Aashto Guide Specifications For Lrfd Seismic Bridge Design

TRB's National Cooperative Highway Research Program (NCHRP) Synthesis 532: Seismic Design of Non-Conventional Bridges documents seismic design approaches and criteria used for "non-conventional" bridges, such as long-span cable-supported bridges, bridges with truss tower substructures, and arch bridges. Design of conventional bridges for seismic demands in the United States is based on one of two American Association of State Highway Transportation Officials (AASHTO) documents: the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications (AASHTO BDS) (1) or the AASHTO Guide Specifications for LRFD Seismic Bridge Design (Guide Spec) (2). The stated scope of these documents for seismic design is limited to conventional bridges. Non-conventional bridges outside the scope of these two AASHTO documents, such as cable-supported bridges and long-span arch bridges, are typically high value investments designed with special project criteria. There is no current AASHTO standard seismic design criteria document specific to these non-conventional bridges. Seismic design criteria for these non-conventional bridges are typically part of a broader project-specific criteria document that addresses the special character of the bridge type.

AASHTO Guide Specifications for LRFD Seismic Bridge DesignAASHTO

This report contains the findings of research performed to develop design specifications for horizontally curved steel girder bridges.

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Safety, Reliability, Risk and Life-Cycle Performance of Structures and Infrastructures contains the plenary lectures and papers presented at the 11th International Conference on STRUCTURAL SAFETY AND RELIABILITY (ICOSSAR2013, New York, NY, USA, 16-20 June 2013), and covers major aspects of safety, reliability, risk and life-cycle performance of str

Covers seismic design for typical bridge types and applies to non-critical and non-essential bridges. Approved as an alternate to the seismic provisions in the AASHTO LRFD Bridge Design Specifications. Differs from the current procedures in the LRFD Specifications in the use of displacement-based design procedures, instead of the traditional force-based "R-Factor" method. Includes detailed guidance and commentary on earthquake resisting elements and systems, global design strategies, demand modeling, capacity calculation, and liquefaction effects. Capacity design procedures underpin the Guide Specifications' methodology; includes prescriptive detailing for plastic hinging regions and design requirements for capacity protection of those elements that should not experience damage.

This work offers guidance on bridge design for extreme events induced by human beings. This document provides the designer with information on the response of concrete bridge columns subjected to blast loads as well as blast-resistant

design and detailing guidelines and analytical models of blast load distribution. The content of this guideline should be considered in situations where resisting blast loads is deemed warranted by the owner or designer.

Nonlinear static monotonic (pushover) analysis has become a common practice in performance-based bridge seismic design. The popularity of pushover analysis is due to its ability to identify the failure modes and the design limit states of bridge piers and to provide the progressive collapse sequence of damaged bridges when subjected to major earthquakes. Seismic Design Aids for Nonlinear Pushover Analysis of Reinforced Concrete and Steel Bridges fills the need for a complete reference on pushover analysis for practicing engineers. This technical reference covers the pushover analysis of reinforced concrete and steel bridges with confined and unconfined concrete column members of either circular or rectangular cross sections as well as steel members of standard shapes. It provides step-by-step procedures for pushover analysis with various nonlinear member stiffness formulations, including: Finite segment–finite string (FSFS) Finite segment–moment curvature (FSMC) Axial load–moment interaction (PM) Constant moment ratio (CMR) Plastic hinge length (PHL) Ranging from the simplest to the most sophisticated, the methods are suitable for engineers with varying levels of experience in nonlinear structural analysis. The authors also provide a downloadable computer program, INSTRUCT (INelastic STRUCTural Analysis of Reinforced-Concrete and Steel Structures), that allows readers to perform their own pushover analyses. Numerous real-world examples demonstrate the accuracy of analytical prediction by comparing numerical results with full- or large-scale test results. A useful reference for researchers and engineers working in structural engineering, this book also offers an organized collection of nonlinear pushover analysis applications for students.

TRB’s National Cooperative Highway Research Program (NCHRP) Report 698: Application of Accelerated Bridge Construction Connections in Moderate-to-High Seismic Regions evaluates the performance of connection details for bridge members in accelerated bridge construction in medium-to-high seismic regions and offers suggestions for further research.

AASHTO has issued interim revisions to AASHTO Guide Specifications for LRFD Seismic Bridge Design, Second Edition (2011). This packet contains the revised pages. They are not designed to replace the corresponding pages in the book but rather to be kept with the book for quick reference.

