



Road & Bridge Design Publications

Monthly Update – December 2012

Revisions for the month of **December** are listed and displayed below. The special detail index for October will remain in effect. Please contact Vladimir Zokvic (zokvicv@michigan.gov) for any questions related to the bridge changes.

Bridge Design Manual

7.02.20 A. (LFD & LRFD): Deleted the language on length of reinforcement in cantilever spans. Designs should be according to AASHTO LRFD section 5.11.1.2.3.

8.07.01 Y. (LFD & LRFD): Added a new note for part width construction removals. Re-lettered notes in section starting with note “R.” Old note “R” was deleted in 2010 via Interim Update.

8.09.02 I. (LFD & LRFD): Note deleted. All work associated with note is now covered in 2012 Standard Specifications for Construction. Remaining notes in section re-lettered.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

MICHIGAN DESIGN MANUAL

BRIDGE DESIGN

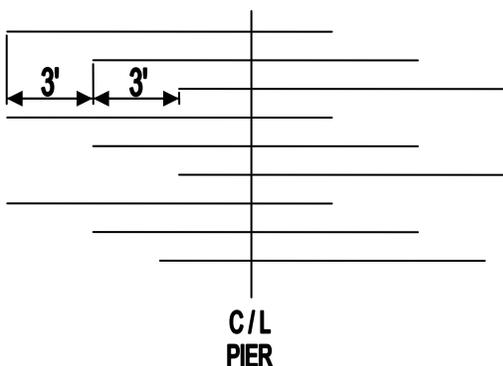
7.02.20

Slab Reinforcement

For general steel reinforcement information applying to both superstructure and substructures, see Steel Reinforcement (Section 7.04).

A. Negative Moment Reinforcement (12-5-2005) (12-17-2012)

Additional longitudinal reinforcement is required in regions of negative moment (see AASHTO 10.38.4.3). Bar ends should have two 3' staggers (see below) to minimize transverse cracking at bar terminations.



With continuous beam design, the bar length should be according to AASHTO 10.38.4.4.

Negative moment reinforcement on 6" decks shall be limited to #6 maximum bar size. The #3 bar longitudinal reinforcement shall be considered in available area for negative moment slab reinforcement. If needed the #3 longitudinal reinforcement in the negative moment region can be replaced with larger bars and combined with added negative moment reinforcement. (11-28-2011)

B. Bar Spacing

See Bridge Design Guide 6.41.01.

7.02.20 (continued)

C. Bar Laps

See Bridge Design Guide 7.14.02A.

Transverse slab reinforcement, if possible, is to be lapped as follows: top steel between the beams and bottom steel over the beams.

D. Cover

All decks will provide 3" of clear concrete cover to the top of transverse reinforcement. See Bridge Design Guide 6.41.01. (5-6-99)

E. Placing of Transverse Bars

Transverse bars are generally placed perpendicular to the beams; however, where the angle of crossing is 70° or greater, transverse bars may be placed parallel to the reference lines if "S along the skew" falls in the same beam spacing range as "S normal to the beams" or the next larger range (see Bridge Design Guide 6.41.01).

Dimensioning is to be perpendicular to reference lines when the transverse bars are laid parallel to the reference line.

F. Epoxy-Coated Reinforcement

All bars in the superstructure are to be epoxy coated.

G. Additional Reinforcement When Haunch Exceeds 6 Inches

Additional transverse and longitudinal reinforcement shall be required when haunch depths exceed 6". Space additional transverse haunch reinforcement (EW05 or EK05 bars) between transverse bars, and ensure bars sufficiently penetrate haunch and slab. See Bridge Design Guide 6.42.03A for details. (4-23-2012)

MICHIGAN DESIGN MANUAL

BRIDGE DESIGN - CHAPTER 7: LRFD

7.02.20

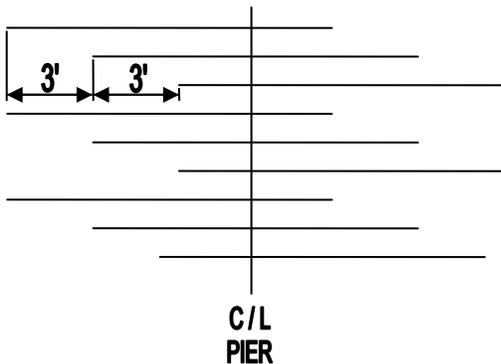
Slab Reinforcement

For general steel reinforcement information applying to both superstructure and substructures, see Steel Reinforcement (Section 7.04).

