



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

April 30, 2007

CIRCULAR LETTER 2007-06

LRFD DESIGN IMPLEMENTATION

COUNTY ENGINEERS/SUPERINTENDENT OF HIGHWAYS
MUNICIPAL ENGINEERS/DIRECTOR OF PUBLIC WORKS
CONSULTING ENGINEERS

The information presented in this Circular Letter is provided to advise of the applicability and schedule for implementation by Local Agencies of the Load and Resistance Factor Design (LRFD) in the design of the structures under their jurisdiction.

Load and Resistance Factor Design. The First Edition of the LRFD Specification was published by the American Association of State Highway and Transportation Officials (AASHTO) in 1994, as an alternative to the *Standard Specifications for Highway Bridges*. The focus of LRFD was to incorporate state-of-the-art analysis and design methodologies for bridges with load and resistance factors based on the known variability of applied loads and material properties. The load and resistance factors are calibrated from acquired bridge statistics. The objective of LRFD design is to achieve greater reliability and a more uniform factor of safety in an effort to provide better serviceability and long-term maintainability for bridges.

LRFD is intended to be a superior design. IDOT Standards have been, or will be, based on the LRFD code. It is therefore suggested, to enhance uniform design procedures, that LRFD design be implemented to the extent possible.

LRFD Implementation. A June 28, 2000 Federal Highway Administration (FHWA) Memorandum, located at <http://www.fhwa.dot.gov/bridge/062800.htm>, states that “***all new bridges on which States initiate preliminary engineering after October 1, 2007, shall be designed by the AASHTO LRFD Bridge Design Specification***”. Exceptions to this policy are provided later in this memorandum. Projects initiated prior to this October 1, 2007 may be designed using Allowable Stress Design (ASD) or Load Factor Design (LFD). However, the term “initiate” required clarification. This was provided by an FHWA Memorandum dated January 22, 2007, see <http://www.fhwa.dot.gov/bridge/012207.cfm>. The memorandum indicates:

- *The term “preliminary engineering” as stated in the LRFD Policy Memorandum shall be interpreted as the initiation of the studies or design activities related to identification of the type, size, and/or location of bridges.*

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The term "initiate" means the date when Federal-aid funds are obligated for preliminary engineering. In cases where Federal-aid funds are not used in preliminary engineering, but are used in construction or other phases of the project, the term "initiate" means the date when the State obligates or expends their own funds for preliminary engineering.

There are a number of different scenarios to consider in determining the applicability of the LRFD design based on funding. The following criteria are provided as clarification of the LRFD design specification use on local agency bridge projects:

1. **Federal-Aid Funds Used in Preliminary Engineering.** Due to the amount of time required to process paperwork after agreements have been signed until the Federal Funds are obligated, we suggest that agreements for projects designed by LFD be submitted so that they are in to the Central Bureau of Local Roads and Streets by **July 31, 2007**. We believe that this will allow sufficient time for Federal Funds to be obligated by September 30, 2007.
2. **Federal-Aid Funds Used in Construction or Other Project Phases (Not Preliminary Engineering).** For these projects, design work may begin when the agreement is signed. The "initiation date" will therefore be the date the agreement for design is signed. Contracts for such projects must be signed no later than September 30, 2007 in order to use an ASD or LFD (non-LRFD) design.
3. **Federal-Aid Funds – Other.** There may be some unique situations where the Federal Funds are obligated for preliminary engineering prior to the signing of the Final Agreement. In those cases, the "initiation date" will be the latest date (the date of the signing of the Final Agreement).
4. **Projects NOT Using Federal Funds (MFT and non-MFT).** Recommend that policy for Item 2 be followed.

Exceptions to LRFD Design Specification. The following are exceptions to the requirement for using the LRFD design specifications.

- A. The use of the LRFD design specifications is being phased in over time to allow for the development of design standards and computer programs. From the June 28, 2000 FHWA Memorandum:

"All new culverts, retaining walls, and other standard structures on which States initiate preliminary engineering after October 1, 2010, shall be designed by LRFD Specifications, with the assumption that the specifications and software for these structures are "mature" at this time."

We believe that this policy also applies to the Standard Plans for Precast Prestressed Concrete Deck Beams. The intent is that the Standard Plans will be modified prior to October 1, 2010. They will incorporate LRFD design, as well as substantial changes in the details for Precast Prestressed Concrete Deck Beams.

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- B. Existing foundations, substructures, and other remaining elements were not designed to the LRFD specifications, and therefore the HL-93 design live load used by LRFD design, which is larger than previous design loads. Since an objective is to achieve economical re-use of existing structure elements when possible, the ASD and LFD design codes may be used for bridges that will undergo re-decking or rehabilitation.

“For modifications to existing structures, States would have the option of using LRFD Specifications or the specifications which were used for the original design.”

See the Structural Design Specification Selection Table from Bridge Manual Table 2.1.2-1 as summarized below:

New or Complete Replacement Structures	
Retaining Walls & Concrete Culverts	AASHTO Standard Spec. for Highway Bridges (ASD or LFD)
All Other Structure Types	AASHTO LRFD Bridge Design Specifications

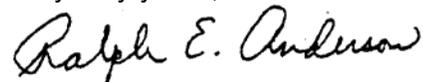
Structure Rehabilitation	
Existing ASD or LFD Designs	AASHTO Standard Spec. for Highway Bridges (ASD or LFD)
Existing LRFD Designs	AASHTO LRFD Bridge Design Specifications

In addition, structures may be load-rated according to the code by which they were designed. The existing Bureau of Bridges and Structures manuals will be archived for reference and for use in bridge load ratings using previous design codes.

With the anticipated updates provided to the “cookbook” PPCDB designs, we expect that design guides, computer programs, and policy direction will be sufficiently mature by the October 1, 2007 date to use LRFD design. Further exceptions may be allowed if questions are identified in design procedures.

If you have any questions regarding the implementation of the LRFD design specifications, please contact Jayme Schiff at 217/785-8748. For questions regarding specific agreements, please contact Greg Lupton at 217/785-1670.

Very truly yours,



Ralph E. Anderson
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JFS/bb29121
cc- Illinois Department of Natural Resources
FHWA, Illinois Division/Attn: Dan Brydl
Illinois State Toll Highway Authority