



**NATIONAL HIGHWAY INSTITUTE**  
*Training Solutions for Transportation Excellence*

4600 N. Fairfax Drive Suite 800  
 Arlington, VA 22203  
 Phone: (703) 235-0500 or (877)-558-6873  
 Fax: (703) 235-0593  
[www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov)

<b>Office of Professional Development</b>		<b>HPD-1</b>
Joe Toole	Associate Administrator for Professional Development	(703) 235-0500
Lori Colihan-Young	Administrative Programs Team Leader	(703) 235-0540
Maggie Glesner	Executive Assistant	(703) 235-0519
<b>Policy and Strategic Planning</b>		<b>HPD-10</b>
Clark Martin	Strategic Management and Policy Coordinator	(703) 235-0547
Cameron Ishaq	Strategic Business Planning Analyst	(703) 235-0525
<b>National Highway Institute</b>		<b>NNHI-1</b>
Moges Ayele, Ph.D.	Director, National Highway Institute	(703) 235-0531
Maria Thomas	Executive Assistant	(703) 235-0531
<b>Affiliate Programs</b>		<b>HPD-20</b>
Al Alonzi	Affiliate Programs Team Leader	(703) 235-0552
Juan Aviles	International Exchange Specialist	(703) 235-0521
Roger Dean	Senior International Program Specialist	(703) 235-0550
Dave Grouchy	LTAP	(703) 235-0542
Jon Schans	Affiliate and FasTrack Programs Coordinator	(703) 235-0509
Bill Evans	LTAP Program Manager	(303) 969-5772 x330
<b>Training Programs</b>		<b>NNHI-10</b>
Richard Barnaby	Training Programs Team Leader	(703) 235-0520
Barbara Burden	Budget Analyst	(703) 235-0532
Cara Burke	Business Analyst, Training and Education	(703) 235-0500
Linda Cleveland	Facilities Coordinator	(703) 235-1212
Bud Cribbs	Training Program Manager	(703) 235-0526
Carolyn Eberhard	Senior Adult Learning Specialist	(703) 235-0010
Catherine Flaherty	Distance Learning Specialist	(703) 235-0541
Ewa Flom	Training Program Manager	(703) 235-0524
Debbie Gwaltney	Distance Learning Program Manager	(703) 235-1199
Bert Hayward	Network Engineer	(703) 235-0543
Wendy Jogasurya	Senior Systems Analyst	(703) 235-0546
Larry Jones	Senior Training Program Manager	(703) 235-0523
Aubrey Joseph	Administrative Assistant	(703) 235-0533
Danielle Mathis-Lee	Training Program Coordinator	(703) 235-0528
Sherron Monts	Travel Coordinator	(703) 235-0534
Mila Plosky	Senior Training Program Manager	(703) 235-0527
Nancy Stout	Training Program Marketing Manager	(703) 235-1260
Richard Usmiller	Adult Learning Specialist	(703) 235-0553
Ilse Van Goth	Senior Adult Learning Specialist	(703) 235-0529
Bill Williams	Training Program Manager	(703) 235-0539
<b>Universities and Grants Programs</b>		<b>NNHI-20</b>
Ilene D. Payne, Ph.D.	Director, Universities and Grants Programs	(703) 235-0535
Robin Alford	Program Analyst	(703) 235-0538
Henry Murdaugh	Universities and Grants Programs Team Leader	(703) 235-0536
Camron Ranje	Information/Systems Analyst	(703) 235-0537



January 2004

Dear Customers and Colleagues:

The United States transportation system is critical to the continued growth of the U.S. economy and the American way of life. With transportation demand growing faster than available resources, the transportation community is faced with a major challenge of meeting the needs of the traveling public in a changing environment. Since 1990, the U.S. population has increased by 32 million to 276 million and is expected to be 300 million by 2020. Vehicle miles traveled are growing twice as fast as the population, raising new challenges and issues relating to highway capacity, congestion, land use, and resource utilization. An aging population with a rapidly growing number of drivers over the age of 65 will also require innovations in roadway design and safety. At the same time, as much as 50 percent of the transportation workforce is expected to retire in the next decade, taking with them years of experience that will be difficult to replace.

The increasing transportation demand, an aging workforce and the continuing need for transportation policy and programs that ensure the quality of the environment will require innovative approaches in the planning and management of the Nation's transportation enterprise. Without a skilled, technically competent workforce to effect policy changes and deliver technological innovation, our transportation system will be severely compromised. The National Highway Institute is working hard to help respond to the challenge of preparing the transportation workforce of the future. In order to provide training in a timely fashion, we are streamlining our course development and delivery process to reduce the time it takes from identification of the need for a new course to the actual delivery of the course to our customers.

We also have developed two new initiatives -- FasTrack and Web conferencing. FasTrack is a program for short courses that can be developed in compressed time frames. It will not be a substitute for the more comprehensive regular NHI courses, but will allow us to be more responsive to customer needs by delivering just-in-time information on policy, program and technology changes. We expect to work closely with the new FHWA Technical Service Teams in developing and managing the FasTrack program. Our web conferencing program will allow us to communicate to 70 sites for information programs of generally two hours or less. The short lead time to develop the information program and the ability to provide material in short time frames make web conferencing a valuable tool as a stand alone service or as part of a FasTrack or NHI course program.

Retooling our NHI course development program and initiating our new FasTrack and web conferencing services demonstrate our commitment to meeting our customer needs and making our contributions to closing the transportation demand-supply gap. We are optimistic that these efforts will build on an already successful NHI program that provided 560 training sessions to more than 13,600 participants this past year.

We look forward to another successful year and to working closely with our customers and partners to bring innovation to transportation through effective workforce development.

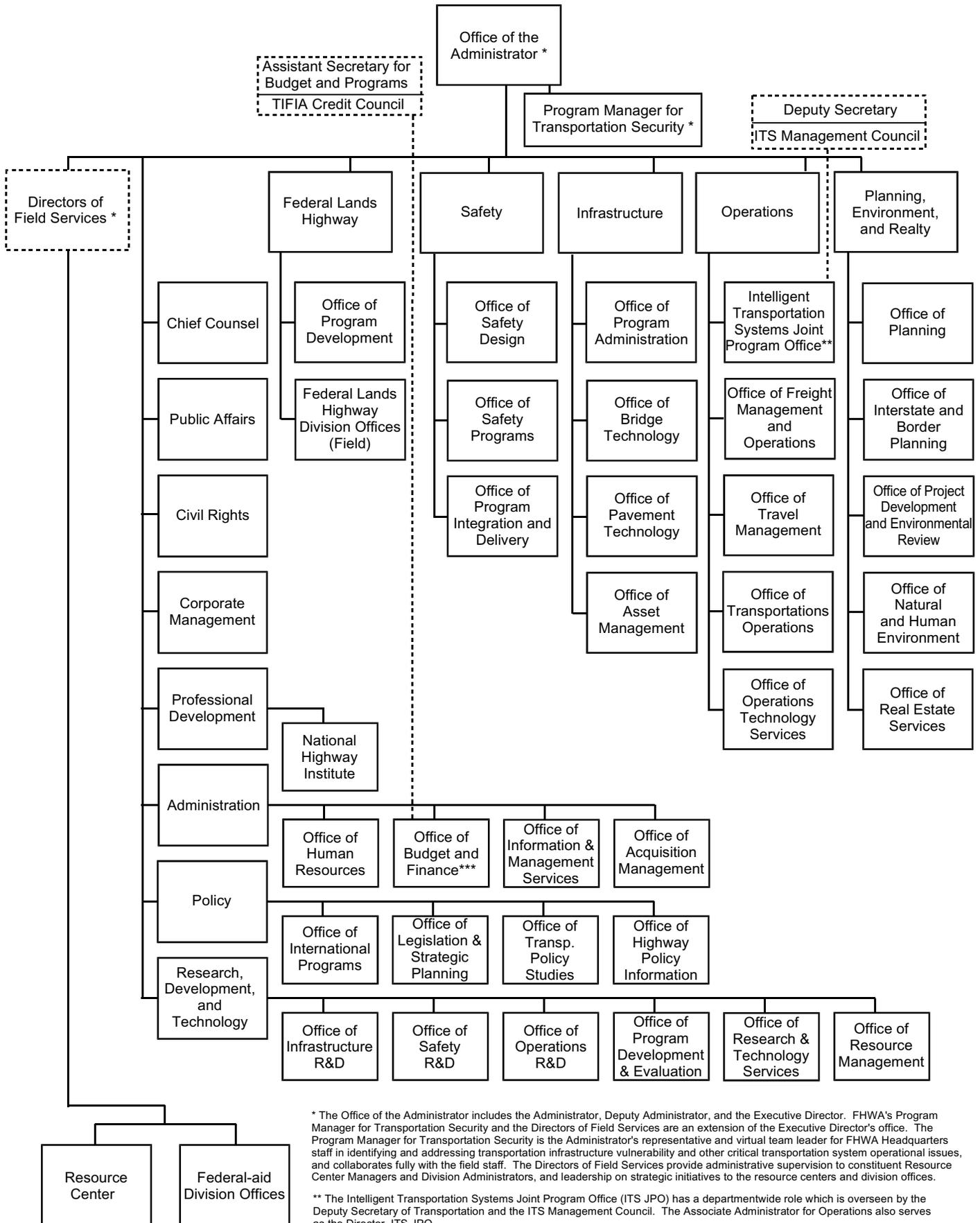
Sincerely,

A handwritten signature in black ink that reads "Moges Ayele".

Moges Ayele, Ph.D.  
Director  
National Highway Institute

# FEDERAL HIGHWAY ADMINISTRATION

Effective September 4, 2002



\* The Office of the Administrator includes the Administrator, Deputy Administrator, and the Executive Director. FHWA's Program Manager for Transportation Security and the Directors of Field Services are an extension of the Executive Director's office. The Program Manager for Transportation Security is the Administrator's representative and virtual team leader for FHWA Headquarters staff in identifying and addressing transportation infrastructure vulnerability and other critical transportation system operational issues, and collaborates fully with the field staff. The Directors of Field Services provide administrative supervision to constituent Resource Center Managers and Division Administrators, and leadership on strategic initiatives to the resource centers and division offices.

\*\* The Intelligent Transportation Systems Joint Program Office (ITS JPO) has a departmentwide role which is overseen by the Deputy Secretary of Transportation and the ITS Management Council. The Associate Administrator for Operations also serves as the Director, ITS JPO.

\*\*\* The Transportation Infrastructure Finance and Innovation Act Joint Program Office (TIFIA JPO), a multi-modal organizational element, is located in FHWA's Office of Budget and Finance. The TIFIA JPO has a departmentwide role which is overseen by the Assistant Secretary for Budget and Programs and the TIFIA Credit Council.



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*The FHWA Core Business Units, Support Offices and Resource Centers routinely provide a wide array of seminars, workshops and technical assistance to stakeholders upon request and as travel funds permit. Many of these are at no cost; others have a nominal fee, collected through NHI. The following is a listing of offerings currently available. Please contact the designated staff member for further information.*

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# NHI Training Courses



## Mathematical Sciences

**Course Number:** 123002A**Course Title:** Scientific Approaches to Transportation Research

Fee	Length
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 20; Maximum 30

The course is expected to be available in Spring 2004.

**Description:**

This course addresses professional and ethical practices for managing, conducting, and evaluating research programs and projects. Participants will learn about the critical elements in the research process, turning research objectives into research hypotheses, testing of the hypotheses and evaluation of the results. The course will look at the scientific method as well as the management and handling of data as it applies to transportation research.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the differences between applied, basic, and development research.
- List the tradeoffs between the risk (cost) and benefits of engaging in research.
- Identify the steps in the research process.
- Identify the steps and sequence of scientific inquiry.
- Discuss issues with experiment design, e.g., types of research investigation and principles of data collection.
- List the key elements of a data management plan.
- Discuss how and why probability distributions are used in statistics.
- Discuss hypothesis testing and Statistical Inference.
- Apply linear regression methods.
- Discuss when and how to apply common nonparametric statistics.

**Target Audience:**

Transportation engineers, research managers and researchers who are involved in the design, development and implementation of transportation research. Participants should have, at a minimum, a limited exposure to basic statistics and research practices.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Peter Kopac	(202) 493-3151	<a href="mailto:peter.kopac@fhwa.dot.gov">peter.kopac@fhwa.dot.gov</a>

## Structures

**Course Number:** 130053A**Course Title:** Bridge Inspection Refresher Training

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course is based on the "Bridge Inspector's Reference Manual." The training provides a review of the National Bridge Inventory (NBI) inspection method and includes discussions on structure inventory items, structure types, and the appropriate codes for Federal Structure, Inventory and Appraisal reporting. The case study-oriented course will employ the host agency's inspection forms to emphasize proper condition and appraisal ratings, and include discussions on fatigue and fracture critical member inspections, and scour and waterway inspection procedures.

CORE COURSE TOPICS are: Review of Structure Inventory Items, Review NBI Coding Rating Guidelines, Condition Coding Exercise, Bridge Load Rating and Analysis, Fatigue and FCM Inspections, Structure Type Identification, Scour & Waterway Inspection, Review Inspector's Responsibilities and Duties.

SUGGESTED OPTIONAL TOPICS (555 minutes total required): Agency Presentation (60 minutes), Pins and Hangers (45 minutes), Eyebars (45 minutes), Team Case Study Number 1 (90 minutes), Culvert Inspection Overview (60 minutes), Team Case Study Number 2 (60 minutes), Coatings (75 minutes), Team Case Study Number 3 (60 minutes) and Team Case Study Number 4 (60 minutes).

OTHER OPTIONAL TOPICS are: Additional Team Case Studies (60 minutes each), Basic Metrication (30 minutes) and Segmental Concrete Box Girder Inspection (30 minutes).

CASE STUDY BRIDGE TYPES are: R1 Steel Truss, R2 Metal Plate Pipe Arch Culvert, R3 CIP Concrete T-Beam, R4 Steel Multi-Beam, R5 4 Span Prestressed I-Beam, R6 Concrete Culvert, R7 Prestressed Adjacent Box Beam and R8 Timber Multi-Beam.

Host agencies interested in using element level data collection procedures for the case studies or additional information on topic options should call Mr. Ray Hartle of Michael Baker Corporation at (412) 269-7905.

**Outcomes:** Upon completion of the course, participants will be able to:

- Approach bridge safety inspection, condition rating, appraisal, and data collection in a uniform manner consistent with standard NBI practice and agency requirements.
- Apply current inspection techniques to fatigue-prone members.
- Evaluate channel scour as applied to waterway ratings.
- Apply load rating concepts to collect field data more effectively.

**Target Audience:**

Federal, State, and local highway agency employees and private sector employees involved in inspecting bridges or in charge of bridge inspection units. Participants must have (1) completed NHI Course No. 130055 - Safety Inspection of In-Service Bridges, or (2) met the criteria for a bridge inspector under the State's procedures or requirements.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Ian Friedland	(202) 366-6712	<a href="mailto:ian.friedland@fhwa.dot.gov">ian.friedland@fhwa.dot.gov</a>

## Structures

**Course Number:** 130054A**Course Title:** Engineering Concepts for Bridge Inspectors

Fee	Length
\$650 Per Participant	5 Days (CEU: 3 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

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 NHI 2-week course No. 130055 on Safety Inspection of In-Service Bridges. This course provide 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.

**Outcomes:** Upon completion of the course, 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, and 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.
- Successfully complete a written examination on the material presented.

**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.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Ian Friedland	(202) 366-6712	<a href="mailto:ian.friedland@fhwa.dot.gov">ian.friedland@fhwa.dot.gov</a>

## Structures

**Course Number:** 130055A**Course Title:** Safety Inspection of In-Service Bridges

Fee	Length
\$1400 Per Participant	10 Days (CEU: 6 Units)

**Class Size:** Minimum 20; Maximum 30

Revised course available for scheduling.

**Description:**

This course is based on the new "Bridge Inspector's Reference Manual," providing 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 hosting Agency/State may monitor the examinations and retain the scores to qualify or certify bridge inspectors. The hosting agency is responsible for grading the examinations. An answer key will be provided.

**Outcomes:** Upon completion of the course, participants will be able to:

- Evaluate a variety of bridges and determine the critical areas for inspection including fracture-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.
- Recognize the various deficiencies that can exist on a bridge and discuss their causes.
- Provide documentation of defects in various materials and of bridge configurations.
- Assign NBIS component ratings or element level condition states (host agency's option).
- 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 Non-Destructive Testing (NDT), is required beyond the usual visual and hand tool inspection and decide what type of further inspection should be conducted.
- Satisfy the NBIS requirements for individuals in charge of the organizational unit delegated bridge inspection responsibilities and for individuals in charge of a bridge inspection team.
- Successfully complete written examinations on the material presented.

**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 130054 - Engineering Concepts for Bridge Inspectors is strongly recommended.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Gary Moss	(202) 366-4654	<a href="mailto:gary.moss@fhwa.dot.gov">gary.moss@fhwa.dot.gov</a>

## Structures

**Course Number:** 130060A**Course Title:** Vessel Collision Design of Highway Bridges

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The AASHTO Guide Specification and Commentary for Vessel Collision Design of Highway Bridges was developed to enable bridge engineers to assess the risk of vessel collision with a bridge, calculate the costs of probable collisions with the bridge, develop plans to minimize the risk of collision, and develop designs to protect the bridge and its motorists in the event of a collision.