A. Negative Moment Reinforcement (12-5-2005) (12-17-2012)

Where additional longitudinal reinforcement is required in regions of negative moment see AASHTO LRFD A 6.10.1.7. If the longitudinal reinforcement is considered to be a part of the composite section, shear connectors shall be provided in negative flexure regions. Where shear connectors are used in negative flexure regions, the longitudinal reinforcement shall be extended into positive flexure region (AASHTO LRFD A 5.11.1.2.3). (8-20-2009) (12-22-2011)

Bar ends should have two 3' staggers (see below) to minimize transverse cracking at bar terminations.



With continuous beam design, the bar length should be according to AASHTO LRFD 5.11.1.2.3.

Negative moment reinforcement on 6" decks shall be limited to #6 maximum bar size. The #3 bar longitudinal reinforcement shall be considered in available area for negative moment slab reinforcement. If needed the #3 longitudinal reinforcement in the negative moment region can be replaced with larger bars and combined with added negative moment reinforcement. (11-28-2011)

7.02.20 A. (continued)

B. Bar Spacing (8-20-2009)

See AASHTO LRFD 5.14.4 and 9.7 and Bridge Design Guide 6.41.01.

C. Bar Laps

See Bridge Design Guide 7.14.02A.

Transverse slab reinforcement, if possible, is to be lapped as follows: top steel between the beams and bottom steel over the beams.

D. Cover

All decks will provide 3" of clear concrete cover to the top of transverse reinforcement. See Bridge Design Guide 6.41.01. (5-6-99)

E. Placing of Transverse Bars

Transverse bars are generally placed perpendicular to the beams; however, where the angle of crossing is 70° or greater, transverse bars may be placed parallel to the reference lines if "S along the skew" falls in the same beam spacing range as "S normal to the beams" or the next larger range (see Bridge Design Guide 6.41.01).

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F. Epoxy-Coated Reinforcement

All bars in the superstructure are to be epoxy coated.

MICHIGAN DESIGN MANUAL BRIDGE DESIGN

8.07.01(continued)

Miscellaneous Notes

- Q. Silica Fume Modified Concrete or Latex Modified Concrete may be selected for the bridge deck overlay concrete. (9-2-2003)
- R. The contractor may use metal stay in place forms. If used, eliminating the polystyrene and filling the corrugations with concrete is prohibited. [Use with metal stay in place forms where design calculations show the increase in dead load will result in an over stress.] (8-20-99)
- S. The contractor shall not use stay-in-place forms. All materials used to form the deck must be removed prior to opening the bridge to traffic. [Use where beam spacing or form loads preclude the use of stay-in-place forms.] (9-2-2003)
- T. The deck shall be saw-cut on both the top and bottom surface prior to deck removal procedures. [Use with bridge widening when the saw-cut is on the outside of the fascia beam or with removal procedures required for stage construction.] (9-18-98) (11-28-2011)
- U. Fill perpendicular railing joints with 1" joint filler to 1/2" from the bevels of railing and seal remaining 1/2" with a silicone rubber sealant. Included in the bid item (Bridge Barrier Railing, (Type 4) (Type 5)) (Bridge Railing, Aesthetic Parapet Tube). [Use in all concrete railings over the piers of continuous deck, at midspan on all structures with a span greater than 100'-0" and cantilever decks where the cantilever is more than 10'-0" long.] (12-5-2005)

8.07.01(continued)

