



COURSE NUMBER

FHWA-NHI-130053

COURSE TITLE

Bridge Inspection Refresher Training

The major goals of this course are to refresh the skills of practicing bridge inspectors in fundamental visual inspection techniques; review the background knowledge necessary to understand how bridges function; communicate issues of national significance relative to the nation's bridge infrastructures; re-establish proper condition and appraisal rating practices; and review the professional obligations of bridge inspectors.

This course is based on the "Bridge Inspector's Reference Manual," 2002 (updated in 2006) with reference to the "AASHTO Manual for the Condition Evaluation of Bridges," 2000, with interims, the "FHWA Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges," 1995, including 2003/2004 errata sheet, and the "AASHTO Guide for CoRe (Commonly Recognized) Structural Elements," 1998, with interims.

Core course topics include tri-axial constraint, inspector qualifications and duties, record keeping and documentation, structure inventory and appraisal overview, National Bridge Inventory (NBI) standard component ratings, element level ratings, safety, component case studies for decks, superstructures, substructures, and channels, and a virtual bridge inspection classroom exercise.

Optional topics include bridge mechanics, superstructure type identification, inspection techniques, fatigue and fracture in steel bridges, traffic safety features, bridge site signing, and culverts.

Host agencies desiring additional information on selection of optional topics and options for addressing NBI rating methods and element level data collection should contact Sean Patrick of Infrastructure Engineers at (412) 257-2898.

OUTCOMES

Upon completion of the training, participants will be able to:

- Identify and document inspection observations using standard methods
- Evaluate defects based on the current AASHTO Manual for Condition Evaluation of Bridges
- Code NBI bridge components using the FHWA Recording and Coding Guide
- Code element level bridge data in accordance with the AASHTO Guide for CoRe (Commonly Recognized) Structural Elements

TARGET AUDIENCE

Federal, State, and local agencies and private sector personnel employed in inspecting bridges or managing bridge inspection programs. Participants must have completed prior comprehensive bridge inspection training, or meet the criteria for a bridge inspector under the State's procedures or requirements.

TRAINING LEVEL: Intermediate

FEE: \$420 Per Person

LENGTH: 3.0 DAYS (CEU: 1.8 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Thomas Everett • (202) 366-4675 • thomas.everett@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



COURSE NUMBER

FHWA-NHI-130054

COURSE TITLE

Engineering Concepts for Bridge Inspectors

This course provides knowledge of the elementary concepts in bridge engineering that are needed by bridge inspectors. Materials, material properties, bridge components and details, loadings, stresses and strains, and deterioration of bridge materials and members are covered. The course concludes with an examination reviewing key elements of bridge engineering.

This course prepares technicians and other personnel who have a limited knowledge of bridge engineering for a more intensive course in bridge inspection, such as the 2-week course FHWA-NHI-130055 Safety Inspection of In-Service Bridges.

OUTCOMES

Upon completion of the training, participants will be able to:

- Identify common bridge types, recognize and name the typical major components and members of a highway bridge, and also the members and features unique to bridges such as trusses, arches, cable-stayed and suspension spans
- Name the common materials used in bridges and describe the basic properties, strengths, and weaknesses of each
- Discuss the basic concepts of elasticity of materials, response of materials and structural members to a variety of loadings, and the relationship between stresses and strains
- Describe the various types of deterioration of the common structural materials that result from weathering, loading, etc.
- Recognize the more common signs of material distress such as steel corrosion and cracking and concrete cracking, spalling and scaling
- Name the secondary elements and features of bridges such as joints, railings, scuppers, etc., and describe the proper role of each in the performance of a bridge
- Demonstrate knowledge of bridges, bridge components, material properties, and mechanics of materials to prepare to take a comprehensive course on bridge inspection

TARGET AUDIENCE

Federal, State, and local technicians, inspectors, and engineers with basic experience relating to highway bridges. Individuals completing this course could serve on a bridge inspection team, but would require additional experience and training to qualify as team leaders.

