GUIDE DESIGN SPECIFICATIONS FOR BRIDGE TEMPORARY WORKS

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American Association of State Highway and Transportation Officials

AASHTO

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PREFACE

Background

In 1991, a study was initiated by the Federal Highway Administration (FHWA) to identify the current state of practice in the United States and abroad for designing, constructing, and inspecting the temporary works used to construct highway bridge structures. This study was known as the FHWA Bridge Temporary Works Research Program. One of the documents produced from this study was FHWA Publication No. FHWA-RD-93-032, *Guide Design Specification for Bridge Temporary Works*, which was subsequently adopted by the American Association of State Highway and Transportation Officials (AASHTO) in 1995.

There have been several initiatives since original publication of the AASHTO *Guide Design Specifications for Bridge Temporary Works* that have advanced the design and construction of the temporary works used in bridge construction. The Structural Engineering Institute of the American Society of Civil Engineers (ASCE) developed SEI/ASCE 37-02, a standard for design loads on structures during construction. Based upon the period of time that has elapsed since the development of the original *Guide Design Specification*, and the development of other related standards over this period of time, the reassessment and updating of the guide design specification seemed appropriate and necessary.

Summary of Changes

This 2017 Second Edition of the AASHTO *Guide Design Specifications for Bridge Temporary Works* has been updated to reflect current codes and practice. The organization is generally the same as the First Edition, but the construction provisions have been moved to the AASHTO *LRFD Bridge Construction Specifications*. The format was also changed so the commentary is adjacent to the specification (two column format) similar to the *AASHTO LRFD Bridge Construction Specifications.* The loads in Section 2—Falsework have also been significantly revised and both ASD and LRFD design specifications are included.

Acknowledgments

The AASHTO *Guide Design Specifications for Bridge Temporary Works* was revised under NCHRP Project 20-07/ Task 294 by Wiss, Janney, Elstner Associates, Inc., Northbrook, Illinois. John F. Duntemann was the Principal Investigator. This project was directed by the NCHRP Task Group, which consisted of the following representatives:

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The original guide design specification was developed under FHWA Contract No. DTFH61-91-C-00088. The project was directed by the Scaffolding, Shoring, and Formwork Task Group of the FHWA, which consisted of the following representatives:

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Section 1

INTRODUCTION

1.1—SCOPE

This Guide Design Specification has been developed for use by state agencies to include in their existing standard specifications for falsework, formwork, and related temporary construction used to construct highway bridge structures. The specification should also be useful to bridge engineers, falsework designers, contractors, and other engineers. Sections within this specification address falsework, formwork, and temporary retaining structures. Related publications and definitions are identified below.

C1.1

The AASHTO *Guide Design Specification for Bridge Temporary Works* was first published in 1995. This specification was originally developed by Wiss, Janney, Elstner Associates, Inc., of Northbrook, Illinois with the FHWA and directed by the Scaffolding, Shoring and Formwork Task Group of the FHWA. These specifications provided unified design and construction criteria that reflected the best practices at the time the specifications were developed.

Since 1995, there have been several initiatives that have advanced the state of practice related to the design and construction of the temporary works used in bridge construction. ASCE developed SEI/ASCE 37, *Design Loads on Structures during Construction*.

This 2017 Second Edition of the AASHTO *Guide Design Specifications for Bridge Temporary Works* has been updated to reflect current codes and practice. The organization is generally the same as the First Edition, but the construction requirements have been moved to the AASHTO *LRFD Bridge Construction Specifications*. The loads in Section 2—Falsework have also been significantly revised and both ASD and LRFD design specifications are included. These documents—the design and construction specifications—complement each other. The AASHTO *Construction Handbook for Bridge Temporary Works* has also been updated and serves as a useful reference on this subject.

1.2—RELATED PUBLICATIONS

American Association of State Highway and Transportation Officials, AASHTO *LRFD Bridge Construction Specifications*, Third Ed., with 2010, 2011, 2012, 2014, 2015, and 2016 Interim Revisions, Washington, DC, 2010.

American Association of State Highway and Transportation Officials, AASHTO *LRFD Bridge Design Specifications*, Seventh Ed., with 2015 and 2016 interim revisions, Washington, DC, 2014.

American Association of State Highway and Transportation Officials, *Construction Handbook for Bridge Temporary Works*, Second Edition, Washington, DC, 2017.

American Association of State Highway and Transportation Officials, *Standard Specifications for Highway Bridges*, 17th Ed., Washington, DC, 2002.

American Society of Civil Engineers, *Minimum Design Loads for Buildings and Other Structures* (ASCE 7-10), Reston, Virginia, 2010.

American Society of Civil Engineers, *Design Loads on Structures During Construction* (ASCE 37-02), American Society of Civil Engineers, Reston, VA, 2002.

Duntemann, J.F., Dunn, L.E., Gill, S., Lukas, R.G., and Kaler, M.D., *Guide Design Specification for Bridge Temporary Works*, Report No. FHWA-RD-93-032, Federal Highway Administration, Washington, DC, November 1993.

Duntemann, J.F., Calabrese, F., and Gill, S., *Construction Handbook for Bridge Temporary Works*, Report No. FWHA-RD-93-034. Federal Highway Administration, Washington, DC, November 1993.

Duntemann, J.F., Anderson, N.S., and Longinow, A., *Synthesis of Falsework, Formwork, and Scaffolding for Highway Bridge Structures*, Report No. FHWA-RD-91-062, Federal Highway Administration, Washington, DC, November 1991.

United States Department of Transportation, Federal Highway Administration, *Accelerated Bridge Construction—Experience in Design, Fabrication, and Erection of Prefabricated Bridge Elements and Systems,* Report No. FHWA-HIF-12-013, Federal Highway Administration, East Hartford, CT, 2011.

U.S. Department of Transportation, Federal Highway Administration, *Certification Program for Bridge Temporary Works* (FHWA-RD-93-033), Federal Highway Administration, Washington, DC, 1993.

U.S. Department of Transportation, Federal Highway Administration, *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*, FP-03, Washington, DC, 2003.

1.3—DEFINITIONS

For the purposes of this specification, the following definitions apply:

Cofferdam—A watertight structure that allows foundations to be constructed under dry conditions.

Engineer—Used with a capital "E" refers to the owner's engineer.

Falsework—Temporary construction used to support the permanent structure until it becomes self-supporting. Falsework includes steel or timber beams, girders, columns, piles, and foundations, and any proprietary equipment including modular shoring frames, post shores, and horizontal shoring.

Formwork—A temporary structure or mold used to retain the plastic or fluid concrete in its designated shape until it hardens. Formwork must have enough strength to resist the fluid

pressure exerted by plastic concrete and any additional fluid pressure effects generated by vibrations.

Scaffolding—An elevated work platform used to support workmen materials and equipment, but not intended to support the structure being constructed.

Shoring—A component of falsework such as horizontal, vertical, or inclined support members. For the purpose of this document, this term is used interchangeably with falsework.

Temporary Retaining Structure—For the purpose of this document, refers to both earth-retaining structures and cofferdams.

1.4—METRIC CONVERSIONS

Conversion of equations from U.S. Customary units to S.I. units is provided in Appendix G.