This 2-day training course provides bridge engineers with the background and overall approach of the design specification. Bridge engineers will be trained on the detailed application of those specifications through the use of a typical design situation. The course covers the following subjects:

- 1) Background and Historical Collisions
- 2) General Provisions including: applicability of the specification, data collection, bridge importance classification, vessel types and characteristics, design vessel, design impact speed/vessel collision energy, collision force on piers and superstructures, ship and barge bow damage, depth and impact load combination and location of forces
- 3) Design Vessel Selection including: waterway/bridge/vessel characteristics, impact distribution, design loads, selection methods (semi-deterministic, risk analysis and cost-effectiveness)
- 4) Substructure Provisions
- 5) Concrete and Steel Design
- 6) Bridge Protection Design Provisions and Planning Guidelines including: physical protection (fixed and moveable bridges), motorist warning systems/aids-to-navigation

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply the AASHTO vessel collision specification to design bridge structures.
- Determine ship and barge characteristics for vessels transiting a waterway.
- Compute vessel impact forces and collision energies.
- Determine the location of impact forces on bridge members.
- Determine design impact loads using Method I (semi-deterministic) criteria, Method II (risk analysis) criteria and Method III (benefit/cost) criteria.
- Describe alternative pier protection systems for bridge structures.
- Apply vessel collision planning guidelines for the development of new bridges.

**Target Audience:**

Federal, State, and local highway bridge design engineers and bridge managers who are responsible for the construction of bridges over marine or inland waterways navigable by large commercial vessels. It will also be of interest to other parties who are responsible for the management of inland waterway, port, and navigation facilities or for the operation of merchant vessels.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Benjamin Tang	(202) 366-4592	<a href="mailto:benjamin.tang@fhwa.dot.gov">benjamin.tang@fhwa.dot.gov</a>

## Structures

**Course Number:** 130069A**Course Title:** Hazardous Bridge Coatings: Design and Management of Maintenance and Removal Operations

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 28**Description:**

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 course, participants will be able to:

- Recognize the health hazards and legal risks associated with lead-containing paint 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.
- Discuss the process undertaken to develop construction cost estimates of installed and life-cycle costs in order to evaluate alternative maintenance painting strategies.
- Prepare clear, well organized, performance-based, project-specific specifications which 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 applicable to managers who are responsible for procurement approval and for other personnel involved in such operations.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Robert Kogler	(202) 493-3080	<a href="mailto:robert.kogler@fhwa.dot.gov">robert.kogler@fhwa.dot.gov</a>

## Structures

**Course Number:** 130078A**Course Title:** Fracture Critical Inspection Techniques for Steel Bridges

Fee	Length
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course replaced NHI Course 13036 - Inspection of Fracture Critical Bridge Members. The curriculum has been upgraded to reflect current practices and address new and emerging technologies available to bridge inspectors. In addition, the course has been reformatted and expanded to include exemplary training and hands-on workshops for popular types of Non-Destructive 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 2 provides demonstration sessions and hands-on applications of NDT techniques for Dye Penetrant; Magnetic Partical Testing, Eddy Current, and Ultrasonic Testing. Days 3 and 4 emphasize inspection procedures and reporting for common FCMs including problematic details, I-girders, floorbeams, 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 course, 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 130054 - Engineering Concepts for Bridge Inspectors and/or 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.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Steve Ernst	(202) 366-4619	<a href="mailto:steve.ernst@fhwa.dot.gov">steve.ernst@fhwa.dot.gov</a>

## Structures

**Course Number:** 130079A**Course Title:** Bridge Coatings Inspection

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The focus of this training course is 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 course, 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 on-site 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.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Bob Kogler	(202) 493-3080	<a href="mailto:bob.kogler@fhwa.dot.gov">bob.kogler@fhwa.dot.gov</a>

## Structures

**Course Number:** 130082A**Course Title:** LRFD for Highway Bridge Substructures, Earth Retaining Structures and Culverts

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

This new course based on the AASHTO Load Resistance Factor Design (LRFD) Bridge Design Specifications is under development for projected delivery to start in late 2004. The course length, content and outcomes may change during the development process.

**Description:**

Course participants will acquire hands-on experience in the design of bridge substructure elements, deep and shallow foundations, earth retaining structures and culverts, in accordance with the AASHTO specifications.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define the limit states and compute the design loads for various bridge abutment and retaining walls, piers, culverts, and foundations.
- Apply LRFD criteria to design various bridge abutment and retaining walls, piers, culverts, and foundations.
- Integrate the LRFD specification provisions into the host agency's current practice for the design of foundations and retaining walls.
- Integrate the geotechnical and structural LRFD design processes for various bridge abutment and retaining walls, piers, culverts, and foundations.

**Target Audience:**

Bridge and geotechnical journeymen or mid-level design engineers with 0-5 years of experience are the primary target audience. However, the likely audience is expected to be a blend of entry-level designers with college LRFD experience, experienced Load Factor Design (LFD) designers with no LRFD experience, and experienced LFD designers with minimal LRFD experience.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Firas Ibrahim	(202) 366-4598	<a href="mailto:firas.ibrahim@fhwa.dot.gov">firas.ibrahim@fhwa.dot.gov</a>
	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>

## Structures

**Course Number:** 130087A**Course Title:** Inspection and Maintenance of Ancillary Highway Structures

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

Available in Summer 2004.

**Description:**

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 course, participants will be able to:

- Identify typical structure configurations.
- Define tensions, compressions, bending, torsion forces, and fatigue.
- List and identify common visible weld defects.
- Identify appropriate non-destructive 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 'Proposed Guidelines.'
- Identify defects in base/anchor bolt 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.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Tom Everett	(410) 962-3743	<a href="mailto:tom.everett@fhwa.dot.gov">tom.everett@fhwa.dot.gov</a>

## Structures

**Course Number:** 130090A**Course Title:** Introduction to Tunnel Engineering

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This new course is designed as an introduction to the fundamentals of tunnel engineering, including tunnel design, construction, inspection, maintenance and rehabilitation of a wide variety of tunnels. It includes practical information on tunnel geology, classifications, ventilation, lighting, fire protection, and emergencies.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the phases of exploration before tunnel construction.
- Classify various types of tunnels, and explain critical issues associated with each type.
- Describe, in general terms, the steps in tunnel construction.
- Explain critical issues associated with the following, as they relate to tunnel construction: ventilation, lighting, fire protection, finishes, and emergencies plans.
- List and explain the major steps in tunnel inspection, maintenance, and repairs.

**Target Audience:**

Public and private sector engineers, maintenance workers, and designers involved with all aspects of tunnel engineering. This one-day course is intended as an introduction to tunnels, assuming little or no prior work experience in the area.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jesus Rohena	(410) 962-2453	<a href="mailto:jesus.rohena@fhwa.dot.gov">jesus.rohena@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131023A**Course Title:** Highway Materials Engineering

Fee	Length
\$4700 Per Participant	30 Days (CEU: 18 Units)

**Class Size:** Minimum 20; Maximum 30

A prospective participant must have a solid academic background in mathematics and science.

**Description:**

This course provides applied knowledge in highway engineering materials and quality control. Coverage includes (1) materials control and acceptance-quality assurance; (2) soil and foundations; (3) steels, welding, and coatings; (4) aggregates and unbound bases; (5) asphalt materials and paving mixtures; and (6) Portland Cement Concrete.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify and describe the characteristics and engineering properties of the materials utilized in highways.
- Identify and describe the selection and important design properties of highway materials.
- Describe the important steps and considerations in the mix design procedures.
- Demonstrate an understanding of materials quality assurance and be able to develop an effective materials acceptance plan.
- Describe the field and laboratory testing procedures and the significance of test results, along with their relationship to laboratory designs.
- Describe the issues and trends of importance to State DOT materials engineering personnel.

**Target Audience:**

State DOT engineers who require a basic knowledge of highway materials. The typical participant will have an undergraduate degree in engineering or equivalent engineering experience in the highway field. These individuals typically will be staff professionals, who either have been assigned or have the potential to be assigned to responsible positions in the highway materials field, such as district or regional materials engineer, or an engineer in the materials central office operations.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Michael Rafalowski	(202) 366-1571	<a href="mailto:michael.rafalowski@fhwa.dot.gov">michael.rafalowski@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131026A**Course Title:** Pavement Subsurface Drainage Design

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course provides detailed information concerning pavement subsurface drainage design for new or reconstructed Portland Cement Concrete (PCC) or Asphalt Concrete (AC) pavements and retrofit edge drains. This course teaches cost-effective design methods, including permeable bases and edge drains where appropriate, to prevent or minimize moisture related distress to pavements.

**Outcomes:** Upon completion of the course, participants will be able to:

- Evaluate the need for subsurface drainage systems for existing pavements or new pavement designs.
- Design subsurface drainage systems for Portland Cement Concrete and Hot-Mix Asphalt pavements.
- Explain the guidelines for developing plans and specifications for subsurface drainage systems.
- Develop monitoring and maintenance programs for pavements with subsurface drainage systems.

**Target Audience:**

The course is directed to Federal, State and local highway engineers, designers, and personnel involved in hydraulic design, materials control, pavements design, research, construction and maintenance of pavement subsurface drainage systems.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Angel Correa	(404) 562-3907	<a href="mailto:angel.correa@fhwa.dot.gov">angel.correa@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131029A**Course Title:** AASHTO Pavement Overlay Design

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

The course is expected to be available in Spring 2004. The hosting agency must provide 15 computers with the following minimum requirements: 486DX Processor, 8 MB RAM, 100 MB Hard Disk, 3.5" Floppy Disk Drive, Windows 95, VGA Graphics Card, Excel 5.0, and AASHTOWare DARWin 3.0. One or more printers are also required. "AASHTOWare" and "DARWin" are trademarks of the American Association of State Highway and Transportation Officials (AASHTO).

**Description:**

A variety of instructional techniques are employed, including lecture and discussion with visual aids, case studies, and workshops facilitated by hands-on usage of appropriate computer software packages. Participants will receive a copy of the course notes which should serve as a valuable future reference on this subject. The course focuses on Part III, Chapters 1, 2, 3, and 5 (as revised) of the "AASHTO Guide for Design of Pavement Structures." Participants will need to furnish their own 1993 "AASHTO Guide for Design of Pavement Structures."

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the significance of various items for consideration in the development of various overlay strategies, including overlay materials, preoverlay repair, subdrainage, milling and recycling, causes of existing pavement deterioration, and others.
- List the procedures and considerations for determining overlay design input parameters, including design serviceability loss, overlay design reliability, effective design subgrade resilient modulus, pavement condition adjustment factors, and others.
- Design any of the following type of overlays, given a set of design conditions, using the condition survey method (and the remaining life method for applicable overlay types):
  - Asphalt overlay of fractured Portland Cement Concrete (PCC) pavement
  - Asphalt overlay of PCC pavement
  - Asphalt overlay of an AC/PCC pavement
  - Unbonded concrete overlay of a PCC or AC/PCC pavement
  - Concrete overlay of an AC pavement

**Target Audience:**

Highway engineers who have pavement design and analysis responsibilities. A working knowledge of pavement design and associated engineering principles is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Mark Swanlund	(202) 366-1323	<a href="mailto:mark.swanlund@fhwa.dot.gov">mark.swanlund@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131032A**Course Title:** Hot Mix Asphalt Construction

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30

This course is designed for an audience of both highway agency and contractor personnel. The host agency should make every effort to ensure such a mix of participants in the course.

**Description:**

This training course is the result of a partnership between American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA), and the Hot-Mix Asphalt (HMA) Industry. It was developed through the cooperative efforts of the Joint AASHTO/FHWA/Industry Training Committee on Asphalt. It combines lectures and problem solving workshop sessions to provide participants with a working knowledge of the hot-mix asphalt construction process and equipment. The course is designed to help participants understand the effect of construction actions on the final product. This program reviews the entire HMA construction process beginning with the delivery of the HMA to the job site, through lay down and compaction, and concluding with quality control/quality assurance (QC/QA) of the completed pavement. To emphasize recommended good practice in HMA construction, various exercises are used, including troubleshooting typical field problems. The course concludes with an examination which reviews the key elements of HMA construction.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the roles and responsibilities of each person on the HMA construction job.
- Describe the purpose of project documents, pre-construction and pre-paving conferences, and cooperative communications on the job.
- List the steps involved in preparing bases and existing pavements for overlays.
- Select correct patching materials and placement techniques for pavement repair.
- Define a proper HMA delivery process to the job site.
- Explain the effect of the various components of a HMA paving machine on the finished mat.
- Describe how to make a good longitudinal or transverse joint.
- Describe what effect the compaction process has on the finished pavement.
- Identify QA techniques that apply to the HMA construction.

**Target Audience:**

This course is designed for an audience that contains 50 percent contractor supervisory personnel and 50 percent Federal, State, and local highway agency construction engineers and field inspectors involved in the planning, construction, and review of HMA placement projects. It is important that such a mix of participants is present. Participants are required to bring a calculator.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Chris Newman	(202) 366-2023	<a href="mailto:christopher.newman@fhwa.dot.gov">christopher.newman@fhwa.dot.gov</a>
	Matthew Corrigan	(202) 366-1549	<a href="mailto:matthew.corrigan@fhwa.dot.gov">matthew.corrigan@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131033A**Course Title:** Construction of Portland Cement Concrete Pavements

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course provides participants with an overview of the entire Portland Cement Concrete (PCC) paving process: setting forms, hauling, curing and grinding concrete, and joint sealing. This course is presented in four modules: 1) Plant Operations: Truck Mixed Concrete and Central Mixed Concrete; 2) Paving Operations: Slipform Paving and Fixed-form Paving; 3) Saw and Seal Operations; and 4) Concrete Pavement Restoration (CPR) Operations. The course is designed to allow presentation of all or some of the modules at the discretion of the host agency. The course focuses on the proper methods for construction of concrete paving with an emphasis on cause and effect.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the differences between truck-mixed and ready-mixed concrete.
- Identify factors in production and paving operations that contribute to achieving a smooth ride.
- Describe the differences between slip-form and fixed-form paving.
- Identify the factors that impact saw timing and crack control.
- Recognize the key factors in placing joint sealant materials.
- Identify the components of concrete pavement restoration application and construction techniques.

**Target Audience:**

Contractors, technicians and inspectors who are involved in daily pavement operations for the placement of PCC pavements. Participants should have some working knowledge of concrete pavement construction.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Michael Rafalowski	(202) 366-1571	<a href="mailto:michael.rafalowski@fhwa.dot.gov">michael.rafalowski@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131044A**Course Title:** Hot Mix Asphalt Production Facilities

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

The course is designed for an audience of both highway agency and contractor personnel. Host agencies should make every effort to ensure that such a mix participates in the course.

**Description:**

This training course combines lectures and workshop sessions to provide participants with a working knowledge of Hot-Mix Asphalt (HMA) Production Facilities. The training program is the result of a partnership between the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the HMA Industry. This course covers the entire HMA Production Facilities process and addresses the following topics: types of plants, drying and heating systems, emission control systems, feeders and conveyor systems, storage systems, plant operation and maintenance, quality control and quality assurance. It concludes with an examination which emphasizes the key elements of HMA Production Facilities.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define the roles and responsibilities of each person at the HMA Production Facility.
- Identify the different types of plants, the main components of each, and how these components interact.
- Describe the materials control process and its effect on the quality of the final product.
- Differentiate between acceptable and non-acceptable methods of plant operation and maintenance.
- Explain the operation of the exhaust fan and emission control systems and discuss their importance.
- Identify potential problems that may occur during production and develop specific solutions to those problems.

**Target Audience:**

This course is designed for project engineers, lead inspectors, plant supervisors, and all others involved with the HMA plant production. This course is designed for an audience that is a mix of contractor/producer personnel along with Federal, State, and local highway agency personnel. Participants are required to bring a calculator.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Chris Newman	(202) 366-2023	<a href="mailto:christopher.newman@fhwa.dot.gov">christopher.newman@fhwa.dot.gov</a>
	Matthew Corrigan	(202) 366-1549	<a href="mailto:matthew.corrigan@fhwa.dot.gov">matthew.corrigan@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131045A**Course Title:** Hot Mix Asphalt Materials, Characteristics and Control

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This training course is the result of a partnership between American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Association (FHWA), and the Hot-Mix Asphalt (HMA) Industry. It was developed through the cooperative efforts of the Joint AASHTO/FHWA/Industry Committee on Asphalt. It combines lectures and problem solving workshop sessions to provide participants with a working knowledge of hot-mix asphalt materials, their characteristics and controls. The course focuses on two areas. The first provides technical information on the material properties of HMA, the processes used to measure these properties, and the effect that these properties have on the final, compacted pavement. The second involves achieving these properties in the field, with discussions on quality management, and analyzing the impact of segregation and density on HMA pavement performance. The course concludes with an examination which reviews the key elements of HMA materials, characteristics and control.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the various and desirable properties of asphalt, aggregates, and mixtures.
- Describe the proper procedures for handling, storing, sampling and testing the materials.
- Distinguish between desirable and undesirable results of tests used for controlling and analyzing the quality of HMA.
- Select the processes and procedures that assure the quality of HMA pavements.