TRAINING LEVEL: Beginner

FEE: \$670 Per Person

LENGTH: 5.0 DAYS (CEU: 3.0 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Thomas Everett • (202) 366-4675 • thomas.everett@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



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COURSE NUMBER

FHWA-NHI-130055

COURSE TITLE

Safety Inspection of In-Service Bridges

This course is based on the "Bridge Inspector's Reference Manual" and provides training on the safety inspection of in-service highway bridges. Satisfactory completion of this course will fulfill the training requirements of the National Bridge Inspection Standards (NBIS) for a comprehensive training course.

Mid-term and final examinations based on course content will be administered to participants. The sponsoring agency/ State may monitor the examinations and retain the scores to qualify or certify bridge inspectors. The sponsoring agency is responsible for grading the examinations. An answer key will be provided.

OUTCOMES

Upon completion of the training, participants will be able to:

- Evaluate a variety of bridges and determine the critical areas for inspection, including fatigue-prone details, and common points of deterioration and/or distress
- Review as-built plans and previous inspection reports and, based on this review, plan and conduct an effective safety inspection for common bridge types and bridge-length culverts
- Provide documentation of defects in various materials and of bridge configurations
- Recognize the need to inspect the underwater portions of bridge structures, describe the types of deficiencies to look for (e.g., scour), determine when an inspection is necessary, and identify the procedures and types of equipment available and the advantages and limitations of each
- Evaluate the severity of material deterioration and member distress and assign ratings according to coding guidance as developed by FHWA and/or the State highway agency.
- Determine when it is necessary to close the bridge (or recommend closure) because of imminent danger
- Discuss the equipment requirements for a complete inspection and demonstrate proficiency
- Recognize when further inspection, such as nondestructive testing (NDT), is required beyond the usual visual and hand tool inspection and decide what type of further inspection should be conducted

TARGET AUDIENCE

Federal, State, and local highway agency employees involved in inspecting bridges or in charge of a bridge inspection unit. A background in bridge engineering or completion of NHI course FHWA-NHI-130054 Engineering Concepts for Bridge Inspectors is strongly recommended.

TRAINING LEVEL: Intermediate

FEE: \$1,400 Per Person

LENGTH: 10.0 DAYS (CEU: 6.0 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Thomas Everett • (202) 366-4675 • thomas.everett@fhwa.dot.gov

NHI Training Program Manager: Jerome A Dimaggio • (202) 366-1569 • jerry.dimaggio@fhwa.dot.gov



COURSE NUMBER

FHWA-NHI-130069

COURSE TITLE

Hazardous Bridge Coatings: Design and Management of Maintenance and Removal Operations

The focus of this training course is on the maintenance or removal of bridge paint systems that contain lead or other potentially toxic materials. In compliance with applicable regulations, the course offers a step-by-step method for the design, specification, and management of bridge painting projects.

The classroom presentation includes a combination of lectures and discussions, demonstrations of key methods and procedures, and workshops. In addition, each participant receives a field guide containing a detailed project design checklist, a model/template specification, a suggested contractor pre-qualification package, and a pre-bid meeting agenda, a submittal review checklist, as well as an environmental, health, and safety checklist.

OUTCOMES

Upon completion of the training, participants will be able to:

- Recognize the health hazards and legal risks associated with paint containing lead and the impacts on bridge painting programs
- Use coating assessment surveys to maximize the service life of individual coating systems and improve the cost-effectiveness of an overall bridge painting program
- Select appropriate combinations of removal methods and containment systems based upon the chosen painting strategy and the relative risks of the paint disturbance operation to workers, the public, and the environment
- Implement a monitoring program that adequately demonstrates that associated risks have been controlled
- Establish performance standards to protect workers, reduce long-term liabilities associated with hazardous wastes, and document successful clearance of project sites
- Prepare clear, well-organized, performance-based, project-specific specifications that establish objective goals for all areas of contract performance but leave the means and methods of construction to the contractor
- Use available tools to help pre-qualify contractors, conduct effective pre-bid meetings, review contractor submittals, and enforce project specifications

TARGET AUDIENCE

Highway and transportation agency employees and private industry personnel who are responsible for development of contract specifications and procurement requirements for the removal and/or maintenance of bridge paint systems. Training is also applicable to managers who are responsible for procurement approval and for other personnel involved in such operations.