- V. The Contractor is to provide a sawed joint 1/2" [1 1/2"] deep by 1/8" wide (minimum) in the top of slab at [transverse construction joints] [at longitudinal construction joints] [and at fixed pin & hanger joints] [the locations shown in section(s)_____]. The joint is to be sawed within 4 hours of removing the curing and is to be filled with Hot-Poured Joint Sealant. (Included in the bid item "Superstructure Conc, Form, Finish, and Cure, Night Casting (Structure No.).") [Use at all construction joints. Use 1 1/2" by 1/8" at the locations shown for continuous for live load slabs.] (11-28-2011)
- W. Additional concrete and forming used to increase slab depth at the Bridge Railing, 2 Tube will not be paid for separately, but shall be included in the bid item "Superstructure Conc (, Night Casting)." [Use when 2 tube railing is placed between traffic and a pedestrian sidewalk or when railing is not on overhang portion of deck slab.] (12-5-2005)
- X. No portion of deck formwork or supports shall protrude above the top of proposed haunch (or top of the beam where there is no proposed haunch). (11-28-2011)
- Y. In order to maintain the integrity of the existing structure during Stage _____ construction, the contractor shall saw cut entirely through the (abutment) (pier) and a minimum of 4" into the top of footing for removal purposes. [Used with part width construction]. (12-17-2012)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.07.01(continued)

Miscellaneous Notes

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MICHIGAN DESIGN MANUAL BRIDGE DESIGN

8.09.02 (continued)

Bridge Deck Repair Notes

- I. The actual quantity of "Conc, (Bridge Deck Ovly) (Silica Fume Modified)" placed on the deck was ____cubic yards. (This information is to be filled in by the Engineer when submitting "as constructed" plans.) (12-5-2005)
- J. Silica Fume Modified Concrete or Latex Modified Concrete may be selected for the bridge deck overlay concrete. (9-2-2003)
- K. False decking shall include the area bounded by (Reference Lines __& __) (edges of shoulders) and outside flange fascias of Beams __& __. [Use when limits are not detailed on the plans.] (12-5-2005)
- L. Bridge overlay cross slope shall be (2%)(1.5%)(placed to match existing slope). [Use 2% cross slope unless compelling reasons warrant the use of 1.5% or existing cross slope. See Section 7.02.19 G. for additional information.] (8-20-2009)
- M. Work for removal and reinstallation of portions of the existing thrie beam guardrail required for access to screed the deck shall be included in the bid item, "Bridge Deck Surface Construction". [Use on overlay projects where work may arise.] (8-20-99)
- N. Work for removal and reinstallation of portions of the existing thrie beam guardrail required to replace the joints shall be included in the bid item, "Deck Joint, Rem". [Use on overlay projects where work may arise.] (12-5-2005)

8.09.02 (continued)

- O. Low temperature protection of concrete shall be applied according to Section 706.03 J. of the Standard Specifications for Construction. Low temperature protection of concrete will not be paid for separately, but will be included in the bid item(s) for "Conc, (Bridge Deck Ovly) (Silica Fume Modified)." (12-5-2005)
- P. Concrete trucks and other heavy equipment shall not be allowed on the deck when reinforcing steel is tied in place and exposed. (9-2-2003)
- Q. The area of link slab(s) as designated, shall not be scarified or hydrodemolished. [Detail limits on deck plan.] (12-5-2005)
- R. No portion of the deck formwork shall encroach on the existing underclearance. [Use where bridge deck is to be cast over traffic.] (12-5-2005)
- S. Concrete Surface Coating shall be applied to the (entire concrete portion of bridge railing (including brush block),) (slab fascia,) (sidewalk fascia,) (underside of deck from slab fascia to fascia beam flange,) (exterior face and bottom of bottom flange of fascia beam). See Special Provision for coating color. The estimated area of coating is ____ syd. [Include any and all parts that are to be coated. Add sketch to plans for clarity if desired.] (12-5-2005)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 8: LRFD

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