



Bridge Design and Load Rating in accordance with the AASHTO LRFD & LRFR Bridge Specifications

May 8-10, 2007
Honolulu, Hawaii

Course Description

This three-day bridge design seminar is sponsored by the Federal Highway Administration and the Hawaii Department of Transportation. It will provide an overview of the current AASHTO Load and Resistance Factor Design (LRFD), Load and Resistance Factor Rating (LRFR), and LRFD seismic design provisions.

The seminar is intended to assist bridge engineers comprehend and implement state-of-the-art design methodologies for concrete bridge design and rating. It will highlight key design steps for concrete superstructure including decks and girders. It will focus on the unified method of design for reinforced and prestressed concrete, sectional shear design utilizing modified compression field theory, and strut-and-tie method for disturbed regions. The seminar will also include an overview of the latest AASHTO LRFR load rating procedures and practices as they relate to concrete bridges. Finally, the seminar, will provide an overview of current and forthcoming LRFD seismic design provisions utilizing the latest seismic knowledge and most current USGS seismic hazard maps.

Why Attend?

Beginning October 2007, all bridges must be designed utilizing the AASHTO LRFD Bridge Design Specifications. The Hawaii Department of Transportation has transitioned to the LRFD design specifications and requires all bridges be designed and rated in accordance with the LRFD & LRFR Specifications. This seminar will provide an overview of LRFD and LRFR for the participants that are not familiar with these specifications, and will provide the latest LRFD & LRFR changes for those who are familiar with these specifications.

CEUs and PDHs

Participants will receive a certificate verifying attendance in bridge design and rating training with equivalence of 2.05 CEUs (20.5 PDHs) upon completion of the seminar.

Registration Fee

The course is free of charge to those attending, but is offered on a 'reservation-only' basis and limited to seats availability.



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Course Location

University of Hawaii, Manoa
East-West Center
Jefferson Hall, Keoni Auditorium
Honolulu, Hawaii

Seminar Agenda

Day 1 Tuesday, May 8, 2007

- 8:00 am Registration
- 8:30 am Welcome and Introductions
- 8:45 am Overview of LRFD – Dr. Firas Ibrahim, FHWA
- 9:45 am Live Load Distribution – Mr. Thomas Saad, FHWA
- 10:45 am Break
- 11:00 am Unified Concrete Design and Other New Concepts – Dr. Shri Bhide, PCA
- 12:00 noon Lunch (on-your-own)
- 1:00 pm Deck Design – Thomas Saad, FHWA
- 2:00 pm Sectional Shear Design, Modified Compression Field Theory and others – Dr. Shri Bhide, PCA
- 3:00 am Break
- 3:15 pm Concrete Girder Design Example – Mr. Thomas Saad, FHWA
- 4:00 pm Q&A on Day 1 -- All
- 4:30 pm Adjourn

Day 2 Wednesday, May 9, 2007

- 8:00 am Strut and Tie Method for Disturbed Regions – Dr. Firas Ibrahim, FHWA
- 8:50 am Strut and Tie Design Example – Dr. Shri Bhide, PCA
- 9:40 am LRFD Resources, Training Aids and Software – Dr. Shri Bhide, PCA
- 10:00 am Break
- 10:20 am Introduction and FHWA's perspective of LRFD specs – Dr. Firas Ibrahim, FHWA
- 10:30 am Introduction to current AASHTO Seismic Design Provisions – Mr. Derrell Manceaux, FHWA
- 12:00 noon Lunch (on-your-own)
- 1:00 pm Proposed LRFD Seismic Design Provisions (Force Based) – Mr. Derrell Manceaux, FHWA



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- 2:00 pm Proposed Guide Specification for Seismic Design, Displacement Based Provisions – Mr. Derrell Manceaux, FHWA
- 2:15 pm Break
- 2:45 pm Proposed Guide Specification for Seismic Design, Displacement Based Provisions (cont'd)
- 4:00 pm Q&A on Day 2 - All
- 4:30 pm Adjourn

Day 3 Thursday, May 10, 2007

- 8:00 am Introduction and FHWA's perspective of LRFR – Dr. Firas Ibrahim, FHWA
- 8:10 am Introduction to LRFR – Mr. Bala Sivakumar, LCE
- 9:00 am Load Models for Structural Evaluation - Mr. Bala Sivakumar, LCE
- 10:00 am Break
- 10:15 am Limit States and Reliability Indices for Load Rating - Mr. Bala Sivakumar, LCE
- 12:00 noon Lunch (on-your-own)
- 1:00 pm Load Rating Equation and Process - Mr. Bala Sivakumar, LCE
- 2:15 pm Break
- 2:30 pm Load and Resistance Factors for Rating - Mr. Bala Sivakumar, LCE
- 3:30 pm P/S Girder Load Rating Example
- 4:00 pm Q&A on Day 3 - All
- 4:30 pm Adjourn