TRAINING LEVEL: Intermediate

FEE: \$550 Per Person

LENGTH: 4.0 DAYS (CEU: 2.4 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 28

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Larry O'Donnell • (708) 283-3502 • lodonnell@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



COURSE NUMBER

FHWA-NHI-130078

COURSE TITLE

Fracture Critical Inspection Techniques for Steel Bridges

The course curriculum reflects current practices and addresses new and emerging technologies available to bridge inspectors. In addition, the course includes exemplary training and hands-on workshops for popular types of nondestructive testing (NDT) equipment and a case study for the preparation of an inspection plan for a fracture critical bridge.

The first day of the course focuses on the concept of fracture critical members (FCMs), FCM identification, failure mechanics, and fatigue in metal. These fundamentals are followed by an overview of NDT methods. Day two provides demonstration sessions and hands-on applications of NDT techniques for dye penetrant, magnetic particle testing, Eddy current, and ultrasonic testing. Days three and four emphasize inspection procedures and reporting for common FCMs, including problematic details, I-girders, floor beams, trusses, box girders, pin and hanger assemblies, arch ties, eyebars, and cross girders/pier caps. A case study of the preparation of an inspection plan of a fracture critical bridge closes out the presentation. The course includes daily participant assignments. The schedule can be tailored to specific agency requirements.

OUTCOMES

Upon completion of the training, participants will be able to:

- Identify fracture critical bridges, fracture critical bridge members, and fatigue prone details
- Categorize contributing factors in the initiation and propagation of fatigue cracks
- Perform an intensive, in-depth, and thorough fracture critical member inspection
- Identify various crack types and assess their impact on the performance of the member
- Evaluate, select, and facilitate the use of available NDT methods
- Recommend a necessary course of action based on inspection findings

TARGET AUDIENCE

Those benefiting most from this training will be public and private-sector bridge inspectors, supervisors, project engineers, maintenance engineers, shop inspectors, shop foreman, and others responsible for shop fabrication and field inspection of fracture critical steel bridge members. Participants should have completed NHI course FHWA-NHI-130054 Engineering Concepts for Bridge Inspectors and/or FHWA-NHI-130055 Safety Inspection of In-Service Bridges, or possess equivalent field experience relative to bridges to fully understand bridge mechanics and bridge safety inspection procedures as required by the National Bridge Inspection Standards.

TRAINING LEVEL: Intermediate

FEE: \$480 Per Person

LENGTH: 3.5 DAYS (CEU: 2.1 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Thomas Everett • (202) 366-4675 • thomas.everett@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



We'd love to hear from you! One way to submit feedback is by clicking "Contact Us" on any NHI Web site page.



COURSE NUMBER

FHWA-NHI-130079

COURSE TITLE

Bridge Coatings Inspection

This training course focuses on inspection of surface preparation and application of protective coating systems for bridge and highway structures, including navigation through the State's painting specification. The course provides a basic overview of the theory of corrosion and its control, the characteristics of various bridge coating types, as well as surface preparation and coating application techniques and equipment. Sessions on understanding coating specifications and diagnosing premature coating failures are also included.

The classroom presentation includes a combination of lectures and discussions, demonstrations of surface preparation, coating application and inspection equipment, and hands-on workshops.

OUTCOMES

Upon completion of the training, participants will be able to:

- Define the components of a corrosion cell and the methods in which protective coatings inhibit the corrosion process
- Describe the components of an industrial coating, the four basic curing mechanisms, and the advantages and limitations of protective coatings systems for bridge and highway structures
- Identify methods for surface preparation and describe the advantages and limitations of each
- Interpret SSPC and NACE surface preparation specifications
- Use coating manufacturers' product data sheets to ensure proper coating mixing, thinning, and application
- Identify methods of coating application and describe the advantages and limitations of each
- Describe the importance of quality assurance inspection of surface preparation and coating application operations on bridge structures
- Calibrate and use coatings inspection gauges and industry standards
- Describe the content of a pre-job conference
- Describe the basic format and content of a painting specification and identify the key items in the State's painting specification and/or special provisions
- Describe quality assurance documentation procedures
- Identify coating maintenance options and determine the overcoatability of an existing coating system
- Identify the causes of premature coating failures, methods of prevention, and resolution
- Recognize basic safety hazards associated with inspection of protective coatings
- Describe the basic controls used to help prevent environmental contamination during surface preparation and coating application operations

TARGET AUDIENCE

Highway and transportation agency employees and private industry personnel who are responsible for the onsite inspection of protective coating systems during their installation by outside painting contractors or by State personnel. Training is also applicable to management and bridge inspection supervisory personnel.