**Target Audience:**

The course is designed for an audience directly involved in the production and construction of hot-mix asphalt pavements. This includes contractor personnel at both the production facility and on the pavement lay down site, and owner/agency personnel involved with the inspection of HMA pavement construction. Also the course is designed for an audience that is a mix of contractor personnel along with Federal, State, and local highway agency personnel.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Matthew Corrigan	(202) 366-1549	<a href="mailto:matthew.corrigan@fhwa.dot.gov">matthew.corrigan@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131050A**Course Title:** Asphalt Pavement Recycling Technologies

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course is the result of a joint effort between Federal Highway Administration (FHWA), the Asphalt Recycling and Reclamation Association (ARRA) and the National Center for Asphalt Technology (NCAT). The course provides an in-depth technical knowledge of several recycling methods. It also offers training related to performance of recycled mixes, legislation/specification limits, selection of pavement for recycling and recycling strategies, economics of recycling, and structural design of recycled pavements. The ARRA publication "Basic Asphalt Recycling Manual" is used as a reference in this course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the various methods (hot and cold) of recycling pavements.
- Determine when asphalt recycling is a viable pavement rehabilitation alternative.
- Select the most appropriate asphalt recycling method or technique.
- Identify materials and mix design for recycled pavements.
- Specify equipment, construction methods, and QC/QA involved in recycling.
- Demonstrate design methods for hot and cold recycled pavements.

**Target Audience:**

This course is intended for State and local highway officials, administrators, pavements design engineers and technicians, and construction engineers and inspectors involved in the recycling of asphalt pavements.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Jason Harrington	(202) 366-1576	<a href="mailto:jason.harrington@fhwa.dot.gov">jason.harrington@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131054A**Course Title:** Pavement Preservation: The Preventive Maintenance Concept

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This training course provides an introduction to the concept of pavement preventive maintenance, including a description of currently available tools and technology that make the implementation of a pavement preventive maintenance program feasible. Targeting an audience of upper management and policy makers in highway agencies, the course focuses on the information needed to develop or improve a preventive maintenance program and illustrates the steps that five States have taken in the development of their own preventive maintenance programs. Considerably less emphasis is given to actual pavement preventive maintenance techniques themselves, although an extensive listing of pertinent references is provided for each technique. This is the first in a series of four courses on the general subject of pavement preservation. The second is NHI Course 131058 - Pavement Preservation: Selecting Pavements for Preventive Maintenance. The third and fourth NHI courses will be 131103 - Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments and 131104 - Pavement Preservation: Integrating Pavement Preservation Practices and Pavement Management.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the components of a Pavement Preventive Maintenance (PPM) program.
- Identify various pavement preservation techniques and materials and discuss the need for performance evaluation and pavement condition analysis.
- Discuss the effects of various treatments on pavement performance and pavement condition indices.
- Describe the importance of integrating pavement preservation into pavement management systems.
- Explain cost/benefit concepts.

**Target Audience:**

This course is intended for upper- and mid-level highway agency professionals who are responsible for pavement preservation and management.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Steve Mueller	(202) 366-1557	<a href="mailto:steve.mueller@fhwa.dot.gov">steve.mueller@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131058A**Course Title:** Pavement Preservation: Selecting Pavements for Preventive Maintenance

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This short course focuses on selecting the right pavement for various preservation treatments by evaluating the merits of each treatment under various field conditions. This course will illustrate in detail the pavement evaluation, project selection, and material considerations for the various preventive maintenance applications. This is the second in a series of four courses on the general subject of pavement preservation. The first NHI course is 131054 - Pavement Preservation: The Preventive Maintenance Concept. The third and fourth NHI courses will be 131103 - Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments and 131104 - Pavement Preservation: Integrating Pavement Preservation Practices and Pavement Management.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify pavement conditions and other attributes that suggest whether preventive maintenance is appropriate.
- Identify feasible treatments for the selected pavement.
- Select the appropriate technique(s) and the appropriate timing for pavement preservation actions to extend the service life and retard the development of pavement distress.
- Select a treatment based on consideration of life-cycle cost, improved performance, anticipated benefits, and other factors.

**Target Audience:**

Field managers and practitioners for both the owner of the facilities and industry.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Steve Mueller	(202) 366-1557	<a href="mailto:steve.mueller@fhwa.dot.gov">steve.mueller@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131060A**Course Title:** Concrete Pavement Design Details and Construction Practices

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides participants with current guidelines on design and construction details for concrete pavements. Topics include important concrete pavement design details, including subgrade preparation, base selection, drainage design, thickness design, joint design and shoulder characterization. The course explains how to select the proper details to enhance structural performance. Emphasis is given to jointed plain concrete pavements (JPCP), although the course includes instruction on jointed reinforced concrete pavements (JRCP) and continuously reinforced concrete pavements (CRCP).

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the effect of critical concrete pavement design details on overall concrete pavement performance.
- Identify critical construction and maintenance practices that impact performance.
- Select appropriate concrete pavement design details to enhance the performance of the pavement for a specific design condition.

**Target Audience:**

This course is intended for highway engineers who are responsible for the design and construction of better-performing, longer-lasting concrete pavements.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Mark Swanlund	(202) 366-1323	<a href="mailto:mark.swanlund@fhwa.dot.gov">mark.swanlund@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131062A**Course Title:** Portland Cement Concrete Pavement Evaluation and Rehabilitation

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course will present state-of-the-practice and state-of-the art techniques to identify the causes and patterns of different types of pavement distress, and what techniques for rehabilitation selection, design, and construction can be applied for the various types of distress.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the typical behavior and performance of Portland Cement Concrete (PCC) pavements.
- Identify common PCC pavement distress types and be able to describe their mechanisms.
- Describe key components of a thorough project-level evaluation.
- Describe the variety of rehabilitation techniques available for PCC pavements.
- Identify feasible rehabilitation techniques for existing PCC pavements.
- Describe a process for selecting the preferred rehabilitation alternative for a given pavement.

**Target Audience:**

This course is intended for FHWA, State, and local highway engineers in design, construction, and maintenance who are involved in the application of pavement rehabilitation techniques.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Mark Swanlund	(202) 366-1323	<a href="mailto:mark.swanlund@fhwa.dot.gov">mark.swanlund@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131063A**Course Title:** Hot Mix Asphalt Pavement Evaluation and Rehabilitation

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course presents state-of-the-practice and state-of-the-art techniques to identify the causes and patterns of different types of pavement distress, and what techniques for rehabilitation selection, design, and construction can be applied for the various types of distress.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe typical behavior and performance of Hot Mix Asphalt (HMA) pavements.
- Identify common types of HMA pavements distress and be able to describe their mechanisms.
- Describe key components of a thorough project-level evaluation.
- Describe the variety of rehabilitation techniques available and state what deficiencies they have.
- Identify feasible rehabilitation techniques for HMA pavements exhibiting different distresses and conditions.
- Develop the process for selecting the preferred rehabilitation alternative.

**Target Audience:**

This course is intended for FHWA, State, and local highway engineers in design, construction, and maintenance who are involved in the application of pavement rehabilitation techniques.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Jason Harrington	(202) 366-1576	<a href="mailto:jason.harrington@fhwa.dot.gov">jason.harrington@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131064A**Course Title:** Introduction to Mechanistic Design for New and Rehabilitated Pavements

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting agency must provide 15 computers with the following minimum requirements: Intel Pentium® Processor, 8 MB RAM, 50 MB hard disk space, CD-ROM drive, Windows 95/NT 4.0 (or later version), VGA graphics card, and Microsoft Excel 5.0 (or later version). Some of the requirements are flexible and are a function of the software typically used in the class. Additional details can be obtained from NHI.

**Description:**

This course presents the theory and application of the most comprehensive, up-to-date mechanistic design concepts. The general framework of the mechanistic-empirical design procedure and the individual components are discussed in detail. The course includes several hands-on workshops pertaining to materials characterization, structural response calculations, pavement performance prediction, and mechanistic-empirical pavement design. These workshops use real-world problems and exercises that enhance future application of this design methodology. Some of the workshops involve computations using public-domain pavement software and simple spreadsheet-based programs, and all are customized to each course based on project data provided by the host agency.

The course also discusses ongoing research and the effects that current research activities might have on the state of the practice. Throughout the class, particular emphasis is placed on the mechanistic-empirical design concepts used in the 2002 Design Guide (NCHRP Project 1-37A) and those that form the foundation of the Superpave pavement performance prediction models. The course will include detailed discussions about the data needs (materials, traffic, environment, etc.) for local/regional calibration of the 2002 Design Guide and what steps agencies should begin to take before the Guide is adopted and used on a day-to-day basis for design.

**Outcomes:** Upon completion of the course, participants will be able to:

- List components of Mechanistic-Empirical (M-E) design procedure.
- List advantages of using M-E design.
- Calculate structural responses for flexible, rigid, and overlaid pavements.
- List major inputs to a mechanistic design procedure and how to obtain them.
- Explain sensitivity of layer thickness, material properties, joint spacing, etc. to structural responses.
- Backcalculate layer moduli for flexible pavements.
- Explain how layer thickness, material properties, joint spacing, etc. affect pavement distresses.
- Construct a flowchart/outline for M-E design of flexible, rigid, and overlaid pavements.

**Target Audience:**

This course is intended for pavement design engineers, materials engineers, and pavement management practitioners from government transportation agencies, the paving industry, and design consultants.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Sam Tyson	(202) 366-1326	<a href="mailto:sam.tyson@fhwa.dot.gov">sam.tyson@fhwa.dot.gov</a>
	Leslie Myers	(202) 366-1198	<a href="mailto:leslie.myers@fhwa.dot.gov">leslie.myers@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131100A

**Course Title:** Pavement Smoothness: Use of Inertial Profiler Measurements for Construction Quality Control

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course presents a comprehensive overview of pavement smoothness and is designed for those people who are directly involved in the use of inertial profilers and the application of the data obtained from inertial profilers. Participants will gain an understanding and knowledge of the different types of measurement techniques and indices used for reporting smoothness from profilers. The course is divided into units that introduce participants to the various components of roadway profiling, the operational requirements of most inertial profiling devices, and the analysis of data from most types of inertial profilers.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the data collection process and operation of the inertial profilers as pavement profile measurement devices.
- Identify the basic elements of the inertial profiler, which include the profiler's components, how the equipment works, what raw data is being collected, outputs from the data collection process, and the filtering of the raw data itself.
- Explain how the inertial profiler output is used to establish various smoothness indices, including data processing techniques and computational procedures of different smoothness, or ride quality indices, identification of outliers, and factors that have an effect on the variability of the measurements.
- Explain the relationships between profiler results and the equipment used, the measurement surface conditions, the measurement environment, the profiler operation, and the profiler operators themselves.
- Explain how data acquisition and computational methods can affect computed indices, including the filtering process, sample intervals, record intervals, variability in collecting the data, and what factors have an affect on that variability.

**Target Audience:**

This course is intended for an audience directly involved in the use of inertial profilers and in the application of the data obtained from inertial profilers. This primarily includes road profiler operators and individuals responsible for the data interpretation. Information may also be of interest to users of profiler output, engineers, and administrators.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Mark Swanlund	(202) 366-1323	<a href="mailto:mark.swanlund@fhwa.dot.gov">mark.swanlund@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131103A

**Course Title:** Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

This course is under development. It is expected to be available in the Summer of 2004.

**Description:**

In preventive maintenance, the types of treatments and the timing of their applications provide highway agencies with a very broad range of life-extending treatment techniques, and enables agencies to achieve their goals of enhancing pavement performance in a cost-effective and efficient manner, while meeting their customers' need for an improved level of service. Obtaining optimum value from preventive maintenance treatments is only possible when preventive maintenance activities are fully linked to a pavement management system. There are many opportunities for such integration, from identifying and tracking the benefits of different treatments and timings to developing models that incorporate the effects of preventive maintenance. By using pavement management data for network level analysis, an effective pavement strategy can be developed that utilizes reconstruction, rehabilitation, and preventive maintenance actions. When used at the project level, pavement management can assist the decision-maker in selecting the best pavement preservation option to be designed and applied.

This course targets those field personnel involved in constructing preventive maintenance treatments, including both buying agency's inspectors and the contractors' foremen and field crews. It contains modules on all of the categories of preventive maintenance treatments in widespread use today, focusing on the best practices for designing and constructing those treatments. It also addresses troubleshooting construction practices, so that participants can clearly identify the results of poor construction practices.

This is the third in a series of four courses on the general subject of pavement preservation. The first and second NHI courses are available for scheduling: 131054- Pavement Preservation: The Preventive Maintenance Concept and 131058- Pavement Preservation: Selecting Pavements for Preventive Maintenance. The fourth NHI course under development is 131104- Pavement Preservation: Integrating Pavement Preservation Practices and Pavement Management.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the benefits provided by preventive maintenance treatments.
- Describe critical design factors for preventive maintenance techniques.
- Describe the recommended procedures for the construction of the preventive maintenance techniques.
- Identify critical post-construction/pre-opening inspection objectives.

**Target Audience:**

Construction foremen and agency construction inspectors, up to and including middle managers. While it is aimed at those who have some familiarity with the equipment and materials used to construct effective preventive maintenance treatments, it should also be of value to those just starting out in the maintenance field.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Steve Mueller	(202) 366-1557	<a href="mailto:steve.mueller@fhwa.dot.gov">steve.mueller@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131104A

**Course Title:** Pavement Preservation: Integrating Pavement Preservation Practices and Pavement Management

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

New course expected to be available in Spring 2004.

**Description:**

This is the fourth in a series of four courses on the general subject of pavement preservation. The first and second NHI courses are available for scheduling: 131054- Pavement Preservation: The Preventive Maintenance Concept and 131058 - Pavement Preservation: Selecting Pavements for Preventive Maintenance. The third NHI course under development is 131103 - Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments.

**Outcomes:** Upon completion of the course, participants will be able to:

- Name several ways pavement management tools can support a pavement preservation program at the project, network, and strategic analysis levels.
- List the reasons it is important for an agency to integrate pavement preservation into its pavement management activities.
- Name the ways that pavement preservation techniques can be integrated into pavement management models.
- Name some of the common obstacles to the successful integration of pavement preservation and pavement management programs and strategies for overcoming these obstacles.

**Target Audience:**

This course is primarily intended for pavement management engineers, district (or regional) maintenance engineers, local agency engineers, maintenance management engineers, and planning and programming personnel.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Steve Mueller	(202) 366-1557	<a href="mailto:steve.mueller@fhwa.dot.gov">steve.mueller@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131105A**Course Title:** Analysis of PMS Data for Engineering Applications

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**NEW Course!** Now available for scheduling.**Description:**

This course is designed to define the nature of engineering applications of pavement management data and help the student recognize the value of engineering analysis to extend the benefits of their Pavement Management System (PMS). As part of this defining process, the course reports the results of engineering analyses that have been carried out by several state DOTs and demonstrates the benefits that these previous studies have contributed to their respective agencies.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the benefits of using shared data for applications in their own agency.
- Define both the types of data and the basic approach that could be taken for the analysis of a wide range of engineering applications.

**Target Audience:**

The course is intended for transportation staff who deal with PMS data and related data at any level, i.e., pavement managers, design engineers, materials engineers, laboratory testers, QA/QC staff, maintenance engineers and performance monitoring staff, both at engineering and supervisory levels.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Sonya Hill	(202) 366-1337	<a href="mailto:sonya.hill@fhwa.dot.gov">sonya.hill@fhwa.dot.gov</a>

## Materials, Pavements, and Base Design

**Course Number:** 131106A**Course Title:** Transportation Asset Management

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 40**Description:**

Asset Management is a systematic process of maintaining, upgrading, and operating physical assets cost effectively. It combines engineering principles with sound business practices and economic theory, and it provides tools to facilitate a more organized, logical approach to decision-making. In the broadest sense, Transportation Asset Management is a strategic approach to managing physical transportation infrastructure. This is an introductory course that covers the principles, concepts, components, techniques, and benefits of Asset Management. The material in this course is based on the "Transportation Asset Management Guide" that was produced under National Cooperative Highway Research Program (NCHRP) Project 20-24(11). The intent of the course is to support, complement, and build familiarity with using the Guide. The course illustrates asset management "best practices" in key functions of a transportation agency's resource allocation and utilization: policy development, planning and programming, program delivery, operations, and use of information and analytic tools. It also provides a self-assessment process that can be applied within transportation agencies to benchmark current asset management practices and identify potential areas for further enhancement and implementation. The course includes exercises to help participants deal with realistic situations in the context of good asset management practice.

**Outcomes:** Upon completion of the course, participants will be able to:

- Understand the fundamentals of Transportation Asset Management.
- Appreciate why using Transportation Asset Management is important to their agency.
- Begin to visualize how the framework and principles of Transportation Asset Management relate and fit into their agency's business processes.
- Use the Self-Assessment Guide to assess and benchmark their agency's Transportation Asset Management program.
- Begin to develop Transportation Asset Management goals and objectives for their agency.

**Target Audience:**

The course is intended for senior-level and mid-level managers from State departments of transportation and other transportation agencies. A 35 minute module at the beginning of the course provides a succinct overview of asset management that is suitable for executives. In as much as Transportation Asset Management crosscuts an organization's functions, participants should represent a number of organizational units, including (but not limited to) planning, engineering (e.g., facility management, design, construction), capital programming, maintenance and operations, financial management, traffic and safety engineering, system operation and management, and information technology. These individuals will typically have the responsibility for decision-making in one or more areas addressed by Transportation Asset Management. The course is also intended for individuals who directly support decisions, business processes, or results related to Transportation Asset Management, e.g., by managing and providing critical information to senior managers, or by having direct responsibility for meeting specific transportation system performance or program delivery targets.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Frank Botelho	(202) 366-1336	<a href="mailto:frank.botelho@fhwa.dot.gov">frank.botelho@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132012A**Course Title:** Soils and Foundations Workshop

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting organization is responsible for providing access to a materials laboratory for demonstration purposes. Course runs from 1:00 PM on Monday through noon on Friday.