Instructor Bios:

Shri B. Bhide, SE, PE, PhD, is Manager of the Bridge Program at the Portland Cement Association. Shri has over twenty years of professional experience in bridge and building structural engineering. He is a Fellow of ACI and is active in TRB's Committee A2C03 – Concrete Bridges, PCI's Bridge, and Bridge Producers' committees, PTI's committee on Bridges, and ACI's technical committees 343 – Bridge Design and 365 – Service Life Prediction. He has co-authored a couple of publications on LRFD design and has presented concrete bridge design seminars at TRB, and at several state DOT and consulting engineers' offices. He is the chair of the National Concrete Bridge Council and serves on the editorial committees of the HPC Bridge Views newsletter and the Aspire magazine. He is a registered Structural Engineer in the State of Illinois, and a registered Professional Engineer in the States of Illinois, Wisconsin, and Ohio.
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Derrell Manceaux, P.E. is a licensed Professional Engineer in Colorado and a senior bridge engineer in the FHWA Resource Center in Denver, Colorado. He has been with the Federal Highway Administration for 23 years and spent 19 years as a designer and Team Leader with the FHWA, Federal Lands Highway Division.



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Derrell has designed numerous structure types over most of the United States and has a special interest in designing structures in high seismic areas. He has been providing seismic workshops throughout the country. Derrell is an Ex-officio member of the AASHTO T3 committee who has been reviewing the seismic specifications currently being developed. He has provided technical assistance to several agencies in seismic related work including design and analysis concerns. Derrell has served on several teams to assess major structures for vulnerable components throughout the country. He holds a BS from the University of Tennessee, ME from the University of Tennessee, and MS from the University of California Berkeley specializing in seismic design and analysis.

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Thomas K. Saad, PE, is a Structural Design Engineer with the Federal Highway Administration in the Resource Center in Chicago, Illinois. He received a Bachelor of Technology in Civil Engineering from Michigan State University and a Master of Science in Civil Engineering degree from the Georgia Institute of Technology. Tom has served as a Structural Engineer with the FHWA for 21 years and has been involved in the design and construction of bridge projects across the nation. He is responsible for aiding State Highway Agencies in the implementation of LRFD and has worked on the development of numerous training aids and courses illustrating the LRFD design process. He is a registered Professional Engineer in the State of Indiana.

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Firas I Sheikh Ibrahim, PhD, PE, is the Senior Codes and Specifications for the Federal Highway Administration in Washington D.C. He serves as the Assistant Secretary for The AASHTO Subcommittee on Bridges and Structures and is a member of several national executive, oversight, and technical committees and task forces responsible for the development of technical guidelines and specifications for bridges. Dr. Ibrahim is responsible for policy making, research, development, training and deployment activities related to bridge codes and specifications. He has provided technical expert design and construction assistance on numerous transportation projects in most states. He has presented numerous seminars and workshops for professionals on the design and construction of bridges.

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Bala Sivakumar, P.E., M.ASCE, is the Chief Engineer for Lichtenstein Consulting Engineers and has directed many of the firm's major bridge design, rehabilitation and evaluation projects in various states. He was the primary author of the recently adopted AASHTO Guide Manual for Load and Resistance Factor Rating of Highway Bridges, developed to be consistent with the AASHTO LRFD Bridge Design Specifications. In 2005 AASHTO approved a resolution to update the LRFR Manual and adopt it as the new "*Manual for Bridge Evaluation*" to replace the "1994 AASHTO Manual for Condition Evaluation of Bridges". Mr. Sivakumar was selected by AASHTO to prepare this new Manual, which was completed this year. He recently assisted Oregon DOT in their recalibration of LRFR live load factors using Oregon WIM data and in their State-wide implementation of LRFR. He served as the Principal Investigator of NCHRP Project 12-63 that proposed revisions to AASHTO rating loads and legal loads for posting and is currently the Principal Investigator for NCHRP 12-76 that will develop protocols for collecting and using weigh-in-motion data in AASHTO LRFD bridge design. He has conducted LRFD and LRFR training courses for several States. He is frequently invited to make technical presentations to the AASHTO Bridge Sub-Committees during their annual meetings. Mr. Sivakumar served as an Associate Editor of ASCE Journal of Bridge Engineering and has authored many technical articles.