TRAINING LEVEL: Beginner

FEE: \$550 Per Person

LENGTH: 4.0 DAYS (CEU: 2.4 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Larry O'Donnell • (708) 283-3502 • lodonnell@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



COURSE NUMBER

FHWA-NHI-130081

COURSE TITLE

LRFD for Highway Bridge Superstructures - Concrete (2-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD), including the approved 2005 and 2006 Interims.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of concrete superstructures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive design manual, FHWA Publication No. FHWA NHI 06-001, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. Preliminary design concepts for prestressed concrete superstructures
2. Pretensioned concrete I-girder design
3. Continuous pretensioned concrete I-girder design
4. Staged construction of prestressed concrete girder bridges
5. Bearing design

OUTCOMES

Upon completion of the training, participants will be able to:

- Describe the concrete bridge superstructure design and construction process in accordance with the AASHTO LRFD specifications
- Identify the application of appropriate AASHTO LRFD specification articles dealing with selection of bridge type, size, and location; bridge economics; concrete bridge superstructure design; and bearings selection and design
- Demonstrate the use of the AASHTO LRFD specification requirements for concrete superstructure design through the completion of step-by-step procedures, student exercises, and design examples
- Successfully complete applicable learning outcome assessments with a combined score of 70 percent or higher

TARGET AUDIENCE

This course has been developed for the needs of practicing public and private sector structural and bridge engineers with 1-10 years of experience. The primary audience is agency and consultant structural designers.

Pre-training Competencies:

Individuals attending this course should have a minimum BSCE degree and have a working knowledge of the AASHTO LRFD or the "AASHTO Standard Specifications for Highway Bridges," and have relevant design experience using either of these specifications on at least one bridge superstructure.

TRAINING LEVEL: Intermediate

FEE: \$320 Per Person

LENGTH: 2.0 DAYS (CEU: 1.2 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firmas.ibrahim@dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



If you're interested in this course, you may also want to take advantage of other NHI structures courses.

FHWA-NHI-123012 Soil and Foundations Workshop - Geotechnical and Materials

FHWA-NHI-132014 Drilled Shafts

FHWA-NHI-132021 Driven Pile Foundations - Design and Construction

FHWA-NHI-132040 Geotechnical Aspects of Pavements - Geotechnical and Materials

FHWA-NHI-132042 Design of MSEW and RSS

FHWA-NHI-132078 Micropile Design and Construction



COURSE NUMBER

FHWA-NHI-130081A

COURSE TITLE

LRFD for Highway Bridge Superstructures - Steel (2-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD), including the approved 2005 and 2006 Interims.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of steel superstructures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive design manual, FHWA Publication No. FHWA NHI 06-001, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. Preliminary design concepts for steel superstructures
2. Steel I-girder design (including miscellaneous steel detail design)
3. Bearing design

OUTCOMES

Upon completion of the training, participants will be able to:

- Describe the steel bridge superstructure design and construction process in accordance with the AASHTO LRFD specifications
- Identify the application of appropriate AASHTO LRFD specification articles dealing with selection of bridge type, size, and location; bridge economics; steel bridge superstructure design; and bearings selection and design
- Demonstrate the use of the AASHTO LRFD specification requirements for steel superstructure design through the completion of step-by-step procedures, student exercises, and design examples
- Successfully complete applicable learning outcome assessments with a combined score of 70 percent or higher

TARGET AUDIENCE

This course has been developed for the needs of practicing public and private sector structural and bridge engineers with 1-10 years of experience. The primary audience is agency and consultant structural designers.

Pre-training Competencies:

Individuals attending this course should have a minimum BSCE degree and have a working knowledge of the AASHTO LRFD or the "AASHTO Standard Specifications for Highway Bridges," and have relevant design experience using either of these specifications on at least one bridge superstructure.

