



Illinois Department of Transportation

Memorandum

To: ALL BRIDGE DESIGNERS

From: Jayme F. Schiff

Subject: Seismic Manual Announcement

Date: September 2, 2022

22.4

A handwritten signature in blue ink that reads "Jayme F. Schiff".

The AASHTO LRFD Bridge Design Specifications currently include a seismic design method known as force-based design. In accordance with these specifications, seismic structural design and detailing policies in the Bridge Manual utilize this method of design. A second design method known as displacement-based design is currently found in the AASHTO Guide Specifications for LRFD Seismic Bridge Design.

Displacement-based design is the only method currently being modified by AASHTO and is expected to replace force-based design in forthcoming AASHTO updates. Displacement-based design is required to be used when other documents such as the AASHTO Guidelines for Performance-Based Seismic Design and AASHTO Guide Specifications for Seismic Isolation Design are used. Therefore, it is prudent for the Department to begin utilizing this method of design.

In anticipation of displacement-based design becoming the preferred method of seismic design used in Illinois, IDOT has begun developing new seismic design and detailing criteria for this method. The seismic design and detailing criteria required for displacement-based design have many differences when compared to the criteria used in force-based design. Because of the large number of differences, and the need for clarity and separation of the two design methodologies, IDOT has chosen to adopt future seismic design and detailing policy into a separate document, known as the Seismic Manual. Use of a separate document to keep seismic design policy will also allow this manual to be updated on a regular basis. These updates will be accompanied with All Bridge Designers Memoranda.

The Seismic Manual will not be populated all at once, but rather will be constructed via a series of All Bridge Designers Memoranda.

This manual will contain most forthcoming seismic policies. Some policies, such as liquefaction analysis, or evaluation of existing structures during Bridge Condition Reports, are more appropriately placed in the manuals associated with their use (e.g. Geotechnical Manual). References to these manuals will be made in the Seismic Manual.

The following is a preliminary outline of the Seismic Manual:

1. Introduction
2. Engineering Design Parameters
3. Design Hazards
4. Planning Structure Types
5. Analysis Procedures
6. Modeling Assumptions
7. Design Requirements
8. Plan Detail Requirements
9. Retrofitting of Existing Bridges
10. Design Guide

The IDOT Bridge Manual will contain all policy regarding force-based design until such time that it is determined that it is no longer required to be maintained.

The Department intends to incorporate displacement-based design on bridges with Type, Size, and Location plans approved September 1, 2023 and later. Due to the amount and complexity of required design changes, and the effects these changes may have on preliminary design, this date may be extended on a project-by-project basis. Type, Size, and Location plans will state which document the designer will be required to use (AASHTO LRFD Bridge Design Specifications for force-based design, AASHTO Guide Specifications for LRFD Seismic Bridge Design for displacement-based design).

Please direct questions to Mark Shaffer, Policy, Standards, and Final Plan Control Unit Chief, by telephone at (217) 785-2914 or email at mark.shaffer@illinois.gov.

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