**Description:**

This course is geared toward the practicing design and construction engineers in the foundation field, routinely dealing with soil and foundation problems, who have little theoretical background in soil mechanics or foundation engineering. The course takes a project-oriented approach whereby the soils input to a fictitious bridge project is followed from conception to completion. A visit to a laboratory is used to illustrate basic soil concepts in typical major project phases. In each phase of the fictitious project, the soil concepts will be developed into specific foundation designs and recommendations. Classroom presentation includes a variety of exercises to verify achievement of learning objectives. Each participant will take away a notebook containing a complete foundation design, completed exercises, and enough reference data to independently complete other related activities.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the minimum level of geotechnical input needed in various project phases of a highway project.
- Identify equipment and procedures used to implement a subsurface investigation of soil and rock conditions.
- Develop a visual description of soils native to the host state.
- Identify location and capabilities of the geotechnical laboratory facilities and personnel in the host state.
- List the basic soil test procedures and application of soil test results to highway projects.
- Demonstrate basic procedures used for both settlement and stability analysis, and identify design solutions to stability and settlement problems.
- Demonstrate procedures used for determining bearing capacity and settlement of spread footing foundations.
- Demonstrate basic skill in the design and construction management of driven pile foundations.
- Identify driven pile foundation construction equipment and procedures for construction inspection.
- Demonstrate basic skill in interpreting static load test results.
- Identify format and provide minimum content for an adequate foundation report.

**Target Audience:**

Geotechnical specialists, bridge designers, highway designers, construction engineers, maintenance engineers and drillers and especially the first-line supervisors involved in the design of highway structures and earthworks. The greatest impact will be achieved by convincing structural, design, and construction engineers to use procedures from this course as a guide for routine geotechnical work. One of the major benefits is to give engineers an appreciation of activities outside their specialties that influence, or are influenced by, the work of the geotechnical specialist. All attendees should be encouraged to attend the entire course. The one exception is for drillers who could be invited to attend only the first phase of the course (Monday PM and Tuesday AM).

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Silas Nichols	(410) 962-2460	<a href="mailto:silas.nichols@fhwa.dot.gov">silas.nichols@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132013A**Course Title:** Geosynthetics Engineering Workshop

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

Two courses are available. These courses provide training on the correct, cost-effective utilization of geosynthetics in transportation applications. The use of geotextiles, geogrids, pavement edge drains, drainage composites, erosion control materials, sediment control materials, and geomembranes are examined. Applications of filtration, drainage, temporary and permanent erosion control, sediment control, roadway separation, roadway reinforcement, roadway subgrade improvement, pavement overlays, embankments over soft foundations, mechanically stabilized earth walls, mechanically stabilized earth slopes, geomembrane containment ponds, and geomembrane pavement encapsulation are covered.

The 1-day Summary course provides an introduction to geosynthetics, focusing on identifying, specifying, testing, installing, and inspecting geosynthetic installations.

The 3-day Design and Construction course provides a review of design procedures, expands on the material of the 1-day Summary course and includes workshop problems and student exercises.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize geosynthetic applications for transportation facilities, construction and maintenance.
- Differentiate between types of geosynthetics and the functions they perform.
- Determine if geosynthetics are a feasible, cost-effective option for construction or maintenance of transportation earthworks.
- Specify procedures for and oversee geosynthetic installations.
- Locate references on geosynthetic materials and geosynthetic applications.
- Prepare conceptual and basic designs for filtration, drainage, temporary and permanent erosion control, sediment control, roadways, pavement overlays, embankments over soft foundations, mechanically stabilized earth walls and earth slopes, and geomembrane transportation applications. [3-day only]
- Select appropriate material property and design parameter test methods for specific geosynthetic projects, and differentiate between index and performance tests/properties. [3-day only]
- Develop appropriate materials and construction specifications for geosynthetic projects. [3-day only]
- Determine the need for site specific monitoring or special inspection schemes to ensure compliance with design. [3-day only]

**Target Audience:**

Federal, State and local transportation personnel (bridge, hydraulic, pavement, geotechnical, construction, and maintenance engineers, and construction inspectors and technicians): 1-Day Course for those involved with construction and maintenance of transportation facilities that include earthwork construction; 3-Day Course for those involved with design and/or construction of transportation facilities that incorporate earthwork. Public agency and private sector engineers and project inspectors responsible for installation, monitoring and inspection of geosynthetics installations can attend either course. There are no prerequisites, although prior attendance in NHI course 132012 - Soils and Foundations Workshop is recommended.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132014A**Course Title:** Drilled Shafts

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

Drilled shafts are an alternate type of deep foundation that may be more cost-effective than, and have improved performance compared to, other types of deep foundations in bridge piers at river crossings, retrofit operations, high-mast lighting, earth retaining structures, single column piers and similar applications. This course provides participants with specific technical guidance on all aspects of designing, installing and monitoring of drilled shafts. The lessons address the following topics: applications, advantages and disadvantages of drilled shafts for transportation structure foundations; general requirements for subsurface investigations; construction methods; construction case histories; construction specifications; principles of design of drilled shafts for axial and lateral loading; expansive soils, downdrag and similar effects; load testing; inspection; integrity testing; repair and retrofit of defective shafts; and cost estimation. The participants will receive a comprehensive Reference Manual on drilled shaft construction and design used by engineers who perform detailed designs of drilled shafts, write construction specifications and evaluate the performance of the contractor through a comprehensive inspection program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define a drilled shaft, as distinguished from other types of foundations.
- Categorize the subsurface conditions that affect the construction of drilled shafts.
- Identify the soil parameters that must be determined in order to design drilled shafts.
- Describe the various drilling rigs and tools that are available to construct drilled shafts under varied subsurface soil and rock conditions.
- Recognize the basic features of drilling aids such as casings and drilling slurries and the reasons for certain fundamental requirements for these aids.
- Recognize the basic requirements for concrete and reinforcing steel for drilled shafts and distinguish those requirements from those for other parts of the structure.
- Design drilled shafts for axial loading in simple soil and rock profiles.
- Demonstrate a general understanding of the elements of designing drilled shafts for lateral loads.
- Demonstrate an understanding of the need for load tests and available methods for performing them.
- Formulate the basic elements of construction specifications for drilled shafts.
- Discuss the rudiments of construction inspection, post-construction integrity testing for drilled shafts, and repair methods for defective drilled shafts.
- Estimate costs for drilled shafts.

**Target Audience:**

Geotechnical engineers, bridge designers, and resident engineers. The course embraces both construction and design, and it is important that all participants attend all lessons, not just those in the immediate area of interest. A key issue is how the details of construction affect the way in which a drilled shaft should be designed and how the intent of the design affects inspection. Participants in the course are expected to have a degree in engineering for which they have passed an undergraduate course in soil mechanics and/or have successfully completed NHI Course 132012 - Soils and Foundations Workshop. This course is intended for field or laboratory personnel with a background in engineering.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Curtis Monk	(515) 233-7320	<a href="mailto:curtis.monk@fhwa.dot.gov">curtis.monk@fhwa.dot.gov</a>
	Barry Berkovitz	(404) 562-3693	<a href="mailto:barry.berkovitz@fhwa.dot.gov">barry.berkovitz@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132021A**Course Title:** Driven Pile Foundations - Design and Construction

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

Revised, available Summer 2004. Revisions include substantial technical updates to the reference manuals, participant manuals and lessons.

**Description:**

This course covers the practical application of driven pile technology, with the emphasis on data interpretation and decision making issues common to real life construction projects. The course addresses: subsurface investigation, pile selection, economic analysis, static design analysis (single pile and pile group behavior under compression, tension and lateral loading, pile settlement, negative skin friction) specifications and contracting documents, construction monitoring (pile inspection, dynamic driving formulas, wave equation analysis, dynamic testing), static methods of pile load testing, driven pile installation equipment and accessories. This course also covers: definition and design procedures of aggressive subsurface conditions; the driven computer program for calculation of static pile capacity; design procedures for downdrag, scour, squeeze, and heave; plugging of open pile sections; and group design for lateral and uplift loads. Instructional methods include workshops, student exercises and sample problems to transfer the necessary knowledge and skills to plan and design driven pile foundation projects, and to implement QA/QC procedures during construction.

**Outcomes:** Upon completion of the course, participants will be able to:

- Implement a systematic plan for the design and construction of driven pile foundations.
- Select appropriate subsurface exploration procedures and laboratory tests to provide design soil parameters for pile foundation design.
- Choose the appropriate pile type in a given soil profile based on the advantages and disadvantages of common driven pile types.
- Use appropriate methods of pile foundation design in applicable subsurface conditions.
- Calculate single and group capacities of driven piles to resist compression, tension, and lateral loads.
- Use time dependent soil strength changes in pile foundation design and construction control.
- Identify the project influence and significance of pile driveability, pile refusal, minimum and estimated pile toe elevations.
- Calculate allowable design and allowable driving stresses for common pile types.
- Explain the key differences between allowable stress design and load and resistance factor design methods.
- Use dynamic formulas, wave equation analyses, dynamic pile testing and static load testing correctly and effectively.
- Identify pile hammer types, their operational characteristics, and key pile hammer and pile hammer accessory inspection issues.
- Explain appropriate methods of pile installation inspection.

**Target Audience:**

The course material has been developed for attendance by geotechnical specialists, bridge engineers, construction engineers, consultant review specialists and advanced level technicians. This course is suitable for attendance by entry level and experienced engineers and advanced level technicians. Attendees should have a basic knowledge of subsurface investigation methods and the general aspects of foundation design and construction.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Chris Dumas	(410) 962-0096	<a href="mailto:chris.dumas@fhwa.dot.gov">chris.dumas@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132022A**Course Title:** Driven Pile Foundations - Construction Monitoring

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

Revised, available Winter 2004. Revisions include substantial technical updates to the reference manuals, participant manuals and lessons.

**Description:**

This course provides information on current methods of driven pile technology with emphasis on data interpretation and decision-making issues common to driven pile installation and monitoring. The course covers the following areas: specifications, contracting issues, pile installation, monitoring and inspection. Application and interpretation of the wave equation, and dynamic and static pile load testing methods are highlighted, with an emphasis on the practical issues related to pile monitoring and acceptance on typical construction projects. Construction material includes: pile capacity verification by formula, wave equation, dynamic test or static test; performance and interpretation of compression, tension, and lateral load test; new load testing devices, the Osterberg Cell and Statnamic; operation and inspection of pile hammers including new hydraulic hammers; and troubleshooting of pile hammer operation and pile installation problems. (Refer to course 132021 - Driven Pile Foundations - Design and Construction for additional background information.) The goal of this course is to transfer the necessary knowledge and skills to plan driven pile foundation projects, and to implement QA/QC procedures during construction.

**Outcomes:** Upon completion of the course, participants will be able to:

- Implement a systematic plan for the construction of driven pile foundations.
- Discuss the appropriate pile type in a given soil profile based on the advantages and disadvantages of common driven pile types.
- Identify pile refusal, and minimum and estimated pile toe elevations.
- Define key components of driven pile specifications.
- Identify pile hammer types, their operational characteristics, and key pile hammer and pile hammer accessory inspection issues.
- Identify pile toe accessories, pile splicing methods, and pile installation aids applicable to the pile type and subsurface conditions.
- Explain appropriate methods of pile installation inspection.

**Target Audience:**

The course material has been developed for geotechnical specialists, bridge engineers, construction engineers, consultant review specialists and advanced level technicians involved in and responsible for the specification and construction monitoring of driven pile foundations. Basic knowledge of subsurface investigation methods is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Chris Dumas	(410) 962-0096	<a href="mailto:chris.dumas@fhwa.dot.gov">chris.dumas@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132031A**Course Title:** Subsurface Investigations

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course presents the latest methods and procedures in the planning, execution and interpretation of the various subsurface investigation methods and the development of appropriate soil and rock design and construction parameters for engineering applications. Topics include: the geotechnical specialist's role in subsurface investigations; exploration methodologies; exploratory equipment types and their suitability for various subsurface conditions; the use of in-situ testing and geophysical surveys for subsurface characterization; the handling, transportation and storage of soil and rock samples; and laboratory testing techniques and interpretation of data. Contracting for soil and rock investigations, correlation of soil and rock properties, and preparation of clear and concise geotechnical reports are also covered. Classroom instruction includes student exercises and example problems to reinforce course objectives.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the importance of performing an adequate subsurface investigation.
- Plan and execute a subsurface exploration program for a typical surface transportation project.
- Use existing information in the planning of the investigation program.
- Apply appropriate in-situ testing procedures based upon the expected subsurface conditions and obtain high quality soil and rock samples for laboratory testing.
- Assign appropriate laboratory testing procedures for determining soil and rock design parameters.
- Interpret the results of laboratory tests and determine soil and rock parameters to be used in design.
- Summarize results of subsurface investigation in a concise geotechnical investigation report.

**Target Audience:**

FHWA, State, and local transportation agency employees, college and university faculty, and consultant engineers who are or will be involved in the planning, execution, review and interpretation of subsurface investigations. An undergraduate degree in geology, engineering geology, civil engineering or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Ben Rivers	(404) 562-3926	<a href="mailto:benjamin.rivers@fhwa.dot.gov">benjamin.rivers@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132033A**Course Title:** Soil Slope and Embankment Design and Construction

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30

The participants will receive a comprehensive Reference Manual on investigation, design, construction and mitigation of soil slopes and embankments used by practicing highway/geotechnical engineers. The Participant Workbook contains copies of visual aids and student exercises that closely follow the PowerPoint slide presentations. The student exercises promote interaction in the classroom and illustrate the basic principles and analyses.

**Description:**

This course covers important aspects associated with the design and construction of soil slopes and embankments. It is intended to provide transportation earthwork professionals with knowledge to recognize potential soil slope/embankment stability and deformation problems in transportation projects, and to develop necessary skills to design and evaluate soil slopes and embankments, and consider the construction and inspection implications. The course embraces both design and construction, and it is important for all participants to attend all lessons, not just those in their immediate area of interest.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize potential failure modes or deformation types for soil slopes and embankments.
- Describe common highway soils slope and embankment problems.
- List the factors that affect the performance of soil slopes and embankments (i.e., geometry, surface water, groundwater, soil parameter, geological factors, etc.).
- Understand basic assumptions of limit equilibrium slope stability analysis.
- Identify the potential failure modes for soil slopes and the type of analysis required to evaluate stability of the slope.
- Determine the stability of a slope using slope stability charts.
- Recognize the major design consideration for embankments constructed using earth fill, rock fill, and lightweight fill.
- List the design steps necessary for the design of an embankment over compressible foundation soil.
- List the common causes/triggering mechanisms for landslides/slope instabilities.
- List appropriate stabilization methods.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers/geologists who are involved in the analysis, design, construction, maintenance, and remediation of soil slopes and embankments on surface transportation facilities. An undergraduate degree in civil engineering or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Sam Mansukhani	(708) 283-3550	<a href="mailto:sam.mansukhani@fhwa.dot.gov">sam.mansukhani@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132034A**Course Title:** Ground Improvement Techniques

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

NEW COURSE. Available Spring 2004. Technical content is based on updated and expanded scope from FHWA's Demonstration Project No.116

**Description:**

This course covers important design and construction aspects associated with ground improvement techniques. Topics on ground improvement techniques include: grouting, vertical drains, stone columns, lightweight fill, vibro compaction, dynamic compaction, deep soil mixing, column supported embankments and other new and innovative concepts. The goal of this course is to have each participant recognize the applicability of, and develop preliminary cost analysis for, specific ground improvement method(s) that could be employed to sufficiently improve the ground, soil and rock, to permit construction of earthwork, bridge and earth retaining structure transportation features.

Participants completing this course will develop an appreciation for the necessary subsurface exploration and laboratory characterization necessary of subsurface soil and rock as well as the requisite design parameters necessary to develop a preliminary design and cost estimate. The course is designed so that maximum input will be elicited from the students, particularly regarding an understanding of application criteria, the impact of geotechnical features on the long-term performance and contracting methods.

**Outcomes:** Upon completion of the course, participants will be able to:

- List the functions and types of ground improvement methods.
- Locate criteria to determine the applicability of each ground improvement method for a specific project under consideration.
- Describe advantages, disadvantages and limitations for each ground improvement method discussed.
- Locate and identify required soil and rock properties necessary to perform preliminary design.
- Prepare conceptual and basic designs, and be able to check contractor submitted designs.
- Discuss appropriate QA/QC methods for each type of ground improvement method.
- Summarize key elements of a preferred contracting method for each technique.
- Develop a preliminary cost estimate based on a preliminary design.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers who are or will be involved in the geotechnical aspects of the design and construction of transportation facilities through problem soils. An undergraduate degree in geology, engineering geology, civil engineering or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Silas Nichols	(410) 962-2460	<a href="mailto:silas.nichols@fhwa.dot.gov">silas.nichols@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132035A**Course Title:** Rock Slopes

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

The participants will receive a comprehensive Reference Manual (FHWA-HI-99-007) and the accompanying Student Exercise (FHWA-HI-99-036). The Reference Manual is a comprehensive reference on investigation, design, and construction of rock slopes for highway/geotechnical engineers, and is geared to the practicing engineer who is involved with rock slope design and stabilization, but may not have the complete theoretical background. The Student Exercises (FHWA HI-99-036) are designed to promote interaction in the classroom, and to illustrate the basic principles and analyses. Solutions to the exercises are included with each exercise.