TRAINING LEVEL: Beginner

FEE: \$320 Per Person

LENGTH: 2.0 DAYS (CEU: 1.2 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firmas.ibrahim@dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



COURSE NUMBER

FHWA-NHI-130081B

COURSE TITLE

LRFD for Highway Bridge Superstructures - Concrete (2.5-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD), including the approved 2005 and 2006 Interims.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of concrete superstructures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive design manual, FHWA Publication No. FHWA NHI 06-001, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. General superstructure design considerations
2. Preliminary design concepts for prestressed concrete superstructures
3. Pretensioned concrete I-girder design
4. Continuous pretensioned concrete I-girder design
5. Staged construction of prestressed concrete girder bridges
6. Bearing design

OUTCOMES

Upon completion of the training, participants will be able to:

- Describe the concrete bridge superstructure design and construction process in accordance with the AASHTO LRFD specifications
- Identify the application of appropriate AASHTO LRFD specification articles dealing with selection of bridge type, size, and location; bridge economics; evolution of bridge design codes; bridge loads and load combinations; structural analysis; deck design; concrete bridge superstructure design; and bearings selection and design
- Demonstrate the use of the AASHTO LRFD specification requirements for concrete superstructure design through the completion of step-by-step procedures, student exercises, and design examples
- Successfully complete applicable learning outcome assessments with a combined score of 70 percent or higher

TARGET AUDIENCE

This course has been developed for the needs of practicing public and private sector structural and bridge engineers with 1-10 years of experience. The primary audience is agency and consultant structural designers.

Pre-training Competencies:

Individuals attending this course should have a minimum BSCE degree, and have a working knowledge of the AASHTO LRFD or the "AASHTO Standard Specifications for Highway Bridges," and have relevant design experience using either of these specifications on at least one bridge superstructure.



TRAINING LEVEL: Intermediate

FEE: \$395 Per Person

LENGTH: 2.5 DAYS (CEU: 1.5 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firas.ibrahim@dot.gov

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If you're interested in this course, you may also want to take advantage of other NHI structures courses.

FHWA-NHI-123012 Soil and Foundations Workshop - Geotechnical and Materials

FHWA-NHI-132014 Drilled Shafts

FHWA-NHI-132021 Driven Pile Foundations - Design and Construction

FHWA-NHI-132040 Geotechnical Aspects of Pavements - Geotechnical and Materials

FHWA-NHI-132042 Design of MSEW and RSS

FHWA-NHI-132078 Micropile Design and Construction



COURSE NUMBER

FHWA-NHI-130081C

COURSE TITLE

LRFD for Highway Bridge Superstructures - Steel (2.5-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD), including the approved 2005 and 2006 Interims.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of steel superstructures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive design manual, FHWA Publication No. FHWA NHI 06-001, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. General superstructure design considerations
2. Preliminary design concepts for steel superstructures
3. Steel I-girder design (including miscellaneous steel detail design)
4. Bearing design

OUTCOMES

Upon completion of the training, participants will be able to:

- Describe the steel bridge superstructure design and construction process in accordance with the AASHTO LRFD specifications
- Identify the application of appropriate AASHTO LRFD specification articles dealing with selection of bridge type, size, and location; bridge economics; evolution of bridge design codes; bridge loads and load combinations; structural analysis; deck design; steel bridge superstructure design; and bearings selection and design
- Demonstrate the use of the AASHTO LRFD specification requirements for steel superstructure design through the completion of step-by-step procedures, student exercises, and design examples
- Successfully complete applicable learning outcome assessments with a combined score of 70 percent or higher

TARGET AUDIENCE

This course has been developed for the needs of practicing public and private sector structural and bridge engineers with 1-10 years of experience. The primary audience is agency and consultant structural designers.

Pre-training Competencies:

Individuals attending this course should have a minimum BSCE degree, have a working knowledge of the AASHTO LRFD or the "AASHTO Standard Specifications for Highway Bridges," and have relevant design experience using either of these specifications on at least one bridge superstructure.