Many state DOTs and the Federal Highway Administration are actively promoting accelerated bridge construction (ABC) to reduce traffic impacts, onsite construction time, environmental impacts, and life cycle costs; and to improve work zone safety, site constructability, material quality, and product durability, while replacing the nation’s transportation infrastructure. With ABC, prefabricated elements reduce or eliminate the onsite construction time that is needed to build a

similar structural component using conventional construction methods. These guide specifications compile the growing body of recommended design and construction specifications for prefabricated bridge elements and systems for ABC with a focus on constructability and durability. -- AASHTO website

Glass fiber reinforced polymer (GFRP) materials have emerged as an alternative material for producing reinforcing bars for concrete structures. GFRP reinforcing bars offer advantages over steel reinforcement due to their noncorrosive nature and nonconductive behavior. Due to other differences in the physical and mechanical behavior of GFRP materials as opposed to steel, unique guidance on the engineering and construction of concrete bridge decks reinforced with GFRP bars is needed. These guide specifications offer a description of the unique material properties of GFRP composite materials as well as provisions for the design and construction of concrete bridge decks and railings reinforced with GFRP reinforcing bars.

"Highways Subcommittee on Bridges and Structures"--P. iv.

"The NCHRP Report 776 provides proposed revisions to Section 1.3--Design Philosophy of the AASHTO LRFD Bridge Design Specifications with detailed examples of the application of the proposed revisions. The proposed revisions include system factors that can be used during the design and safety assessment of bridges subjected to distributed lateral load being evaluated using the displacement-based approached specified in the AASHTO Guide Specifications for LRFD Seismic Bridge Design or the traditional force-based approach. Also, the report presents system factors calibrated for application with bridge systems subjected to vertical vehicular loads. The material in this report will be of immediate interest to highway design engineers."--Project information.

This book contains a selected number of papers that were presented at the Second New York City Bridge Conference organized by the Bridge Engineering Association. It represents the state-of-the-art papers from different countries on a wide spectrum of topics in bridge engineering.

AASHTO has issued proposed interim revisions to the AASHTO Guide Specifications for LFRD Seismic Bridge Design (2009). This packet contains the revised pages. They are not designed to replace the corresponding pages in the book but rather to be kept with the book for fast reference.

"TRB's National Cooperative Highway Research Program (NCHRP) Report 761: Reference Guide for Applying Risk and Reliability-Based Approaches for Bridge Scour Prediction presents a reference guide designed to help identify and evaluate the uncertainties associated with bridge scour prediction including hydrologic, hydraulic, and model/equation uncertainty. For complex foundation systems and channel conditions, the report includes a step-by-step procedure designed to provide scour factors for site-specific conditions."--Publisher's description

Covers seismic design for typical bridge types and applies to non-critical and non-essential bridges. Approved as an alternate to the seismic provisions in the AASHTO LRFD Bridge Design Specifications. Differs from the current procedures in the LRFD Specifications in the use of displacement-based design procedures, instead of the traditional force-based R-Factor method. Includes detailed guidance and commentary on earthquake-resisting elements and systems, global design strategies, demand modeling, capacity calculation, and liquefaction effects. Capacity design procedures underpin the Guide Specifications' methodology; includes prescriptive detailing for plastic hinging regions and design requirements for capacity protection of those elements that should not experience damage.

"This report presents the analytical study of the shear capacity of reinforced concrete columns using both the AASHTO LRFD bridge design specifications and the AASHTO guide specifications for the LRFD seismic bridge design. The study investigates various levels of axial load, transverse reinforcement and longitudinal reinforcement to determine who the two specifications compare. The AASHTO guide specifications for the LRFD seismic bridge design permits the designer to use the AASHTO LRFD bridge design specifications or equations within the AASHTO guide specifications for the LRFD seismic bridge design with predetermined values. [...] A parametrical study was extended to conventional full-scale columns, using both the AASHTO LRFD bridge design specifications and the AASHTO guide specifications for the LRFD seismic bridge design to predict shear strength in order to analyze the direct effects of the parameters on the shear strength predictions."--Abstract

"These specifications are intended for the design, evaluation, and rehabilitation of highway tunnels and for the design of tunnels constructed using cut-and-cover, bored, mined, and immersed tunnel construction methodologies. Provisions are not included for water conveyance, utility, transit, or rail tunnels, or shafts. Structures internal to tunnels that support roadways over ventilation plenums, roadways, or other openings in the tunnel are to be designed in accordance with the AASHTO LRFD Bridge Design Specifications (see related item), including the loadings specified here that are unique to tunnels. The load effects of these internal structures shall be applied to the tunnel lining, walls, or other supporting members in accordance with these specifications. Retaining walls for retained cut approaches to tunnels should also be designed in accordance with the AASHTO LRFD Bridge Design Specifications."--Publisher description.

This edition is based on the work of NCHRP project 20-7, task 262 and updates the 2nd (1999) edition -- P. ix.