**Description:**

The course presents appropriate geological investigation techniques, shear strength theories and determination of rock strength, and various design methods for rock slopes with different failure mechanisms. Other topics include: rock blasting, rock slope stabilization methods and contracting issues. Classroom instructions include the discussion of sample problems and case histories involving rock slope analyses and design.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the basic principles of rock slope design.
- Plan and execute a geological investigation including geologic mapping.
- Perform appropriate in-situ and laboratory strength tests.
- Determine rational design rock strength parameters by proper evaluation of in-situ and laboratory test data along with appropriate rock strength correlations.
- Identify the failure mechanisms associated with rock slopes and apply appropriate design methodologies.
- Design effective rock-fall protection and slope stabilization measures.
- Design a monitoring program for cut slopes.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers/geologists who are or will be involved in the design, excavation and stabilization of rock slopes. An undergraduate degree in geology, engineering geology, civil engineering, or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Barry Siel	(303) 716-2191	<a href="mailto:barry.siel@fhwa.dot.gov">barry.siel@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132036A**Course Title:** Earth Retaining Structures

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course addresses the selection, design, construction and performance of earth retaining structures used for support of fills or excavations and cut slopes. Factors that affect wall selection are discussed, including contracting approaches with an emphasis on required bidding documents for each approach. Class discussions will include design procedures and case histories, demonstrating the selection, design and performance of various earth retaining structures.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize potential applications for retention structures used in transportation facilities.
- Select the most technically appropriate and cost-effective type of retaining wall for the application from a thorough knowledge of available systems.
- Examine and select appropriate material properties, soil design parameters and earth pressure diagrams.
- Prepare conceptual and basic (i.e., for simple geometry) designs, using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods and be able to appraise contractor submitted designs.
- Select appropriate specification/contracting method(s) and prepare contract documents.
- Demonstrate a clear understanding of retaining wall construction and maintenance.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers/geologists who are or will be involved in the design, excavation and stabilization of rock slopes. An undergraduate degree in geology, engineering geology, civil engineering, or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Barry Siel	(303) 716-2191	<a href="mailto:barry.siel@fhwa.dot.gov">barry.siel@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132037A**Course Title:** Shallow Foundations

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

The participants will receive a comprehensive Reference Manual on investigation, design, and construction of shallow foundations used by highway/geotechnical engineers that will be referred to during the course so the participants will become familiar with its contents. The student exercises book is an interactive teaching tool for the course.

**Description:**

This course provides transportation earthwork professionals with the necessary skills to design shallow foundations for transportation applications, and consider the construction and inspection implications on the design. The course will be of most benefit to geotechnical engineers, engineering geologists, foundation designers, project engineers, and highway/bridge engineers who are involved in design and construction of foundations for surface transportation projects. Presentation of the course is in an interactive format so that the participants are actively involved in the learning experience.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize potential failure modes or deformation types for soil slopes and embankments.
- Develop the ability to judge when shallow foundations should be considered.
- List the failure modes of shallow foundations.
- Determine the bearing capacity of shallow foundations on soils and rocks.
- Calculate vertical stress distribution below a shallow foundation.
- Determine the primary consolidation settlement of shallow foundations on cohesive soils.
- Determine the settlement of shallow foundations on cohesionless soils.
- Identify problematic soils that may be encountered.
- List the soil improvement techniques that may be used to improve the performance of shallow foundations.
- List ground improvement techniques that may be used to improve the performance of shallow foundations.
- Describe procedures for construction inspection and performance monitoring of shallow foundations.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers/geologists who are involved in the analysis, design, construction, maintenance, and remediation of soil slopes and embankments on surface transportation facilities. An undergraduate degree in civil engineering or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132040A**Course Title:** Geotechnical Aspects of Pavements

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**NEW COURSE.** Available Summer 2004.**Description:**

This course covers the latest methods and procedures to address the geotechnical issues in pavement design, construction and performance for new construction, reconstruction, and rehabilitation (e.g., road widening) pavement projects. The course content includes: geotechnical exploration and characterization of in place and constructed subgrades; designing and constructing pavement subgrades and unbound materials for paved and unpaved roads with emphasis on the mechanistic-empirical design approach, including the three levels of design inputs; the overall geotechnical and drainage aspects of bases, subbases and subgrades (for a safe, cost-effective and durable pavement); and, construction and inspection of pavement projects.

The goal of this course is to have each participant recognize the essential importance of the geotechnical aspects relevant to the design, construction and performance of a pavement system. Participants completing this course will develop an appreciation for adequate subsurface exploration and laboratory characterization of subgrade soils as well as the requisite design parameters for unbound base layers and drainage features in relation to pavement design. The course is designed so that maximum input will be elicited from the students, particularly regarding an understanding of the impact of geotechnical features on the long-term performance of pavement systems.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the geotechnical parameters of interest in pavement design and their effect on the performance of different types of pavements.
- Explain the influence of climate, moisture, and drainage on pavement performance.
- Identify and explain the impact of unsuitable subgrades on pavement performance.
- Determine the geotechnical inputs needed for design of pavements.
- Evaluate and select appropriate remediation measures for pavement subgrades.
- Explain the geotechnical aspects of construction specifications and inspection requirements.
- Identify subgrade problems during construction and develop recommended solutions.

**Target Audience:**

Pavement, geotechnical, construction and material engineers and geologists who are or will be involved in the design, evaluation and construction of pavements. An undergraduate degree in civil engineering, geology or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Sam Mansukhani	(708) 283-3550	<a href="mailto:sam.mansukhani@fhwa.dot.gov">sam.mansukhani@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132041A**Course Title:** Geotechnical Instrumentation

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course is designed to provide the student with the necessary knowledge and skills to plan, select, and implement instrumentation programs in geotechnical features for construction monitoring and performance verification. The course will discuss measurement tools, including recommendations for a systematic and complete approach to planning monitoring programs. Recommendations for the selection of proper instrumentation for various types of construction are presented. Field tasks covered include: calibration, maintenance and installation of instrumentation, collection of instrumentation data, processing and presentation of collected data, interpretation of processed data and reporting of results.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize effective uses of geotechnical instrumentation in transportation projects.
- Identify benefits of instrumentation to help participants promote instrumentation programs to their teams (ultimate benefit - save money).
- Recognize the need to follow a systematic approach when planning, selecting, and executing an instrumentation program and identify the components of a systematic approach.
- Identify available instrumentation and how it is used for answering key geotechnical questions.
- Identify where to find additional information and assistance.
- Perform an evaluation of the need for and potential benefits of geotechnical instrumentation on a project.

**Target Audience:**

FHWA, State, and local highway agency employees, college and university faculty, and consultant engineers/geologists who are or will be involved in the design, evaluation and construction of pavements. An undergraduate degree in civil engineering, geology or equivalent engineering experience in the highway/transportation field is desirable.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132042A

**Course Title:** Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

The course reference manuals "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes: Design and Construction Guidelines" and "Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes" were updated in 2001 and curriculum materials were developed to provide interactive training for the adult learner.

**Description:**

Mechanically Stabilized Earth Walls (MSEW) and Reinforced Soil Slopes (RSS) are two modern methods of earth fill construction which are extremely cost effective and aesthetically pleasing. The basic concept behind these related methods is to combine soil, reinforcing materials made of steel or polymers and appropriate facing to produce a composite material with improved engineering properties. Both MSEW and RSS provide substantial construction time and cost savings when compared with other conventional types of earth-retaining systems.

The goal of this course is to provide agencies with state-of-the-practice design tools and construction practices to initiate or continue implementation of mechanically stabilized earth technology for routine use of cost effective earth retention structures. This course would be of most benefit to persons who are involved in design and construction of earth retention structures for surface transportation projects.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize potential applications for MSEWs and RSS structures for use in transportation facilities.
- Prepare conceptual and basic (i.e., for simple geometry) designs, and be able to check contractor submitted designs for walls and slopes.
- Examine and select appropriate material properties and parameters used in design.
- Calculate cost of conceptual MSEWs and RSS structures, and determine if construction is a cost-effective option.
- Select appropriate specification/contracting method(s). Prepare detailed materials and methods of construction specifications.
- Define and communicate major components of construction inspection of MSEWs and RSS structures, to confirm compliance with design.

**Target Audience:**

Primary audience is agency and consultant bridge/structures, geotechnical, and roadway design engineers; engineering geologists; and consultant review specialists. Additionally, management, specification and contracting specialists, and construction engineers interested in design and contracting aspects of MSEW and RSS structures are encouraged to attend. Attendees should have a basic knowledge of soil mechanics and structural engineering. (Note that NHI offers a 1-day MSEW and RSS Construction course (No. 132043), and the target audience for that course is construction engineers, inspectors, and technicians.)

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>
	Rich Barrows	(360) 619-7704	<a href="mailto:rich.barrows@fhwa.dot.gov">rich.barrows@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132043A**Course Title:** Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

The course reference manuals "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes: Design and Construction Guidelines" and "Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes" were updated in 2001 and curriculum materials were developed to provide interactive training for the adult learner.

**Description:**

Mechanically Stabilized Earth Walls (MSEW) and Reinforced Soil Slopes (RSS) are two modern methods of earth fill construction which are extremely cost effective and aesthetically pleasing. The basic concept behind these related methods is to combine soil, reinforcing materials made of steel or polymers and appropriate facing to produce a composite material with improved engineering properties. Both MSEW and RSS provide substantial construction time and cost savings when compared with other conventional types of earth retaining systems.

The goal of this course is to provide agencies with current construction practices for continued, or to initiate, implementation of mechanically stabilized earth technology for routine use of cost effective earth retention structures. This course is most beneficial to persons who are involved in construction of earth retention structures for surface transportation projects.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize potential applications for MSEWs and RSS structures for use in transportation facilities.
- Recognize differences between available systems and their components.
- Understand the intent of specification/contracting method(s).
- Define and communicate major components of construction inspection of MSEW and RSS structures, to confirm compliance with design.

**Target Audience:**

Primary audience is agency and consultant construction engineers, inspectors and technicians. Additionally, management; specification and contracting specialists; bridge/structures, geotechnical, and roadway design engineers; and engineering geologists interested in construction aspects of MSEW and RSS structures are encouraged to attend. Attendees should have a basic knowledge of soil mechanics and structural engineering. (Note that NHI offers a 3-day Design of MSEW and RSS Structures course (No. 132042), and the target audience of that course is bridge/structures, geotechnical, and roadway design engineers; and engineering geologists.)

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jerry DiMaggio	(202) 366-1569	<a href="mailto:jerry.dimaggio@fhwa.dot.gov">jerry.dimaggio@fhwa.dot.gov</a>
	Rich Barrows	(360) 619-7704	<a href="mailto:rich.barrows@fhwa.dot.gov">rich.barrows@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132069A**Course Title:** Driven Pile Foundation Inspection

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course was developed to provide a basis for local, regional or national qualification for pile driving inspectors of all States. Its goal is to provide inspectors with the practical knowledge and accepted standard industry practices for the inspection of pile driving construction operations.

To establish a national standard for transportation personnel, this course was developed based upon the existing Florida DOT's Pile Driving Inspector's Qualification course materials, the 2000 AASHTO Bridge Construction Specifications, and FHWA/NHI courses 132021 "Driven Pile Foundations - Design and Construction," and 132022 "Driven Pile Foundations - Construction Monitoring." However, the local specifications, inspection reports, and plan sheets available from the hosting agency also will be discussed. The course includes a 3-hour qualification examination.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the inspector's role, duties and responsibilities.
- Describe the pile driving system components.
- Recognize key inspection elements of the contract documents.
- Identify proper communication and coordination with the engineer and contractor.
- Identify the key elements of a pile installation plan.
- Recognize and identify pile driving system components and tools.
- Verify tip elevations, cutoff elevations, pile penetration and length driven for vertical and battered piles.
- Perform inspection of pile driving operations and verify compliance to construction tolerances.
- Recognize "when to stop driving" based upon provided driving criteria, minimum tip or penetration and refusal guidelines.
- Verify pile condition, labeling and marking for compliance.
- Recognize and explain the difference between test piles and production piles and the various types of pile testing.
- Identify "driving" irregularities.
- Identify and document pay quantities.
- Interpret and apply applicable AASHTO specifications relating to foundation acceptance.
- List potential problems and safety issues.

**Target Audience:**

Foundation or major structures inspectors involved in inspection of pile driving operations during construction. Additionally, project management and construction engineers in charge of pile driving construction inspection are encouraged to attend. Attendees should have completed courses in Basic Construction Plan Reading, Basic Construction Math and high school algebra.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Peter Osborn	(401) 528-4550	<a href="mailto:peter.osborn@fhwa.dot.gov">peter.osborn@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132070A**Course Title:** Drilled Shaft Foundation Inspection

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The Drilled Shaft Foundation Inspection course is a stand-alone training course developed to provide a basis for local, regional, or national qualification of drilled shaft foundation inspectors. The goal of this course is to provide drilled shaft foundation inspectors with practical knowledge and standard industry practices for the inspection of drilled shaft foundation construction. This course is designed to be of most benefit to foundation inspectors, who are responsible for or involved in providing inspection of drilled shafts during construction. Presentation of the course is in an interactive format so that the participants are actively involved in the learning experience. A two-hour qualification exam is administered on the third day of the course.

The course follows recommended FHWA specifications and practices for drilled shaft construction. This course may be modified to follow local agency specifications and practices, which may deviate from recommended FHWA specifications and practices.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify and understand the role and duties of the inspector.
- Recognize key inspection elements of the contract documents.
- Identify proper communication and coordination with the engineer and contractor.
- Interpret and verify contractor compliance with drilled shaft installation plan items.
- Recognize and identify drilled shaft construction equipment and tools.
- Perform visual field verification of soil/rock material for comparison to supplied soil boring data/logs.
- Calculate percent recovery and Rock Quality Designation (RQD).
- Recognize and identify the various types of drilled shaft construction.
- Perform inspection of drilled shaft excavations for compliance to plans, construction tolerances and cleanliness.
- Recognize and explain pre-mix mineral and polymer slurry tests and various integrity tests.
- Verify reinforcing cage construction compliance including side spacers and SCL requirements.
- Determine theoretical shaft concrete volumes and develop concrete curves.
- Identify shaft "concreting" irregularities.
- Perform calculations for volume, area, circumference and elevation.
- Locate, explain, and apply applicable FHWA guide specifications/AASHTO/State DOT specifications relating to compliance.
- Identify potential problems and safety issues.
- Perform required reporting and pay quantity calculations.

**Target Audience:**

The primary audience is agency and consultant foundation or major structures inspectors. Additionally, project management and construction engineers in charge of drilled shaft construction inspection are encouraged to attend.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Peter Osborn	(401) 528-4550	<a href="mailto:peter.osborn@fhwa.dot.gov">peter.osborn@fhwa.dot.gov</a>

## Geotechnical

**Course Number:** 132078A**Course Title:** Micropile Design and Construction

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

Under development - anticipated availability for scheduling is Fall of 2004. The course runs from 8:00 am the first day to 4:00 pm the second day.

**Description:**

This course is directed toward the practicing geotechnical, foundation and structural engineer who have basic knowledge and experience in the design and construction of deep foundations. This course compares and contrasts micropiles with traditional deep foundation types, presents a stepwise procedure for the design of micropiles, and discusses aspects and issues concerning construction, inspection and integrity testing. Classroom presentations include exercises that will lead participants through the complete design of a micropile. The use of micropiles for slope stability applications is also discussed. Each participant will take away a notebook containing a complete micropile design, completed exercises and micropile reference manual.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the characteristics, benefits and limitations of micropiles.
- Describe the sequence of micropile construction and the typical materials used.
- Perform geotechnical and structural design for micropiles in structural foundation support applications.
- Describe design concepts and methods for micropile slope stabilization and earth retention systems.
- Describe the difference between the various types of load tests and the different load test factors.
- Describe the construction process and testing of micropile systems to ensure compliance with the contracting specifications.
- Identify the items included in and appropriately apply the different types of specifications and contract.
- Evaluate if micropiles are likely to be an option that is viable and cost effective.

**Target Audience:**

Geotechnical specialists, foundation engineers, bridge engineers, and foundation construction engineers involved with the design and construction of structure foundations. The primary goal is to provide the target audience with guidance on when it is appropriate to use micropiles and the state-of-the-art in the design and construction of micropiles.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Barry Siel	(303) 716-2191	<a href="mailto:barry.siel@fhwa.dot.gov">barry.siel@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133005A**Course Title:** Highway Capacity and Quality of Flow

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting organization is responsible for providing computers with the following minimum requirements: 133 MHz Intel Pentium® II Processor or equivalent with 32 MB RAM, Windows 95 (SR-1) or NT 4.0 with Service Pack 6a, color monitors, 20 MB of available disk space. NOTE: Maximum of two participants per terminal.

**Description:**

This course provides basic instruction in the use of the 2000 Highway Capacity Manual (HCM). Software is employed in most of the capacity analyses performed in the course. Approximately one-half of the course is dedicated to sessions on interrupted flow facilities (i.e., signalized intersections, unsignalized intersections and arterials). The remainder of the course covers freeways, weaving sections, ramps, multilane, and two-lane rural facilities. The course includes lectures describing the procedures for performing capacity analyses on each type of highway facility. Demonstrations and hands-on application of the highway capacity software are used to solve example and workshop problems.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain facility characteristics and their limits as used in the HCM 2000 English.
- Explain analytical procedures and how to apply them.
- Use formulas by inputting data, reviewing and adjusting default values or adjusting factors, as necessary, for project and local conditions.
- Determine LOS from results.