TRAINING LEVEL: Intermediate

FEE: \$395 Per Person

LENGTH: 2.5 DAYS (CEU: 1.5 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firas.ibrahim@dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



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COURSE NUMBER

FHWA-NHI-130081D

COURSE TITLE

LRFD for Highway Bridge Superstructures - Steel and Concrete (4.5-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD), including the approved 2005 and 2006 Interims.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of steel and concrete superstructures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive design manual, FHWA Publication No. FHWA NHI 06-001, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. General superstructure design considerations
2. Preliminary design concepts for steel superstructures
3. Steel I-girder design (including miscellaneous steel detail design)
4. Preliminary design concepts for prestressed concrete superstructures
5. Pretensioned concrete I-girder design
6. Continuous pretensioned concrete I-girder design
7. Staged construction of prestressed concrete girder bridges
8. Bearing design

OUTCOMES

Upon completion of the training, participants will be able to:

- Describe the bridge superstructure design and construction process in accordance with the AASHTO LRFD specifications
- Identify the application of appropriate AASHTO LRFD specification articles dealing with selection of bridge type, size, and location; bridge economics; evolution of bridge design codes; bridge loads and load combinations; structural analysis; deck design; concrete bridge superstructure design; steel bridge superstructure design; and bearings selection and design
- Demonstrate the use of the AASHTO LRFD specification requirements for superstructure design through the completion of step-by-step procedures, student exercises, and design examples
- Successfully complete applicable learning outcome assessments with a combined score of 70 percent or higher

TARGET AUDIENCE

This course has been developed for the needs of practicing public and private sector structural and bridge engineers with 1-10 years of experience. The primary audience is agency and consultant structural designers.

Pre-training Competencies:

Individuals attending this course should have a minimum BSCE degree, have a working knowledge of the AASHTO LRFD or the "AASHTO Standard Specifications for Highway Bridges," and have relevant design experience using either of these specifications on at least one bridge superstructure.

TRAINING LEVEL: Intermediate

FEE: \$695 Per Person

LENGTH: 4.5 DAYS (CEU: 2.7 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firas.ibrahim@dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



If you're interested in this course, you may also want to take advantage of other NHI structures courses.

FHWA-NHI-123012 Soil and Foundations Workshop - Geotechnical and Materials

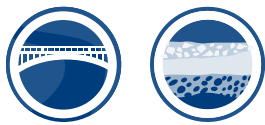
FHWA-NHI-132014 Drilled Shafts

FHWA-NHI-132021 Driven Pile Foundations - Design and Construction

FHWA-NHI-132040 Geotechnical Aspects of Pavements - Geotechnical and Materials

FHWA-NHI-132042 Design of MSEW and RSS

FHWA-NHI-132078 Micropile Design and Construction



COURSE NUMBER

FHWA-NHI-130082B

COURSE TITLE

LRFD for Highway Bridge Substructures and Earth Retaining Structures (4-Day)

This course expands the suite of FHWA services to assist State and local governments in a successful implementation of load and resistance factor design (LRFD). The course promotes the philosophy of the LRFD design platform and establishes the motivation for LRFD as the reassurance that safe design practices are being applied where needed. For structural applications, the curriculum follows the AASHTO "LRFD Bridge Design Specifications," 3rd Edition, 2004 (AASHTO LRFD). However for geotechnical applications, the curriculum follows recent development work on AASHTO LRFD Section 10, Foundations, including the approved 2006 interim specifications.

This course is a combination of Instructor-led discussions and workshop exercises. It includes LRFD theory applied to design examples and illustrates step-by-step LRFD design procedures through a series of detailed process flowcharts. The training includes the extensive use of student exercises and example problems to demonstrate overall design, detailing, and construction principles addressed in the reference materials, and provides hands-on experience in the AASHTO LRFD design and detailing of bridge abutment and pier elements, deep and shallow foundation design, and earth retaining structures. Exercise and example problems are based on components of overall comprehensive bridge design examples using AASHTO LRFD and provide comparisons between ASD, LFD, and LRFD design methods where meaningful.

The curriculum materials are comprised of a comprehensive reference manual, FHWA Publication No. FHWA NHI 05-094, lecture and workshop exercises intended to promote or enhance a working knowledge of the AASHTO LRFD specification, and a participant workbook for lecture notes and exercises.

