

**ASCE – INDOT
STRUCTURAL COMMITTEE
MEETING NO. 105 AGENDA**

October 8th, 2024

9:00 am, MS Teams and INDOT I-465 Conference Room (7th floor)

1. Review and approve Meeting 104 minutes.

- a. Meeting 104 minutes will be distributed to committee for review along with the Meeting 105 minutes.
- b. Wagner – Committee Order of Operations refreshed by Stephanie Wagner. Committee member feedback received and revisions incorporated.
- c. Brandon Arnold – Now the official Committee Secretary for the next two years.
- d. Kyle Muellner (Parsons) – New member. Replaces Sean Porter on the committee.

2. Bridge Design 2024 Conference Update (Wagner)

- a. February 25, 2025 is the conference date
- b. Wagner will open conference with updates and further explanation on the new semi-integral end bent details (Design Memos 24-12, 24-13, & 24-14 and BDA 409-02).
- c. Mike Wigger will speak about different wall types and when each is best suitable.
- d. Elizabeth Mouser will speak on INDOT standards and how best to handle old bridge railings within preservation projects.
- e. Design panel with various levels of experience will speak.
- f. Jennifer Hart will speak about load rating.
- g. There will be a presentation on SS&T reports.
- h. Mike McCool will speak on open pile bent rehabs.

3. Semi-integral bent details Update (Wagner, McCool, White, Schickel, Borcharding, Merida)

- a. Wagner – Topic complete. Design memos and bridge design aid have been released.

- b. Wagner – There will be a small update to clarify formwork to keep costs minimized.

4. LRFD vs LFD on Rehabilitation Projects (White, McCool, Wright, Wenning, Arnold)

- a. White – We want to start with LRFD, acknowledge that it will likely not work for existing components, and develop guidance for how to handle these situations. Hart is working on a flow chart to provide guidance to the design community on steps to take when existing components do not pass HL-93 loading, etc.
- b. Hart – Guidance to include recommendations on when to contact INDOT Load Rating or perform load ratings to help determine design considerations and changes.
- c. McCool – Group developing guidance should consider design firms that do not typically perform bridge inspections and load ratings. How are they to analyze these types of rehabilitations consider the impacts to load ratings? When will INDOT be asked to step in and support them?
- d. Hart – It should be expected that the designer determines the limiting design loading.
- e. Hailat – In the case of piles, driving records should be investigated to help determine actual capacities.
- f. McCool – This topic could become significantly larger than the committee may want it to be. White – Agreed. Goal should be guidance for designers on how to mitigate theoretical overstress from increased loading in LRFD code vs LFD code.
- g. McCool – MOT phasing needs to be strongly considered in guidance. Impacts to shifting traffic, for example, on a hammerhead pier could have significant impacts.
- h. McCool – Stage 1 on rehab projects should be the submittal where analysis of LRFD loading on existing components is checked, including superstructure and substructure as appropriate, and scope adjusted accordingly. The analysis

results could then be brought to the IFC to help finalize project scope. Stage 1 fees would need to be adjusted.

5. Environmental Bridge Permits (Wagner, Merida, Hailat, Porter, Lesh)

- a. Wagner – INDOT making progress on developing standard drawings for temporary causeways and temporary platforms. INDOT Hydraulics working to determine discharge for which the causeways will be expected to remain serviceable. These drawings will then be sent to environmental review agencies for their feedback. Goal is to refer to standard drawings in our plans instead of detailing them.
- b. Muellner – Did we receive contractor input? Wagner – Yes, INDOT has requested feedback from multiple contractors on the ICI Committee.

6. Staged Deck Pours for Steel Bridges (McCool, White, Merida, Borcharding, Shaw)

- a. McCool – Group analyzed a three-span bridge with proper span ratios to see difference in deflections between options of pouring entire deck at once, pouring separately per current IDM figures, and the option of pouring positive moment regions first and then pouring negative moment regions afterwards. Deflection results were very similar between the three analyses. Stress will be checked next. Group then needs to check for outliers to see if catch-all guidance can be developed. Group will check bridges with long spans, high skews, etc. to find geometries that may require additional analysis.

7. NEXT Beams (McCool, White, Wenning, Arnold, Wagner, Spaans)

- a. McCool – Breaking topic down into three topics: design, fabrication, and construction. Group is putting together revisions to IDM chapters to include NEXT beams as a consideration, a design aid, revisions to the INDOT Standard Specifications, detailing considerations for fabrication, etc.
- b. Wagner – Do we need to add NEXT beams to our prestressed members section.
McCool – Yes, we are working on the revisions listed above.

- c. Schickel – Should we mention it at the upcoming Bridge Design Conference?
McCool – It could be added to the beginning of the conference where updates that the INDOT Structures Committee are working on are discussed. Lesh – this should be added to the presentation on SS&T that will be given.
- d. Wagner – Just to get the word out and put something in writing to remind designers to consider them as an option, INDOT may revise IDM or release a DM now that says they are acceptable, and that more information will follow.

