks along the outside face of the beam. These cracks were located near the ends of the box beams. Attached is an e-mail from Don Bosse which addresses the possible causes of these types of cracks (See Attachment No. 2). It was suggested that the specification for concrete box beams be revised to specify that the voids be vented during beam production until after the initial set and sealed before the beams are delivered. Tony Uremovich will oversee this matter.

14. After the INDOT Seismic Seminar, Janette Fulkerson e-mailed some questions and concerns regarding INDOT policy with seismic design. After some discussion among the group, Steve Weintraut and Keith Hoernschmeyer addressed her questions (See Attachment No. 3). The group stressed that the designer needed to work closely with the geotechnical consultant to obtain an accurate soil site classification. It was reported that FHWA is at least 1 year away from publishing some Seismic guide specifications.

15. Figure 67-1C of the Indiana Design Manual shows a 2'-4" vertical dimension from the bottom of the integral end bent to the bottom of the bearing assembly. It was pointed out that this depth should be 2'-3". Tony Uremovich will oversee this revision.

16. The group felt that the joint setting dimensions and temperatures as shown on Standard Drawing 724-BSSJ-04 are correct. It was pointed out that temperature ranges are addressed in the LRFD code but joint dimensions are not.

17. The question was raised whether the designer should follow equation 33-4.1 with regards to bridge deck gutter flow or Figure 36-7A of the Indiana Design Manual for the allowable water spread on the bridge deck. It was pointed out that Figure 36-7A had recently been revised and the erroneous material in Chapter 33 had been deleted.

18. Mike McCool requested comments from the group members with regards to his proposal of using #4 bars spaced at 8 inches for both mats of steel for concrete decks on beam bridges. (See Minutes for Meeting No. 39, Item 5).

The next meeting for the INDOT Structural Subcommittee is scheduled for 9:00 am on July 24, 2008, in a room to be determined.

This meeting was adjourned at 11:30 a.m.

Respectfully submitted,
BUTLER, FAIRMAN and SEUFERT, INC.

Michael Matel, P.E.
mmatel@bfsengr.com

MM:lm

Attachments

ATTACHMENT No. 1

Sorry it took so long, I gave the seminar information to an employee who took it home over the weekend. Unfortunately he forgot to bring it back on Monday, so I didn't have Mike's email address. Anyway, as discussed, there are a few items in the LRFD manual that aren't addressed in the IDM. I have a PCA guide that provides an opinion, but I don't really like some of the opinions it provides. The main issues are as follows:

1. The LRFD manual (5.11.1.2) states that no more than 50% of the reinforcing can be terminated at a section. For the negative moment, only half of the second bar cuts can occur at a section. The PCA guide suggests using a longer bar (approximately 30 inches) and stagger them every other time. This means all of the temperature and shrinkage bars will also have to stagger which creates multiple bars to place. I don't think the contractors will find this very economical. I guess my main question is, why can't a bar be cut off if it is in a compressive zone?
2. The PCA guide includes the full railing load in the edge beam design. The IDM assumes it will be distributed across the entire width, similar to the old specification. Is this going to remain INDOT's policy and how are sidewalks handled? Will this same logic be used for the substructure loading? I am setting up a plate analysis in 3D to see how a standard slab responds to a railing load just for my own information. I'll let you know what I find.
3. The LRFD code (9.7.1.3) discussed reinforcement directions being perpendicular to the skew for bridges with skews over 25 degrees. This requires an edge beam to carry the reaction along the discontinuous edge. I believe INDOT does not follow this convention, and allows the transverse reinforcing to follow the skew up to 45 degrees. I'm not sure if this section was intended for beam supported slabs only. The PCA guide implies that it is also applicable to slab bridges. I agree with INDOT's standard, but would like some guidance.
4. The IDM calls for the Michigan Truck Train and Toll Road Loading if the bridge is in a certain location. It also says to use the lane loading and strength I combination. I think the code calls for strength II and no lane load, but I'm not sure. I would like some guidance.
5. Will INDOT prepare any design examples for slab bridges using the IDM?

