Preface

The author of the *Bridge Design Manual* (BDM) is the Methods Unit of the Bridges and Structures Bureau (BSB).

The BDM shall be used with other Iowa DOT documents and standards including the latest editions of the Bridges and Structures Bureau Standards, the Construction and Materials Bureau Instructional Memoranda, and *Standard Specifications for Highway and Bridge Construction*. It also shall be used with the 2017 AASHTO *LRFD Bridge Design Specifications*, 8th Edition except as noted. The BDM also references the 2002 AASHTO *Standard Specifications for Highway Bridges*, 17th Edition with current errata changes. A list of reference documents and standards along with abbreviations is given in the Introduction section. An additional list is given with each major article or section.

Bridges and Structures Bureau documents are available on the Bureau web site:

https://iowadot.gov/bridge/

Other Iowa DOT documents are available in the Electronic Reference Library:

https://iowadot.gov/erl/index.html

Exceptions with respect to the use of LRFD are as follows:

- Repairs shall continue to follow guidelines in the repair section.
- BDM Article 10.2, Sign Support Structures, is a dual ASD/LRFD article. The Iowa DOT currently is transitioning from allowable stress design (ASD) standards based on the 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 6th Edition to load and resistance factor design (LRFD) standards based on the 2015 AASHTO *LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 1st Edition.
- Starting with the July 2023 release and all releases up to and including the January 2024 release of the Iowa DOT working standards included rebar development and lap length updates based on the 2017 AASHTO *LRFD Bridge Design Specifications*, 8th Edition. These working standards shall be incorporated into project details starting with the October 2024 letting. The signed standard plans have rebar development and lap lengths based on the 2014 AASHTO *LRFD Bridge Design Specifications*, 7th Edition and will be updated to the 8th edition by BSB as time permits. The signed standard plans should be used “as is” until they are updated by BSB.
- Starting with the July 2023 release and all releases up to and including the January 2024 release of the Iowa DOT working standards included the following changes to the deck on beam details:
    - Interior deck thickness increases from 8 inches to 8.5 inches.
    - Thickness of the deck overhang tapers increases from a permissible range of 9.00 to 10.25 inches at the exterior beam top flange edge to a permissible range of 10.25 to 11 inches. Thickness of deck overhang tapers increases from 8.75 inches for PPCBs and 9 inches for steel beams at edge of deck to 10 inches for both.
    - Top of deck built-in (sacrificial) wearing surface increases from 0.50 inches to 0.75 inches.
    - Concrete cover increases from 2.5 inches to 2.75 inches for topmost layer of deck reinforcement and from 1 inch to 1.5 inches for bottommost layer of deck reinforcement.
    - Top of deck transverse reinforcement in the deck overhang changes from straight bars to hooked bars.

  These working standards shall be incorporated into project details starting with the October 2024 letting. The signed standard plans do not include these updates and should be used “as is” until they are updated by BSB. This item does not involve an LRFD exception but is included here since it involves a significant change in practice.
- Starting with the July 2023 release and all releases up to and including the January 2024 release of the Iowa DOT working standards includes phasing out of the 34-inch tall TL-4 and 44-inch tall

TL-5 NCHRP 350 F-shape barrier rails to be replaced with the 38-inch tall TL-4 and 44-inch tall TL-5 MASH single slope barrier rails. These working standards shall be incorporated into project details starting with the October 2024 letting. The signed standard plans do not include the updates and should be used “as is” until they are updated by BSB.

- Chapter 5 “Concrete Structures” of the 2017 AASHTO *LRFD Bridge Design Specifications* requires D-regions (disturbed or discontinuity) to be designed using the strut-and-tie method (STM) for the strength and extreme event limit states with some exceptions provided for legacy methods [AASHTO-LRFD 5.5.1.2.3]. Historically, the Iowa DOT has used sectional models, which is a B-region method, in some areas which are classified as D-regions (e.g., typical pier caps). Iowa will continue designing based on its current historical practices until STM is incorporated into the BDM.

In general, the BDM is intended to define Bureau practice for typical Iowa bridges without restricting innovation for unusual site and design conditions. The words “shall”, “required”, “Bureau policy”, and similar terms indicate mandatory specifications that need to be followed unless exceptions are approved by the supervising Unit Leader. Other terms such as “should”, “prefer”, and “recommended” indicate general guidance subject to engineering judgment of the designer. Interpretations of the supervising Unit Leader, the Chief Structural Engineer, the Bridge Project Development Engineer, and the Bridge Engineer supersede policies in this manual.

The entire manual is generally scheduled to be updated twice a year on January 1 and July 1 however these release dates can change, and interim releases may also occur on occasion. Only changes to the previous release will be shown.

Standard CADD notes are provided in Section 13 at the end of the manual.

Users are invited to bring errors and omissions to the attention of the Methods Unit of the Bridges and Structures Bureau.

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