**Target Audience:**

State, local, FHWA, contractors, and MPOs who design and analyze intersections, interface with freeways, deal with signal time issues, design and manage operations of urban streets, plan for type of intersections for future needs, work with system(s) monitoring and management of arterial systems; or who conduct operational analysis to determine needs of highway facility, estimate the level of service for new/proposed and existing operations, and manage freeway systems.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	John Halkias	(202) 366-2183	<a href="mailto:john.halkias@fhwa.dot.gov">john.halkias@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133010A**Course Title:** Computerized Traffic Signal Systems

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course presents current technology and control options available for computerized traffic control, including microcomputer applications. The course covers the technical issues of a computerized traffic control system and steps necessary to develop and manage a system using the Systems Engineering process. These steps begin with establishing system requirements, followed by understanding and combining system elements, evaluating and selecting the system, installation, as well as operation, maintenance and continuing system evaluation.

**Outcomes:** Upon completion of the course, participants will be able to:

- Discuss and apply the Systems Engineering Process.
- Identify procedures for system feasibility and conceptual design.
- Identify signal system functional requirements and capabilities.
- Identify system components and configurations.
- Discuss signal timing and operational strategies.
- Identify system design documents and system implementation process.
- Identify operations, maintenance and performance evaluation elements.

**Target Audience:**

Traffic engineering personnel from State, Federal, and local agencies involved in the technical aspects of traffic engineering. The course will not assume any prior knowledge of computers and thus will describe the theory of operation and the manner in which it can be applied to traffic signal controls.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Pamela Crenshaw	(202) 366-1482	<a href="mailto:pamela.crenshaw@fhwa.dot.gov">pamela.crenshaw@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133028A**Course Title:** Traffic Control Signalization and Software

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

This course will be available in Spring 2004.

**Description:**

There is a need to understand that the congestion and delays that exist on our streets and roadways can be managed better with a thorough understanding of effective traffic signal timing and the optimization of well developed, designed, implemented, maintained and operated traffic signal control projects are essential to this process. Engineering tools are available to design, optimize, analyze, and simulate traffic flow. This course addresses the application of the Manual of Uniform Traffic Control Devices (MUTCD) to intersection displays, as well as signal timing, computerized traffic signal systems, control strategies, integrated systems, traffic control simulation and optimization software. The course is divided into three parts: Traffic Signal Timing and Design, Traffic Signal Systems, and Traffic Software.

**Outcomes:** Upon completion of the course, participants will be able to:

- Make basic decisions regarding traffic signal timing and progression.
- Develop and fine tune traffic signal timing plans.
- Discuss the available computer software for optimizing signal timing and progression.
- Identify the proper signal timing optimization, traffic control signalization, and evaluation techniques for a signal project.
- Discuss the procedures for traffic control signalization projects.
- Explain the traffic signal warrants of the Federal MUTCD and be able to apply them.
- Correctly locate signal heads, detectors, and other traffic signal equipment relative to the roadway.
- Identify the different types and capabilities of traffic detectors as well as their correct placement for low and high speed approaches.
- Be able to accommodate pedestrian traffic in terms of physical location as well as signal phasing.
- Be able to determine the need for pre-timed, actuated, or volume density type strategies.
- Explain when to apply simulation software to fine tune or validate signal timings.

**Target Audience:**

Public sector traffic engineers and traffic engineering technicians involved in the development, design, review and inspection of traffic control projects.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Pamela Crenshaw	(202) 366-1482	<a href="mailto:pamela.crenshaw@fhwa.dot.gov">pamela.crenshaw@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133048A**Course Title:** Managing Traffic Incident and Roadway Emergencies

Fee	Length
\$4500 Per Session	1 Day (CEU: 0.6 Units)
\$6900 Per Session	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 35

Maximum number of participants for 1 and 2 day course can be increased with prior approval by NHI Training Program Manager. Per session course fees will adjust accordingly, dependent upon number of participants.

**Description:**

This course is part of the core ITS curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course addresses institutional and technical aspects of safe and efficient resolution of traffic incidents and other roadway emergencies. The course focuses on practices to obtain good inter-agency and inter-disciplinary understanding and cooperation.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the program elements needed for a formalized multi-agency program to manage traffic incidents and roadway emergencies.
- Formulate techniques for effective on-site management of incidents.
- Identify technological solutions to facilitate the management of incidents.
- Develop a short-term list of 'next step' actions to improve multi-agency response to both major and minor traffic incidents.

**Target Audience:**

Persons at mid or upper-management levels in various agencies who direct the resources of their agencies at the scene of a traffic incident or in response to an incident. Agencies which should be represented at workshops include: law enforcement, fire and rescue (including emergency medical), emergency communications, transportation (including traffic management and highway maintenance), planning, towing and recovery, traffic reporting media, hazardous materials contractors and other emergency management personnel responding to traffic emergencies on freeways and arterial streets.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	David Helman	(202) 366-8042	<a href="mailto:david.helman@fhwa.dot.gov">david.helman@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133072A**Course Title:** High Occupancy Vehicle (HOV) Facilities

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

Please call Danielle Mathis-Lee for more detailed information regarding different course options. (New, Fall 2004.)

**Description:**

The HOV Facilities training course will provide participants with a general appreciation and understanding of the key policies, technical, and other issues to consider in the planning, design, implementation, management, operation, and marketing of HOV facilities. HOV facilities are a proven and viable operational strategy to help move more people along congested urban and suburban routes. HOV facilities are a strategy to assist public agencies and transportation services providers to address the identified mobility, safety, productivity, environmental, and quality of life needs in metropolitan areas. The technical reference for this course is the NCHRP Report 414: HOV Systems Manual.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify and discuss the concepts, goals and benefits of HOV facilities.
- Describe the public involvement and marketing techniques that may be appropriate in the planning, design, or operation of an HOV facility or system.
- Identify the different types of freeway and arterial HOV facilities, their operational characteristics, and the conditions where they may be successful.
- Identify the primary stakeholders involved with HOV systems along with the key policies, institutional issues, and interest to integrate into the planning, development, implementation, and operation of HOV facilities.
- Identify the major types of vehicles expected to use an HOV facility or regional system and the key operational characteristics to consider.
- Discuss the range of studies, methodologies, tools, and analysis appropriate to use in planning individual HOV facilities or a regional HOV system.
- Discuss the key roadway, operational, and enforcement issues to consider in the planning, design, and implementation phases of HOV facilities.

**Target Audience:**

Traffic engineers, transportation planners, roadway design engineers, transportation managers/supervisors, transit planners, transit managers/supervisors, and public information specialists who are involved in the planning, design, management, operations, and marketing of an HOV system. Pre-training Competencies: Individuals attending this course should have a basic understanding of traffic engineering or transportation planning principles, along with an appreciation of the elementary concepts of traffic management strategies, traffic flow theory, roadway improvement planning, project design processes, public outreach and marketing.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Jon Obenberger	(202) 366-2221	<a href="mailto:jon.obenberger@fhwa.dot.gov">jon.obenberger@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133075A

**Course Title:** Freeway Traffic Operations

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)
\$650 Per Participant	5 Days (CEU: 3 Units)

**Class Size:** Minimum 20; Maximum 30

Course update to be completed in Fall 2004.

**Description:**

The course modules include system engineering, traffic flow theory and concepts, impacts of design on operations, data collection and management, data analysis and assessment, traffic operation and control strategies, traffic incident management, management, information systems, data communications, and traffic control centers.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the interrelationships between various strategies used to manage travel and control traffic on freeways.
- Discuss how the application of traffic operations principles and concepts to the roadways geometric design process can influence the interaction between drivers, their vehicles, and the highway environment.
- Describe how traffic operations should be considered with freeway planning, design, construction, management, operations, safety, and maintenance issues.
- Describe the basic traffic flow theories, procedures, and techniques for analyzing freeway operations.
- Recognize the role and most effective methods for collecting and using data to manage a freeway system and controlling traffic.
- Analyze the operational quality of various components of a freeway system using the procedures and techniques described in the course.
- Describe alternatives for managing and controlling freeway travel and its impact on traffic operations.
- Assess the potential impacts of various types of incidents and the potential for various strategies or plans to mitigate the impacts on traffic operations.
- Identify the potential of various plans and procedures to mitigate the impacts of scheduled activities or events on freeway operations.

**Target Audience:**

Federal, State, and local transportation professionals involved in planning, design, and implementation of freeway improvement projects and the day-to-day management of travel and control of traffic on freeway facilities.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Jon Obenberger	(202) 366-2221	<a href="mailto:jon.obenberger@fhwa.dot.gov">jon.obenberger@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133077A**Course Title:** Transient Protection, Grounding, and Shielding of Electronic Traffic Control Equipment

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides participants with information on how to protect equipment from lightning strikes and other transients. The course fee includes the cost of the course reference manual for each participant (\$15.00).

**Outcomes:** Upon completion of the course, participants will be able to:

- Design or evaluate equipment protection proposals.
- Determine the adequacy of plans and specifications for protecting equipment.
- Communicate with traffic control signalization specialists regarding equipment protection.
- Promote adequate protection of electronic traffic control equipment.

**Target Audience:**

Federal, State and local traffic engineers involved in the design, review and inspection of traffic control projects. Consultants working in the highway industry may also purchase the course.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Raj Ghaman	(202) 493-3270	<a href="mailto:raj.ghaman@fhwa.dot.gov">raj.ghaman@fhwa.dot.gov</a>

## Design and Traffic Operations

**Course Number:** 133078A

**Course Title:** Access Management, Location and Design

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course covers access management along streets and highways. General benefits, as well as the social, economic, political and legal implications of access control are examined. Existing access management practices and policies from States and jurisdictions are used as examples of what types of programs have been implemented and how effective they have been. Through in-depth discussion, access management techniques and the warrants for their use are reviewed. Guidelines for design and application of these access management techniques are described in detail. Strategies for developing and implementing retrofit programs to improve existing access control are presented. The course presents several "before" and "after" case studies, which show the impacts of retrofit programs on local businesses. Techniques and procedures for evaluating the impacts of access control on the safety and operations of the highway system are also covered.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the various elements involved in planning, developing, implementing, and administering an effective access management program.
- Assess the safety and operational impacts of alternative access management techniques.
- Demonstrate convincingly the merits of obtaining and maintaining good access management along streets and highways.

**Target Audience:**

This course is designed for Federal, State, and local planners and engineers who are currently involved or expect to be involved in decisions on, and/or design of, access to existing or new sites.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	John Harding	(202) 366-0640	<a href="mailto:john.harding@fhwa.dot.gov">john.harding@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134001A**Course Title:** Principles of Writing Highway Construction Specifications

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

Additional resource for highway specifications: The National Highway Specifications web site is now available at <http://fhwapap04.fhwa.dot.gov/index.jsp>.

**Description:**

This course addresses the engineering, legal aspects, and linguistics of writing specifications. THIS IS NOT A COURSE IN TECHNICAL WRITING! The course, however, addresses the issues of how to draft new specifications or rewrite existing ones in clear, readable, and definitive statements of contract requirements. Classroom activities include: lectures, case studies, workshops and writing assignments.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize and apply the principles to write clear, concise, complete, and technically correct specifications.
- Write specifications in the active voice imperative mood.
- Write specifications without ambiguities and with measurable standards.
- Describe the difference between traditional methods specifications and statistically-based quality assurance specifications.
- Identify newer types of procurement and contracting methods.
- Demonstrate appreciation for the importance of specifications for highway construction contracting.

**Target Audience:**

Personnel working in contract administration, design, materials selection and quality control, and the management of highway construction, including contribution of information in contract provisions. This includes specification writers who use the information in writing the formal contract documents.

**PREREQUISITES:** This course is not for beginners! Participants must have experience (five years minimum) in at least one of the following disciplines: Contract Administration, Materials, Specification Writing, Roadway or Bridge Design, Roadway or Bridge Construction.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Chris Newman	(202) 366-2023	<a href="mailto:christopher.newman@fhwa.dot.gov">christopher.newman@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134005A**Course Title:** Value Engineering Workshop

Fee	Length
\$650 Per Participant	5 Days (CEU: 3 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

Value Engineering is the systematic process of review and analysis of a project during its design/development phase to provide suggestions for reducing its total cost while providing an equal or better quality project. A Value Engineering review is made by a multi-disciplined team who: (1) investigate/analyze the design of an existing project; (2) analyze project functions and costs; (3) creatively speculate on alternative ways to perform the various functions; (4) evaluate the best and/or least life-cycle alternatives; (5) develop acceptable alternatives into fully supported recommendations; and (6) present the team's recommendations to management. This workshop provides the Value Engineering education necessary for the participants to successfully participate in future value studies. It also encourages formation of interactive Value Engineering teams at the State and division office levels. The workshop incorporates value analysis of actual projects furnished by the host agency.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the difference between Value Engineering and other cost reduction or problem solving techniques.
- Identify areas where the application of Value Engineering techniques have potential for savings in financial or material resources.
- Participate in a Value Engineering team and provide guidance to team members who have less experience.
- Support the use of Value Engineering, recognizing it as a management tool for product improvement and cost reduction

**Target Audience:**

Professional and technical staff of FHWA and State highway/transportation departments, including officials of local transportation agencies involved in recurrent Federal-aid work.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Donald Jackson	(202) 366-4630	<a href="mailto:donald.jackson@fhwa.dot.gov">donald.jackson@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134006A**Course Title:** Highway/Utility Issues

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

This course is designed to include participants from highway agencies and from utilities. Hosting agencies should make every effort to ensure both are present.

**Description:**

This course presents the fundamentals of effective coordination of utility relocation and accommodation issues throughout the planning, design, construction, and maintenance phases of a highway project. Participants from both highway and utility communities will be involved throughout the course, demonstrating their knowledge through workshops, exercises, and other activities. The course will include methods for measuring the attainment of learning objectives. Two instructors will facilitate the course, one experienced in highway matters, the other in utility matters.

**Outcomes:** Upon completion of the course, participants will be able to:

- Locate utility issues and concerns during the project development process and flag opportunities for early coordination.
- Identify the critical processes related to utilities for permits, relocation, and project construction.
- Be able to read a plan and profile sheet.
- Be able to use templates for creating a simple plan for establishing the proper traffic control plan (TCP).
- Describe successful practices that might be considered as options for each phase of a project.

**Target Audience:**

Federal, State, and local highway agencies, and public/private utility companies responsible for highway/utility coordination.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Roger McClellan	(202) 366-6765	<a href="mailto:roger.mcclellan@fhwa.dot.gov">roger.mcclellan@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134029A**Course Title:** Bridge Maintenance Training

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course focuses on cost-effective bridge maintenance and repair procedures performed by typical transportation agency crews. Included are step-by-step instructions for preparing for and performing maintenance and repair on common bridge elements. Bridge preservation is emphasized throughout. While engineers often attend, the material is designed for bridge crew supervisors and technicians.

**Outcomes:** Upon completion of the course, participants will be able to:

- Justify, develop and implement a cost-effective preservation strategy for a group of bridges.
- Understand problems related to deferred maintenance, including the bridge condition decline, more expensive reactionary maintenance activities, and unsatisfactory public relations.
- Identify maintenance or repair needs and select the best remedial strategy. Understand properties and preservation options involving common bridge materials such as concrete, steel and timber.
- Describe the step-by-step tasks required to accomplish proven preservation procedures on the various bridge elements.
- Identify critical members and avoid procedures that might result in damage such as field welding repairs on fracture critical tension members.
- Recognize problems that warrant specialized expertise, for example, soliciting the involvement of a qualified structural engineer when repairing structural damage.
- Collect and report bridge maintenance data necessary to properly document agency records.
- Exercise effective management techniques (such as planning, scheduling, monitoring and reporting) during daily bridge maintenance operations.

**Target Audience:**

State and local bridge maintenance technicians and supervisors.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	George Romack	(202) 366-4606	<a href="mailto:george.romack@fhwa.dot.gov">george.romack@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134042A

**Course Title:** Materials Control and Acceptance - Quality Assurance

Fee	Length
\$600 Per Participant	4.5 Days (CEU: 2.7 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

The course provides participants with an understanding of the basic elements of a statistically-based quality assurance program. The following sessions are included in the course: Introduction, Sampling Theory, Organization of Data, Analysis of Data, The Normal Distribution, Sources of Variability, Process Control, Acceptance Plans and Risks, Percent Within Limits Acceptance Plans, Implementation and Summary.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the importance of organizing data, necessary forms of data organization and how to plot frequency histograms.
- Recognize how a sample relates to the population, including the myth of a single representative sample, establish and use random stratified sampling plans.
- Calculate population and sample means standard deviations and coefficient of variation.
- Recognize the relationship between single and multiple samples.
- Recognize basic probability concepts, illustrate the relationship of histograms to probability density functions and calculate areas under normal distribution curves.
- Explain the meaning of the terms precision, accuracy, and bias.
- Identify sources of variability and how to use precision and bias statements.
- Develop and apply process control plans, including how to calculate control chart limits and to plot and interpret statistical control charts.
- Recognize the strengths and weaknesses of acceptance plans based on sample means and percent within limits.
- Recognize the different types of specifications and how they work, including the inputs to specifications and requirements for the use of contractors.
- Recognize the elements of acceptance plans, including buyer and seller risks.
- Recognize the elements of a quality assurance system.