8. Bearing Retrofits / Rehabilitation (Swiderski, Schickel, McCool, White)

- a. White – Steel H-Pile bolster detail and shims concepts have been drafted. A template USP for shimming and jacking will be developed.
- b. McCool – Guidance should be developed to limit jacking heights. Jacking too high can damage joints above.

9. Open Pile Bent Rehabs (McCool, Wright, White, Schickel, Arnold, Merida)

- a. McCool – Group is close to being finished. Draft details and guidance have been developed. They will be shared with entire committee for review. Hauser has provided input on standard form dimensions, constructability, etc.
- b. Muellner and Hailat – We may need guidance for situation where shell pile thickness that remains is so thin or we have fluted piles where welding shear studs to them is problematic.
- c. Shaw – Guidance should require cleaning pile to remove steel delaminations to determine sound pile steel thickness. White – Guidance should refer back to ISS 711 which lists minimum material thickness for acceptable welding.

10. Post-Installed Anchors (Arnold, McCool, Wagner, White, Muellner, Swiderski)

- a. Arnold – Group last met in July. Swiderski is reviewing sample design calculations prepared by McCool's firm on two recent projects. White to investigate creation of a new pay item to be used for epoxy dowels in structural applications versus Type D-1 dowels in PCCP pavement, etc. Purdue is currently researching this topic. Phase II of the research will investigate the

effects of impact loading. Epoxy materials must satisfy ACI Standard 355.4-11. Not all epoxy materials on the current INDOT Approved list satisfy this standard. Epoxy materials must comply with Build American Buy America (BABA). Some notable suppliers of epoxy will no longer be accepted. Group is working on developing a Bridge Design Aid which will detail which failure mechanisms to check, how to check them, etc. A sample USP or an RSP will also be developed for the use of epoxy dowels in structural applications.

11. IDM Steel Chapter Update (McCool, Schickel, Hailat, Wagner, Shaw)

- a. McCool – Proposed revisions have been drafted and are in review. Group is meeting regularly. Section 711 of the ISS is also being reviewed to make sure it is consistent with the IDM. Overall, the IDM and ISS chapters have simply become out of date. Current detailing practices and material specifications are under review.
- b. White – Revisions to Section 711 should be discussed by the Standard Specifications committee in November 2025.

12. Bridge Joint Retrofits (White, Hailat, Schickel, Muellner)

- a. White - Group completed. Recent Bridge Design Aid 412-05 was released, closing the topic.

13. RC Slab IDM Figures (Wenning, Wagner, Merida, Borcharding, Wright)

- a. Wagner – There are questions regarding formwork for slabs near the end bents. Issue is due to minimum clearance from bottom of slab to berm. Contractors need more room to install concrete leveling pads to support falsework.
- b. Wright – Suggests caps be 2'-6" tall, minimum, to provide the additional vertical clearance. Caps deeper than 2'-6" will likely be needed. He has created falsework details for multiple contractors that required over 3'-0" of clearance from bottom of cap to bottom of slab. He noted that many projects are being constructed without extending the caps deeper, resulting in exposed end bent

piles due to vertical placement of concrete leveling pads used to support falsework.

- c. McCool – RC Slab bridges will then need wingwalls, which has not traditionally been done.
- d. White – IDM 405 figures will be updated. Use of standard OS or SQ drains in RC slabs, 2" bottom rebar cover, elimination of crank bars in the slab as a standard practice, and the increase in cap depth could all get incorporated at the same time.

14. Prestress Beam Camber and Box Beam Bearings on high skew (White, McCool, Hart, Wagner, Hailat, Muellner, Spaans, Wenning)

- a. White – Spaans provided good information on actual measured beam cambers for various beams. Group is comparing actual cambers versus predicted for different beam lengths, shapes, etc. So far, the AASHTO I-Beams camber are close between predicted and actual cambers. Hybrid bulb-tees are consistently being fabricated flatter than predicted values. Group will check to see if predicted deflections can be better matched by simply changing the PCI multipliers for hybrid bulb-tees. Guidance will be given for additional dead load to include for beams coming out flatter than predicted. Similarly, vertical clearance guidance could be developed to raise profile grade in such a way as to ensure vertical clearance is satisfied even if beams are fabricated flatter than predictions.
- b. White – Guidance needs to be developed, or plans and specifications adjusted, to handle situations where seats need to be modified during construction for actual cambers that significantly deviate from predicted values.

15. Approach Slab and Rail Details (White, Borcharding, Wenning, Schickel)

- a. White – Issue is joint between bridge railing and bridge railing transition at the location of the IA joint at the end of a bridge deck. Can the bridge railing joint detail be modified to maintain presence of joint as intended when both

components are slip-formed? INDOT Construction being requested for input.

Guidance for sawcutting joint near bridge floor or placing expansion material at bottom of joint needs to be developed.