TRB's National Cooperative Highway Research Program (NCHRP) Report 655: Recommended Guide Specification for the Design of Externally Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements examines a recommended guide specification for the design of externally bonded Fiber-Reinforced Polymer (FRP) systems for the repair and strengthening of concrete bridge elements. The report addresses the design requirements for members

subjected to different loading conditions including flexure, shear and torsion, and combined axial force and flexure. The recommended guide specification is supplemented by design examples to illustrate its use for different FRP strengthening applications.

Over 140 experts, 14 countries, and 89 chapters are represented in the second edition of the Bridge Engineering Handbook. This extensive collection highlights bridge engineering specimens from around the world, contains detailed information on bridge engineering, and thoroughly explains the concepts and practical applications surrounding the subject. Published in five books: Fundamentals, Superstructure Design, Substructure Design, Seismic Design, and Construction and Maintenance, this new edition provides numerous worked-out examples that give readers step-by-step design procedures, includes contributions by leading experts from around the world in their respective areas of bridge engineering, contains 26 completely new chapters, and updates most other chapters. It offers design concepts, specifications, and practice, as well as the various types of bridges. The text includes over 2,500 tables, charts, illustrations, and photos. The book covers new, innovative and traditional methods and practices; explores rehabilitation, retrofit, and maintenance; and examines seismic design and building materials. The fourth book, Seismic Design contains 18 chapters, and covers seismic bridge analysis and design. What’s New in the Second Edition: Includes seven new chapters: Seismic Random Response Analysis, Displacement-Based Seismic Design of Bridges, Seismic Design of Thin-Walled Steel and CFT Piers, Seismic Design of Cable-Supported Bridges, and three chapters covering Seismic Design Practice in California, China, and Italy Combines Seismic Retrofit Practice and Seismic Retrofit Technology into one chapter called Seismic Retrofit Technology Rewrites Earthquake Damage to Bridges and Seismic Design of Concrete Bridges chapters Rewrites Seismic Design Philosophies and Performance-Based Design Criteria chapter and retitles it as Seismic Bridge Design Specifications for the United States Revamps Seismic Isolation and Supplemental Energy Dissipation chapter and retitles it as Seismic Isolation Design for Bridges This text is an ideal reference for practicing bridge engineers and consultants (design, construction, maintenance), and can also be used as a reference for students in bridge engineering courses.

Recent surveys of the U.S. infrastructure‘s condition have rated a staggering number of bridges structurally deficient or functionally obsolete. While not necessarily unsafe, a structurally deficient bridge must be posted for weight and have limits for speed, due to its deteriorated structural components. Bridges with old design features that canno

Up-to-date coverage of bridge design and analysis—revised to reflect the fifth edition of the AASHTO LRFDspecifications Design of Highway Bridges, Third Edition offers detailedcoverage of engineering basics for the design of short-andmedium-span bridges. Revised to conform with the latest fifthedition of the American Association of State Highway

andTransportation Officials (AASHTO) LRFD Bridge DesignSpecifications, it is an excellent engineering resource for bothprofessionals and students. This updated edition has beenreorganized throughout, spreading the material into twenty shorter,more focused chapters that make information even easier to find andnavigate. It also features: Expanded coverage of computer modeling, calibration of servicelimit states, rigid method system analysis, and concrete shear Information on key bridge types, selection principles, andaesthetic issues Dozens of worked problems that allow techniques to be appliedto real-world problems and design specifications A new color insert of bridge photographs, including examples ofhistorical and aesthetic significance New coverage of the "green" aspects of recycled steel Selected references for further study From gaining a quick familiarity with the AASHTO LRFDspecifications to seeking broader guidance on highway bridgedesign—Design of Highway Bridges is the one-stop, readyreference that puts information at your fingertips, while alsoserving as an excellent study guide and reference for the U.S.Professional Engineering Examination.

This manual is intended to provide a technical resource for bridge engineers responsible for seismic analysis and design. It serves as a reference manual for use with the 5-day National Highway Institute (NHI) 130093 course “LRFD Seismic Analysis and Design of Bridges”, and the 3-day 130093A course “Displacement-Based LRFD Seismic Analysis and Design of Bridges”. The manual covers fundamental topics such as engineering seismology; seismic and geotechnical hazards; structural dynamics (Single-Degree-of-Freedom (SDOF) and Multiple-Degree-of-Freedom (MDOF)); and methods for modeling and analyzing bridges subject to earthquake ground motions. It also presents the principles of capacity design; applications of capacity design to piers, foundations, superstructures and connections; and discusses the requirements and recommendations of the seismic provision in each of the AASHTO LRFD Bridge Design Specifications and AASHTO Guide Specifications for LRFD Seismic Bridge Design, and their common features. Lastly, the manual addresses seismic isolation design in accordance with AASHTO Guide Specifications for Seismic Isolation Design, and retrofitting strategies in accordance with the 2006 Federal Highway Administration (FHWA) Seismic Retrofitting Manual for Highway Structures.