**Target Audience:**

Federal, State, and local highway agency engineers in materials, construction, research and other highway fields and technicians involved in specification development, laboratory, and field testing of highway materials.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Michael Rafalowski	(202) 366-1571	<a href="mailto:michael.rafalowski@fhwa.dot.gov">michael.rafalowski@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134049A**Course Title:** Use of Critical Path Method (CPM) for Estimating, Scheduling and Timely Completion

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This training course is designed to educate State highway, FHWA, and industry project staff about the availability of effective construction and maintenance planning and scheduling tools that can help in providing visual representation of current project status, completed tasks, and expected completion of all activities. These tools can be focused to accelerate construction and minimize impact on the traveling public.

**Outcomes:** Upon completion of the course, participants will be able to:

- Create a CPM chart for a sample project using these basic components: a project definition, milestones and a Gantt chart, work schedules (including work breakdown schedules), and an activity network.
- Calculate resource needs and reserves, and propose resource leveling strategies.
- Prepare a risk analysis/management plan for the sample project.
- Use a complex CPM to determine the status of the project, identifying slack or float and delays.
- Describe methods for managing multi-project scheduling.

**Target Audience:**

Federal, State, local and private contractor project engineers/managers and related field personnel.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	Celso Gatchalian	(202) 366-1342	<a href="mailto:celso.gatchalian@fhwa.dot.gov">celso.gatchalian@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134054A**Course Title:** Design and Implementation of Erosion and Sediment Control

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

A joint effort between FHWA and the Environmental Protection Agency (EPA), this course reflects the agencies' commitment to providing education and training on planning, design, implementation, enforcement, inspection and maintenance strategies to control erosion and sediment on highway construction projects, as well as to ensure that regulatory issues are addressed accurately and uniformly. Each discipline involved in a highway construction project has a different set of priorities. Reflecting NHI's commitment to learner-centered training, the course offers participants opportunities for discussion and joint problem solving, through which they will gain information about the roles and responsibilities of other team members.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the components of an erosion and sediment control (ESC) plan.
- List the sources of information for the ESC plan.
- Identify management practices and related management measures that are appropriate for typical situations and for a case example.
- List typical construction and inspection problems. Describe both suitable prevention strategies and remedies for failures.
- Link Federal and State environmental regulations to the components of the ESC plan.

**Target Audience:**

A mix of Federal, State and local highway design, construction, inspection and maintenance staff; environmental agency representatives, as well as consultants and members of the construction industry are encouraged to attend to provide their perspectives, learn each other's responsibilities, and explore an array of options to erosion and sediment control.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Patricia Czenas	(202) 366-4085	<a href="mailto:patricia.czenas@fhwa.dot.gov">patricia.czenas@fhwa.dot.gov</a>

## Construction and Maintenance

**Course Number:** 134056A**Course Title:** Pontis Bridge Management

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 10; Maximum 20

In addition to the 2.5-day training, a 2-hour session has been developed as part of the course to serve as an introduction to the attributes and benefits of the Pontis program. This introduction is designed for Federal, State and local executives and upper and mid-level highway agency professionals responsible for an agency's bridge/highway program. Executives and management officials are encouraged to attend the opening introduction and overview sessions.

**Description:**

Pontis is a computer software program, owned and licensed by AASHTO, designed to assist bridge managers and practitioners in analyzing bridge data to predict future bridge conditions and needs, determine optimal policies, and recommend projects and schedules within budget and policy limitations. The course covers entering and editing inspection data, developing a bridge preservation policy, performing bridge network level analyses, developing bridge projects, running Pontis reports, and refining Pontis results. The course focuses on an agency's business process steps, key concepts of bridge management and their application to Pontis, using the software, instructor demonstration exercises, and practical student exercises. Each participant will receive a participant notebook. Six laptop computers containing the PONTIS 4.0 software and sample training database are furnished by the NHI for use in the training course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Use Pontis to support bridge management.
- View, enter and edit bridge inspection and inventory data.
- Develop, update, optimize and interpret a preservation policy.
- Enter program simulation inputs, run network analyses and review results.
- Create and rank bridge projects.
- View and interpret Pontis results.
- Generate and interpret reports.
- Customize Pontis to support agency business practices.

**Target Audience:**

This course is designed for bridge program managers, bridge management engineers, bridge maintenance engineers, bridge inspectors, and project planning and programming personnel.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Ewa Flom	(703) 235-0524	<a href="mailto:ewa.flom@fhwa.dot.gov">ewa.flom@fhwa.dot.gov</a>
Technical Information	George Romack	(202) 366-4606	<a href="mailto:george.romack@fhwa.dot.gov">george.romack@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135010A**Course Title:** River Engineering for Highway Encroachments

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course provides training in the theory and application of alluvial channel flow, fluvial geomorphology, sediment transport, and river mechanics to the planning, location, design, construction, maintenance and operation of highways. Material for this course comes from Hydraulic Design Series 6 (HDS-6) and includes detailed coverage of sediment transport equations and computations. Additional topics include: stream gauging, sediment properties, sediment measurement, and river training. Case histories provide practical examples of problems that occur at highway crossings and encroachments of streams and rivers, and a computer generated 360 degree virtual tour site visit is used for a comprehensive workshop. Example problems will be worked by the course participants.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply open channel flow equations and concepts in the design and evaluation of highway hydraulic structures.
- Determine resistance to flow and sediment transport at highway crossings.
- Apply sediment transport and sediment continuity relationships for the analysis of stream bed degradation and aggradation.
- Evaluate the interrelationships between fluvial (river) geomorphology and hydraulic design.
- Integrate river mechanics equations, concepts and principles into the design, maintenance, evaluation and inspection of highways in the river environment.

**Target Audience:**

Engineers who are responsible for the evaluation of stream stability and the design of highway hydraulic structures. The course is designed for graduate engineers (BS) who have been trained in basic hydraulics of rigid-boundry, open channel flow.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135027A**Course Title:** Urban Drainage Design

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides a detailed introduction to urban roadway drainage design. Design guidance for solving basic problems encountered in urban roadway drainage design is provided. Topics to be discussed:

## HYDROLOGY

- Rational Equation
- Soil Conservation Method
- Regression Equations
- Synthetic Hydrographs

## HIGHWAY DRAINAGE

- Gutter Flow
- Roadway Inlet Interception
- Storm Drain Systems
- Energy and Hydraulic Grade Lines
- Detention Ponds
- Storm Water Management

The 4-day course includes the basic 3-day course, plus presentation of the 1-day course 135028 - Stormwater Pump Station Design.

**Outcomes:** Upon completion of the course, participants will be able to:

- Determine runoff (peak flows and volumes) from urban watersheds.
- Apply basic hydraulic principles to urban drainage design.
- Perform roadway drainage designs using various roadway inlets.
- Size and/or analyze storm drain conveyance systems.
- Establish the energy and hydraulic grade lines for storm drains.
- Design and/or analyze detention basins.
- Perform hydraulic design of pumping stations (with optional day 4).

**Target Audience:**

Highway designers with limited experience in drainage design, but familiar with mathematical concepts such as algebra and geometry and have some working background in hydrology and hydraulics.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Dan Ghere	(708) 283-3557	<a href="mailto:dan.ghere@fhwa.dot.gov">dan.ghere@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135028A**Course Title:** Stormwater Pump Station Design

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides an overview of the location and type selection of stormwater pump stations. A major portion of the course is devoted to recommended hydraulic design procedures for sizing and optimizing stormwater pump stations. This course is also offered as a one day add-on to NHI Course 135027 - Urban Drainage Design. Topics to be discussed include:

- 1) Site Considerations
- 2) Hydrology
- 3) Storage
- 4) Pump Configuration
- 5) Mass Curve Routing
- 6) Pump Selection
- 7) Sump Dimensions
- 8) Mechanical and Electrical Considerations

**Outcomes:** Upon completion of the course, participants will be able to:

- Determine locations where pump stations are appropriate.
- List types of pumps and pump stations.
- Apply basic hydraulic principles to accomplish graphical mass curve routing.
- Size pumps and determine start/stop elevations.
- Determine storage volume needed.
- Size wet wells according to industry standards.

**Target Audience:**

Highway designers with some experience in storm drainage design, familiarity with mathematical concepts such as algebra and geometry and have a working background in hydraulics and hydrology.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Dan Ghery	(708) 283-3557	<a href="mailto:dan.ghery@fhwa.dot.gov">dan.ghery@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135041A

**Course Title:** HEC-RAS, River Analysis System

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 20; Maximum 30

The host is responsible for providing 15 computers with the following minimum configuration: 850 MHz Intel Pentium® III Processor or equivalent with 128 MB RAM, Windows NT 4.0 with Service Pack 6a or 98 Second Edition or 95 (SR-1), 100 MB available disk space, CD-ROM drive, and 1024 x 768 color video display.

**Description:**

HEC-RAS is a computer program designed as the successor to the U.S. Army Corps of Engineers' Hydraulic Engineering Circular HEC-2, Water Surface Profiles program (WSPRO). The program incorporates the Standard Step Method for Water Surface Profile computations, bridge hydraulics, including the method presented in WSPRO, culvert hydraulics, flood encroachments, design of open channel flow, analyzing split flow options and sub and supercritical flow computations. The program can be used to compute bridge pier and abutment scour following the HEC-18 guidelines. The program is Windows-based and uses a Graphical User Interface for file management, data entry and editing, program execution and output display. It provides easy conversion from English to metric units and vice-versa.

Both courses provide an overview and hands-on experience with the computer program including modeling of bridges, but the 3.5 day version adds coverage of culvert modeling or multiple-opening bridges. A representative from the host agency is encouraged to contact the instructor when setting up the course to determine which length course would best suit the needs of the course participants and if the 3.5 day version is requested whether coverage of culverts or multiple-opening bridges is preferred. Each participant will receive a notebook containing the course notes, and a CD containing user documentation, HEC-RAS software and example computer workshops.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply the conservation of mass, energy and momentum to computations of water surface profiles, hydraulics of bridges and the hydraulics of culverts.
- Create cross section, bridge and culvert data files.
- Create flow files.
- Run the HEC-RAS computer program to solve all applications as presented in this course.
- Trouble-shoot the output data to determine the validity of the results.

**Target Audience:**

Federal, State and local hydraulic engineers who have responsibility for the design and analysis of river systems and stream crossings. Participants should have experience in using the Windows environment and knowledge of the fundamentals of open channel flow, including basic understanding of HEC-2 or WSPRO.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135046A**Course Title:** Stream Stability and Scour at Highway Bridges

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

See NHI Course 135047 for a description of the 1-day course for bridge inspectors.

**Description:**

This course provides comprehensive training in the prevention of hydraulic-related failures of highway bridges. The effects of stream instability, scour, erosion and stream aggradation and degradation are covered. Material for the 3-day course comes primarily from two Hydraulic Engineering Circulars (HEC), "Evaluating Scour at Bridges" (HEC-18), and "Stream Stability at Highway Structures" (HEC-20).

The course provides training in conducting a stream stability reconnaissance, stream classification, and qualitative analysis of stream response. Quantitative techniques are provided for estimating long-term degradation, and calculating the magnitude of general and local scour at bridge piers and abutments for simple and complex substructures. A comprehensive workshop integrates reconnaissance and analytical techniques to determine the need for a plan of action for correcting stream instability and scour problems.

NHI Course 135048 is a recommended subsequent course that provides training in the selection and design of countermeasures for stream instability and scour problems, including development of a plan of action and an introduction to fixed and portable instrumentation for scour monitoring.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify stream instability and scour problems at bridges.
- Define problems caused by stream instability and scour.
- Estimate the magnitude of scour at bridge piers and abutments and in the bridge reach.

**Target Audience:**

Federal, State and local highway hydraulic, structural, and geotechnical engineers and bridge inspectors responsible for maintaining the integrity of highway bridges against possible hydraulic related problems. Consultants who do bridge engineering work are encouraged to attend.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135047A

**Course Title:** Stream Stability and Scour at Highway Bridges for Bridge Inspectors

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

See NHI Course 135046 for a description of the 3-day course for identifying and analyzing stream stability and scour problems at highway bridges.

**Description:**

This course is an abbreviated presentation of NHI Course No. 135046. The course provides an understanding of and assistance in detecting hydraulic-related problems at highway bridges. The effects of stream instability, scour, erosion, and stream aggradation and degradation are covered. Countermeasures to these problems are discussed. This course concentrates on visual keys to detecting scour and stream instability problems and provides an introduction to portable scour monitoring instrumentation. The course emphasizes inspection guidelines to complete the hydraulic and scour-related coding requirements of the National Bridge Inspection Standards (NBIS). This course can be offered as a 1-day module in conjunction with the 3-day NHI Course 135046 or as a stand-alone presentation.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify stream instability and scour problems at bridges.
- Conduct field evaluations for scour and stream instability problems and properly code the results in the National Bridge Inventory.
- Recognize countermeasures for stream instability and scour.

**Target Audience:**

Federal, State and local highway bridge inspectors responsible for detecting possible hydraulic-related problems that may threaten the integrity of highway bridges. Consultants who do bridge inspection work for the States may attend if space is available.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135048A

**Course Title:** Countermeasure Design for Bridge Scour and Stream Instability

Fee	Length
\$335 Per Participant	2.5 Days (CEU: 1.5 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides an overview of countermeasures to highway related failures from the effects of stream instability, scour, erosion and stream aggradation and degradation problems. Material for the 2.5-day course comes primarily from Hydraulic Engineering Circular (HEC) "Bridge Scour and Stream Instability Countermeasures - Experience, Selection, and Design Guidance" (HEC-23).

Given a stream instability and scour problem, participants will select appropriate countermeasures to correct the problem. The course provides training in recommended strategies for developing a plan which includes appropriate countermeasures, including alternatives to conventional riprap and filter design.

Participants will apply hydraulics analysis techniques to countermeasure design and will select from seven available design guideline workshops for a detailed design workshop on four specific countermeasures. The course provides an introduction to fixed and portable instrumentation for scour monitoring using slides and video demonstrations. Participants will receive training in designing a monitoring program to reduce the risk from scour.

NHI Course 135046 provides training in identifying and analyzing stream instability and scour problems at highway bridges and is recommended as a prerequisite for this course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Develop a plan of action for a scour critical bridge.
- Propose countermeasures for stream instability and scour problems.
- Identify countermeasures for bridge scour and stream instability using the HEC-23 countermeasures matrix.
- Design selected countermeasures with HEC-23 design guidelines.

**Target Audience:**

Federal, State and local highway hydraulic, structural, and geotechnical engineers and bridge inspectors responsible for maintaining the integrity of highway bridges against possible hydraulic related problems. Consultants who do bridge engineering work are encouraged to attend.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135056A**Course Title:** Culvert Design

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides participants with the recommended design procedures for the hydraulic design of culverts. Material for the 3-day course comes primarily from "Hydraulic Design of Highway Culverts," Hydraulic Design Series No. 5 (HDS-5), which is provided to participants. "Hydraulic Design of Energy Dissipators for Culverts and Channels" (HEC-14) is discussed, but not provided. Culvert Hydraulic Design/Analysis Computer Program (HY-8) is discussed and demonstrated. However, this is not a "hands-on" computer course. A portable hydraulic flume is set up in the classroom for the participants to observe hydraulic principles and the hydraulic effects of culverts, improved inlets, pipe slope, material roughness and various end treatments. The participants measure velocity, discharge and headwater in the flume under various conditions and use the information to make actual design calculations.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify design alternatives based on culvert type, material, shape and service life considerations.
- Describe the factors that govern inlet and outlet control and describe how each factor influences culvert performance.
- Calculate tailwater depth and velocity and describe how tailwater affects culvert performance.
- Design conventional culverts using HDS-5.
- Improve culvert performance for inlet control culverts by designing an improved inlet using HDS-5.
- Evaluate culvert outlet velocity and the need for energy dissipators, and select alternative energy dissipators using HEC-14.
- Identify appropriate computer programs for culvert and energy dissipator design.

**Target Audience:**

The course is suitable for entry level personnel who have some drainage design experience or have taken NHI Course 135065A and is valuable as a refresher course for those with previous culvert design training or experience.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Joseph Krolak	(410) 962-0091	<a href="mailto:joseph.krolak@fhwa.dot.gov">joseph.krolak@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135065A

**Course Title:** Introduction to Highway Hydraulics

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course is based on Hydraulic Design Series No. 4 (HDS-4), "Introduction to Highway Hydraulics." The objective of the course is to provide a broad overview of basic highway drainage concepts. Fundamental hydraulic concepts are discussed, followed by open-channel flow principles and design applications of open-channel flow in highway drainage, including the design of stable channels, and pavement drainage. Closed-conduit concepts and applications in highway drainage include the application of culvert and storm drainage design. The presentation concludes with an introduction to concepts and design of energy dissipaters. Detailed design criteria are drawn from other Hydraulic Design Series manuals and Hydraulic Engineering Circulars, providing a broad overview of all components of highway drainage design with an emphasis on practical applications. A portable hydraulic flume is set up in the classroom for the participants to observe numerous hydraulic principles. The participants take velocity and discharge measurements from the flume while in various setups and use the information to make design calculations.