16. New Business

- a. Muellner – Has INDOT experienced significant cracking on new bridge decks?
 - i. White – Yes. For now, INDOT suggests placing silane sealer over deck first (not official INDOT policy yet). On local projects, additional measures of placing methacrylate sealer could be used. Issue is nationwide due to different cement being used (Type IL, which results in paste not adequately bonding to the aggregate, significantly variable cure times, delayed adequate flexural strength, etc.).
 - ii. McCool – This guidance should be presented to entire design community.
 - iii. White – INDOT went away from using surface seal on bridges as it required 30 days of cure time before it could be applied. Construction times will increase if we as an industry go back to using it on all jobs.
 - iv. Muellner – This should be discussed at next INDOT Bridge Design Conference.
 - v. White – Guidance needs to not allow for poor curing procedures by the contractor to be excused.
 - vi. Wagner – The issues are happening on bridges that used E5 and ones that did not.
 - vii. White – M. Nelson (INDOT) is investigating it and working to determine the best course of action. More to follow.
- b. Lesh – INDOT is hosting an NSBA bridge forum. Information will be applicable for entry level designs and experienced designers. Date will be October 29, 2024. Cost is free. Wagner will distribute information to the committee members.
- c. Next Committee meeting will be January 21, 2025 at 9:00 AM (EST).

Recurring Business

- Bridge Design Aids Update (Wagner)
- Standards Committee Updates
- Overlay Types (Hunter, White)
- Link Slab Design and Details (Wagner, Wenning, Schickel)
- Research Needs and Innovative Ideas Update (Wagner)
- Wall Committee Update

Bridge Design Conference Topics

- Pannel Discussion “Start to Finish of a Project”

Research Projects

- Fire Damage on Concrete Bridges
- Seismic Assessment Design and Retrofit
- ABC Guide
- Strut-and-Tie Modeling
 - Pack Rust - Mitigation Strategy Effectiveness
 - Repair and Strengthening of Bridge using FRP
 - A New Approach to Accelerated Fabrication of Steel Bridges: Design, Optimization, and Demonstration
- Evaluating Reserve Strength of Girder Bridges due to Bridge Rail Load Shedding
- Pedestrian Bridges -- Development of New Criteria for Design & Construction
- Seismic Evaluation of Indiana Bridge Network and Current Bridge Database for Asset Management
- Self Healing Concrete
- BIM for Bridge and Structures
- Development of Protocols for Reuse Assessment of Existing Foundations in Bridge Rehabilitation and Replacement Projects
- Pile Stability Analysis in Soft Soils
- Legal and Permit Loads Evaluation for Indiana Bridges
- Use of LRFR Methodology for Load Rating of INDOT Steel Bridges
- Improved Live Load Lateral Distribution Factors for us in Load Rating of Older Continuous and T-Beam Reinforced Concrete Bridges
- Shear and Bearing Capacity of Corroded Steel Beam Bridges and Effects on Load Rating
- Civil Infrastructure Systems Open Knowledge Network (CIS-OKN)
- Implementation Study: Continuous, Wireless Data Collection and Monitoring of the Sagamore Parkway Bridge

Parking Lot

- Long term deflections in prestressed beams
- Special provision for high strength concrete
- Mild reinforcement in prestressed beams (particularly 401 bars)
- Post Tensioning Specs
- Terminal Joint Details
- Alternate Structure Types
- Continuity of Prestress Concrete Beams (Heidenreich)(**TRB Research**)
- Hydro-demolition (Wagner)
- Fiber Wrap (Jessop)
- High Early Strength Concrete (Nelson)
- Expansion Joints Options (Wagner, White, Eichenauer) (**PP**)
- Load Rating Policy and Procedures (Hunter)
- Approach Slabs (Hailat,)
- Bridge Deck Overhang Design (Wagner, McCool, Hunter, Eichenauer)
- Pile Driving Recommendations
- SIP Forms (Hunter)
- Girder Stability (McCool, Arnold, Porter, Eichenauer, White)
- TS-1 Railing (White, McCool)
- Clear Deck Forms (Schickel)
- Epoxy Anchors (Arnold, Hailat, White, Shaw)
- RC Slab Edge Beam Replacement Details (McCool, White, Shergalis)
- Pile Design for 3-sided structures – Update on potential research project? (White, Schickel, Borcharding, Hunter, Merida)
- STM for End Bents (Arnold, Hailat, Hunter, Schickel, White)
- PVC Deck Drains on RC Slab Bridges (Shergalis, Wagner, Schickel, Porter, Swiderski)
- Reinforcing Cover on Slab Bridges (Schickel, Shergalis, Porter, White)
- Concrete mix designs (White, Nelson, Wenning, McCool, Merida)
 - E5 / internally cured concrete, semi-lightweight, lightweight, rapid curing concrete in RCBA (currently a RSP), UHPC (nonproprietary)
- ABC Working Group (Schickel, Arnold, Wagner, Hailat, McCool, White, Wright, Cowan)