There are some other items to discuss, including substructure design, but this is a good start. I think an example project would help flush some of the details out. Please let me know if you have any questions.

Kurt

ATTACHMENT No. 2

The diagonal cracks at the end of the beam I have seen before, although not often. I'm not sure what causes this but I suspect it is in the detailing of the mild reinforcing. I know we often see I-Beams that are designed to code but they lack sufficient reinforcing to control cracking in the end of the beam. And by that I don't mean eliminate the cracking, just keep the number and widths of cracks to a minimum. So in this case I would be curious if all the strands are contained within the mild reinforcing and to what extent the strands are de-bonded, and the extent of mild reinforcing present. Large amounts of de-bonding or long lengths (as in 6' plus) can sometimes cause some cracking that we don't normally see if there isn't sufficient mild reinforcing.

I believe the horizontal cracks present in the voided area of the beam may have been caused during production. We know through experience that the air in and around the void expands after casting due to the heat of hydration. We also target our application of accelerated curing to immediately follow the initial set of the concrete. If the void hasn't been vented there could be enough air pressure to cause a crack in the side walls of the beam at that time when the concrete is set, yet very weak. Standard practice is to vent the void after finishing the top of the beam and before it is covered with tarps. We use a plain drinking straw that is slipped over a welding rod and plunge both into the top of the beam, holding the straw in place and pulling the rod out. When we do this it is not unusual to feel a slight burst of air when you pull the rod out.

I look forward to meeting you all on the 24th and hearing your input.

Don

Michael Matel ATTACHMENT No. 3

From: Hoernschemeyer, Keith [mailto:Keith.Hoernschemeyer@fhwa.dot.gov]
Sent: Tuesday, April 22, 2008 8:33 AM
To: Stephen Weintraut
Subject: RE: ASCE - INDOT Structural Subcommittee; INDOT Design Memo 08-01

Steve,

Here are some simplified responses to Janette's concerns:

1. Projects under design and located outside the current "seismic" counties may require seismic details if structure acceleration (SD1) at existing ground level is greater than 0.10 g

Yes, that is correct. This follows the philosophy of the "old" specifications which required seismic detailing for Zone 2 (>.10g) at bedrock which was assumed to be the same at ground level.

2. Geotechnical Investigations for projects noted above may have been completed and require additional services to determine soil site classification.

I am not sure how deep soil borings are usually taken, but we usually have a boring at each bent. Each boring has numerous blow count measurements which can be used to determine the overall soil classification at the site. It seems like the geotech can use existing information (blow counts from borings, shear wave velocities from CPT, and geological knowledge of the area) to give us an overall soil classification. This is an issue I would have to look into further, since the training we attended presented a very simplified soil classification methodology. The soil classification system as presented at the training is very simplistic (i.e. rock, blow counts > 50, 50 > blow counts > 15, 15 > blow counts)

3. Design criteria using the guide specifications for seismic categories A and B (zone 1 and 2 per interims) may not need the seismic details required for design in accordance with the 2008 interims. INDOT and LPA's are applying severe financial scrutiny for design and construction costs, it may be more economical to design in accordance with the guide specs than the 2008 interims.

Yes, it may be more economical to design in accordance with the Guide Specs as opposed to the 2008 Interims. However, since the Guide Specs have not been printed yet and INDOT has not had a chance to evaluate the impact adopting it may have, it is premature to make that determination. Impact on project cost may be one criteria INDOT will use in determining whether to adopt the Guide Spec.

4. Does Design Memo 08-01 apply to retaining walls? (I would assume it does)

??? ***INDOT will look into this and report back to the group.***

5. How best to get the information to all consultants who may be developing scope of services that includes the 2008 interims, but are unaware of the additional design and details that are potentially required.

A Design Memo? More training? ??? ***INDOT may sponsor more training in the fall of 2008. They will also update the Design Manual.***