The curriculum material contains the following major topics:

1. Loads, load distribution, and load combinations
2. Principles of limit state designs
3. Geotechnical spread footing design (soil and rock)
4. Driven pile and drilled shaft design (soil and rock)
5. Substructure design and detailing for a cantilever abutment and hammerhead pier
6. Mechanically stabilized earth walls
7. Precast modular walls
8. Ground anchor wall design

The following course delivery options are available in order to suit the varying levels of participant experience within a given agency.

FHWA-NHI-130082C: 5-Day delivery applicable to substructure and retaining wall design, complete with LRFD fundamentals. Fee \$750 Per Participant (3.0 CEUs)

FHWA-NHI-130082B: 4-Day delivery applicable to substructure design only with no retaining wall design. Fee \$600 Per Participant (2.4 CEUs)

FHWA-NHI-130082A: 3-Day delivery applicable to substructure design only with no LRFD fundamentals and no retaining wall design. Fee \$450 Per Participant (1.8 CEUs)

FHWA-NHI-130082: 1-Day delivery applicable to retaining wall design only with no LRFD fundamentals. Fee \$250 Per Participant (0.6 CEUs)

OUTCOMES

Upon completion of the training, participants will be able to:

- Define AASHTO LRFD limit states and compute structural and geotechnical design loads
- Apply AASHTO LRFD criteria for design
- Integrate the AASHTO LRFD specification provisions into the host agency's current practice
- Integrate the geotechnical aspects of LRFD foundation design into LRFD structural design

TARGET AUDIENCE

The primary target audience for the seminar is mid-level bridge and geotechnical journeymen or mid-level design engineers with one to five years of experience responsible for the structural and/or geotechnical design of bridge substructures and earth retaining structures. The course can accommodate a blend of entry-level designers with college LRFD experience and experienced designers with load factor design (LFD) experience but minimal or no LRFD experience.

TRAINING LEVEL: Intermediate

FEE: \$620 Per Person

LENGTH: 4.0 DAYS (CEU: 2.4 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 40

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Jerry DiMaggio • (202) 366-1569 • jerry.dimaggio@fhwa.dot.gov

Subject Matter Contact: Firas Ibrahim • (202) 366-4598 • firas.ibrahim@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov



NHI training is led by top notch Instructors. See page 258 for more information about the Instructor Certification Program or contact our NHI Instructor Liaison at (703) 235-0010.



COURSE NUMBER

FHWA-NHI-130087

COURSE TITLE

Inspection and Maintenance of Ancillary Highway Structures

This course provides training in the inspection and maintenance of ancillary structures, such as structural supports for highway signs, luminaries, and traffic signals. Its goal is to provide agencies with information to aid in establishing and conducting an inspection program in accordance with the FHWA "Guidelines for the Installation, Inspection, Maintenance, and Repair of Structural Supports for Highway Signs, Luminaries, and Traffic Signals."

OUTCOMES

Upon completion of the training, participants will be able to:

- List and identify common visible weld defects
- Identify appropriate nondestructive testing techniques
- Identify factors that lead to corrosion and explain mitigation methods used in ancillary structures
- Define the severity of observed defects in accordance with the FHWA guidelines
- Identify defects in base/anchor rod installations
- List key issues in construction inspection of ancillary structures
- Identify repair techniques and discuss their use

TARGET AUDIENCE

Structural engineers, material engineers, traffic engineers, field inspectors, construction supervisors, maintenance personnel, and other technical personnel involved in the installation, inspection, maintenance, and repair of ancillary highway structures. This course is not a design course; however, the information should be helpful to those working in design and specification of ancillary structures.

TRAINING LEVEL: Beginner

FEE: \$320 Per Person

LENGTH: 2.0 DAYS (CEU: 1.2 UNITS)

CLASS SIZE: MINIMUM: 20; MAXIMUM: 30

NHI Training Information: (703) 235-0534 • nhitraining@dot.gov

Subject Matter Contact: Tom Everett • (202) 366-4675 • thomas.everett@fhwa.dot.gov

NHI Training Program Manager: Louisa Ward • (703) 235-0523 • louisa.ward@dot.gov