**Outcomes:** Upon completion of the course, participants will be able to:

- Calculate design discharge using the Rational Method or Regression Equation procedures.
- Apply the continuity and energy equation to solve practical design problems.
- Use the Weir equation to calculate the flow overtopping a roadway embankment.
- Use Manning's equation to calculate velocity or flow depth in simple or compound channels and recognize when this equation cannot be appropriately applied.
- Evaluate channel flow conditions (subcritical, critical or supercritical) using the Froude number.
- Design a stable channel using basic hydraulic concepts and Hydraulic Engineering Circular (HEC)-15.
- Apply basic pavement drainage concepts in calculation procedures described in HEC-22.
- Design a simple culvert crossing using the procedures in HDS-5.
- Design a simple storm drain and calculate the Hydraulic Grade Line (HGL) using the energy equation and HEC-22.
- Describe which energy dissipaters are useful for culvert or storm drain applications based on HEC-14.

**Target Audience:**

Entry level engineers or engineering technicians who are performing highway drainage calculations on transportation facilities. It will also be useful as a refresher course on hydraulic fundamentals for experienced personnel.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Jorge Pagan	(202) 366-4604	<a href="mailto:jorge.pagan@fhwa.dot.gov">jorge.pagan@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135067A

**Course Title:** Practical Highway Hydrology

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

The course provides engineers and designers with the knowledge and practical application of hydrologic principles to highway design. Participants will be required to work example problems that stress actual design situations. The course is based on the recently revised Hydraulic Design Series (HDS) No. 2, "Highway Hydrology" which is also used in the course as a reference manual.

Participants will learn how to select and effectively implement techniques for estimating peak flows and flood hydrographs in gaged and ungaged streams for watersheds of the size typically encountered in highway drainage design.

The overall course objectives enhance the understanding of basic hydrologic concepts and principles as they pertain to highways, and enable application of appropriate hydrologic concepts and tools in the design of drainage facilities and hydraulic structures.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify which peak flow design methods are suitable for given watershed characteristics and design requirements.
- Estimate times of concentration.
- Apply the Rational Method, Soil Conservation Service (SCS) graphical peak discharge method and US Geological Survey (USGS) regression equations.
- Adjust hydrologic estimates for urbanization.
- Implement the Log-Pearson III Frequency Analysis.
- Outline the procedure for generating, routing, and adding hydrographs in a typical hydrologic model.
- Apply the SCS methods for hydrograph estimation.
- Describe the practical capabilities and limitations of commonly used computer models, and of methods for extracting model input from Geographical Information System (GIS) databases.
- Perform storage and channel routing calculations.
- Design a storm water management facility.
- Perform hydrologic analysis for wetland design.
- Account for the unique aspects of snowmelt, and arid lands hydrology.

**Target Audience:**

Highway engineers and designers who are responsible for designing the storm water storage, channels, and storm drains, as well as those involved in the hydraulic design of bridges and culverts. Attendees will benefit from, but are not required to have, a basic knowledge of hydrologic science. The course is a useful primer for those new to the subject as well as a thorough review for experienced hydrologic engineers.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Joseph Krolak	(410) 962-0091	<a href="mailto:joseph.krolak@fhwa.dot.gov">joseph.krolak@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135071A

**Course Title:** Surface Water Modeling System with FESWMS and SMS

Fee	Length
\$650 Per Participant	5 Days (CEU: 3 Units)

**Class Size:** Minimum 20; Maximum 26

The host is responsible for providing 15 computers with the following minimum configuration: 850 MHz Intel Pentium® III Processor or equivalent with 128 MB RAM, Windows NT 4.0 with Service Pack 6a or 98 Second Edition or 95 (SR-1), 100 MB available disk space, CD-ROM drive, and 1024 x 768 color video display.

**Description:**

The course presentation provides a balance of hydraulic theory, background of the finite element method, data requirements necessary to operate the Finite Element Surface Water Modeling System (FESWMS) computer program and to use of Surface-Water Modeling System (SMS) in the development of input data files and the analysis of the data output.

The FESWMS is a depth averaged two-dimensional surface water model for analyzing complex flow patterns in river or tidal situations. The program has been designed for modeling bridges and hydraulic structures commonly found in highway hydraulic applications. The program is capable of modeling bridges, bridges in pressure flow, culverts, weir flow over the roadway, and general and local scour through the reach being analyzed. The model is capable of handling steady and unsteady flow through hydraulic systems. Because of the intensive input data requirements and large amounts of output generated by the FESWMS computer program, the pre- and post-processing program SMS is used in the course. SMS is capable of interactively building finite element networks, including the input data files necessary to use the FESWMS computer program. The program is also capable of graphically presenting the output from FESWMS, using a variety of formats.

Participants will receive a notebook that includes: course materials, a FESWMS User's Manual and SMS User's Manual, including copies of the software used in the course. Non-State highway agency course participants will receive a demonstration version of the proprietary SMS computer program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply the fundamentals and use the capabilities of the FESWMS computer program to develop two-dimensional water surface elevations and velocity fields.
- Develop input data necessary for use in the FESWMS computer program.
- Use SMS as a pre- and post-processing program for the FESWMS computer program.
- Use SMS to build finite element networks and input data files for use with the FESWMS computer program, including to graphically view and manipulate the output.

**Target Audience:**

Federal, State, and local hydraulic engineers who have responsibility for the design and analysis of highway stream crossings. In order to derive the most benefit from this training, course participants should have knowledge of the fundamentals of open channel flow and should be familiar with the general concepts associated with two-dimensional surface water flow modeling. Experience with Windows-based computer programs is helpful.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135080A**Course Title:** Hydrologic Analysis and Modeling with WMS

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 25

The host is responsible for providing 15 computers with the following minimum configuration: 850 MHz Intel Pentium® III Processor or equivalent with 128 MB RAM, Windows NT 4.0 with Service Pack 6a or 98 Second Edition or 95 (SR-1), 100 MB available disk space, CD-ROM drive, and 1024 x 768 color video display.

**Description:**

This course is designed as a hands-on, application-oriented training course using the Watershed Modeling System (WMS) to make hydrologic estimates using a variety of techniques. It will provide attendees with the knowledge and tools necessary to use data derived from geographical information systems (GIS) to develop hydrologic estimates and model runoff from watersheds. The course also teaches how to use digital terrain data for the development of watershed parameters that are required by most commonly used hydrologic analysis programs.

The WMS is a comprehensive environment for hydrologic analysis. It is developed by the Environmental Modeling Research Laboratory (EMRL) of Brigham Young University, and has been licensed for use by all State and Federal highway agencies. WMS makes it possible to take advantage of the wealth of digital terrain, land use, soil, and other GIS data readily available from government and private agencies. This data can then be used for preparing input files for several commonly used hydrologic models. Models supported by the interface include HEC-1 (HMS), TR-20, TR-55, and the Rational Method. This course also includes instruction in use of the regional regression equations contained in the National Flood Frequency (NFF) database. This course teaches the techniques and methods necessary to locate and use GIS data so that labor intensive processes such as delineating watershed boundaries and calculating modeling parameters from paper maps can be avoided when computing design flows and developing flow hydrographs at bridges and culverts.

Participants will receive a notebook that includes course materials, a WMS User's Manual, and copies of the software, workshops, and tutorials used in the course. Non-State highway agency course participants will receive a demonstration version of the proprietary WMS computer program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Automate basin delineation in WMS with GIS vector data, DEMs, and TINs.
- Efficiently use digital watershed data for hydrologic modeling parameter development.
- Locate and obtain digital data sources for watershed delineation and hydrologic model development.
- Use WMS to build hydrologic input data files for use with HEC-1 (HMS), TR-20, TR-55, regional regression equations, and Rational Method programs, including instruction on how to graphically view the output.

**Target Audience:**

Federal, State, and local hydrologic/hydraulic engineers who have responsibility for the design and analysis of highway stream crossings. In order to derive the most benefit from this training, course participants should have knowledge of the fundamentals of hydrology and hydrologic modeling. Experience with one of the aforementioned hydrologic modeling computer programs would be helpful.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Larry Arneson	(303) 716-2144	<a href="mailto:larry.arneson@fhwa.dot.gov">larry.arneson@fhwa.dot.gov</a>

## Hydraulics

**Course Number:** 135081A**Course Title:** Introduction to Highway Hydraulics Software

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 14; Maximum 20

Under development: for Summer 2004. This course requires computers with the following minimum configuration: 850 MHz Intel Pentium® III Processor or equivalent with 128 MB RAM, 100 MB available disk space, CD-ROM drive, and Windows NT 4.0 with Service Pack 6a. One computer is required for every two participants.

**Description:**

The course provides engineers and designers with hands-on experience in the selection and application of software tools commonly applied for highway hydraulics including estimating peak flows and hydrographs, as well as the analysis and design of storm drains, culverts, detention basins, and channels. The Watershed Modeling System (WMS) will be the Windows interface used for most applications. The software included in the course is:

1. NFF (National Flood Frequency Program)
2. SCS TR-55
3. HEC-1/HEC-HMS
4. FHWA Storm Drain for design of pipes and inlets
5. HY8 for culvert and energy dissipator analysis and design
6. WMS detention basin and channel calculators for detention basin and channel design

**Outcomes:** Upon completion of the course, participants will be able to:

- Select and effectively apply software tools available to the engineer and designer.
- Specifically, enable appropriate application of hydrologic and hydraulic software for the design of highway drainage facilities and hydraulic structures.

**Target Audience:**

Highway engineers and designers responsible for the hydrologic and hydraulic aspects of designing storm drains, culverts, detention basins, and channels. Attendees should have a basic knowledge of hydrology and hydraulics. The course will briefly review theory, but will focus on hands-on problem solving.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Larry Jones	(703) 235-0523	<a href="mailto:larry.jones@fhwa.dot.gov">larry.jones@fhwa.dot.gov</a>
Technical Information	Joseph Krolak	(410) 962-0091	<a href="mailto:joseph.krolak@fhwa.dot.gov">joseph.krolak@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137001A**Course Title:** ITS Awareness Seminar

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This seminar provides an overall understanding of Intelligent Transportation Systems (ITS) and ITS infrastructure. The course illustrates the ITS components by showcasing multi-modal systems that are deployed around the country. Institutional and technical elements in deploying ITS infrastructure are presented. This course provides an overview of what goes into the planning, design, architecture, standards, procurement, installation and construction, operation and maintenance, and funding of ITS systems. The benefits associated with various types of ITS deployment are presented and explained.

The one hour executive summary developed for elected and appointed officials may be requested through the National Resource Center, or the FHWA Division. Questions concerning this offering should be addressed to the Technical Information POC.

**Outcomes:** Upon completion of the course, participants will be able to:

- Discuss the elements and functions of ITS.
- Explain the benefits of ITS.
- Recognize the need to identify stakeholders and the need for interaction among them.
- State the importance of integrating systems technology.
- Identify the institutional policy implications of ITS.
- Identify information resources, such as web sites, other training, data libraries, etc. for more information on ITS.

**Target Audience:**

This course is intended for those who need a general sense of what ITS is and what it can deliver. It is directed toward a wide variety of disciplines, groups and organizations such as State, Federal and local transportation planners and traffic engineers; Metropolitan Planning Organizations (MPOs); transit and highway operators; public safety responders (enforcement, fire, EMS, towing, public works); transportation management center (TMC) specialists; motor carrier managers; environmental groups; IT personnel; college and university faculty and students; consultants; contractors; elected officials and the general public.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Larry Swartzlander	(202) 366-6066	<a href="mailto:larry.swartzlander@fhwa.dot.gov">larry.swartzlander@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137002A**Course Title:** Deploying Integrated ITS - Metropolitan

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course supports integrated intelligent transportation system infrastructure deployment with consideration of the National ITS Architecture. The regional context in which the public components of ITS infrastructure will be implemented and integrated is emphasized. The course combines the technical and institutional components of integrated ITS infrastructure. The importance of each component is discussed and placed in context with the regional decision that must be made by State and local agencies.

Transportation program managers will obtain an understanding of the technical and institutional implications for deploying integrated infrastructure within the framework of a regional architecture.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe a process for deploying ITS projects, with a regional architecture, and using a systems engineering approach.
- Explain the benefits of an ITS National Architecture at the following levels: national, regional, project and standards (requirements).
- Define stakeholders and their roles in integrated ITS deployment.
- Recognize how to identify transportation and information needs.
- Identify user requirements.
- Define a concept of operations.
- Explain the role of communications to achieve the benefits of integration.
- Discuss benefits and costs of ITS deployments.

**Target Audience:**

State agencies, MPOs and city/local/county transportation professionals that plan highway and transit systems and implement ITS deployment schedules as part of the planning process. ITS managers and specialists who provide oversight, coordinate projects and programs, review specifications, develop regulations and specifications, and design systems. Other audiences include systems engineers, regional architecture developers, systems integrators, and private sector personnel who will be involved in the deployment process.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
ITS	Ron Giguere	(202) 366-2203	<a href="mailto:ron.giguere@fhwa.dot.gov">ron.giguere@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Barry Zimmer	(202) 366-4082	<a href="mailto:barry.zimmer@fhwa.dot.gov">barry.zimmer@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137003A**Course Title:** ITS Public/Private Partnerships

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description: COURSE DELAYED, CALL FOR INFORMATION.**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course describes various types of cooperative public/private partnerships. It presents public/private partnership models for cost sharing, shared deployment, and franchising. It also identifies institutional impediments, discusses sharing in ITS partnering, and presents successful case studies.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe functions/roles required to deploy ITS.
- Identify ITS infrastructure components where private resources effectively contribute.
- Recognize private sector motives/interests.
- Identify potential partnership opportunities at project level.
- Describe program strategies for private sector involvement.
- Anticipate key partnership issues and choose the best type of partnerships to meet the needs of the region.

**Target Audience:**

Transportation program managers currently involved in ITS or expected to be involved in ITS planning, implementation, operation, or maintenance.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Robert Rupert	(202) 366-2194	<a href="mailto:robert.rupert@fhwa.dot.gov">robert.rupert@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137005A

**Course Title:** ITS Telecommunications Overview

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course provides a broad introduction to telecommunications technologies, the associated issues and practical lessons-learned in the applications for such technologies of ITS.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize and deal with the current issues associated with the deployment and application of telecommunications infrastructure within the context of transportation project development, design, operations and management.
- Plan and conduct a requirements analysis to match devices and components to telecommunications technologies.
- Make use of regional ITS architectures for telecommunications planning.
- Explain the fundamentals of telecommunications at a basic level.
- Define some of the key terminology and concepts used in transportation telecommunications.
- Generalize a frame of reference to help in identifying and defining the institutional and organizational issues associated with the effective use of telecommunications technology in an advanced transportation context.

**Target Audience:**

Public and private-sector transportation professionals (project planners, engineers, managers and senior technicians) involved in ITS transportation planning and ITS deployment, such as MPOs transit agencies, municipalities, State Highway Agencies, FHWA Division and Resource Center Offices, FTA personnel, and systems integrators.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	William S. Jones	(202) 366-2128	<a href="mailto:william.jones@fhwa.dot.gov">william.jones@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137007A**Course Title:** Rural ITS Toolbox

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course describes many ITS related practices and techniques that have been successfully applied to rural transportation problems. These successes are documented in the Rural ITS Toolbox. The training goes further into what is provided in the Toolbox, including problem solving techniques and training for the participant to describe the Toolbox contents to their stakeholders. The Rural ITS Toolbox training will be helpful to identify ITS solutions that can have a low-cost/high-return impact on rural transportation.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define ITS by discussing the elements and functions of ITS.
- Comprehend the value of the Rural ITS Toolbox for articulating rural ITS deployment strategies.
- Discuss local examples of regional ITS projects.
- Explain the benefits of rural ITS.
- Recognize the need to identify stakeholders and the importance of fostering interaction among them.
- Identify information resources, such as Web sites, other training, data libraries, etc. for more information on ITS.
- Tailor portions of the rural ITS Toolbox for presentation/discussion with other rural stakeholders so that they recognize their roles in rural ITS deployment.

**Target Audience:**

County, municipal and town executives; traffic engineers; State, Federal and local transportation planners; MPOs' transit and highway operators; public safety responders (enforcement, fire, EMS, towing, public works); Transportation Management Center (TMC) operators; motor carrier managers; environmental groups; IT personnel; college and university faculty and students, and consultants and contractors.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	James Pol	(202) 366-4374	<a href="mailto:james.pol@fhwa.dot.gov">james.pol@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137013A

**Course Title:** Deploying the National Intelligent Transportation System (ITS) Architecture

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course is designed to be an interactive workshop to demonstrate how to apply the National ITS Architecture tools and methodologies when developing regional and project ITS architecture. A copy of the National ITS Architecture 4.0 is provided on CD-ROM for course use and student retention.

**Outcomes:** Upon completion of the course, participants will be able to:

- Use the National ITS Architecture as a tool when developing regional and project ITS architectures.
- Identify integration opportunities while developing regional and project ITS architectures.
- Use the National ITS Architecture CD-ROM to find definitions.
- Identify the difference between user service and user service requirements, and describe how these relate to the National ITS Architecture.
- Identify the types of projects that must comply with USDOT policies regarding consistency with ITS Architecture and Standards, and describe the key requirement for compliance.
- Define the systems engineering process, as it is used with the National ITS Architecture.

**Target Audience:**

Public sector audiences, who are involved in ITS planning and deployment, as well as systems integrators and private sector transportation professionals who develop ITS solutions.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Ron Giguere	(202) 366-2203	<a href="mailto:ron.giguere@fhwa.dot.gov">ron.giguere@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137015C

**Course Title:** Introduction to National ITS Architecture

**Class Size:** N/A

This web-based course is approximately 6 hours, and is available anytime - 24 hours, 365 days a year via the Internet. This course is available at the Consortium for ITS Training and Education (CITE) located at: <http://www.citeconsortium.org/registration.html>. Please go to the CITE Website to register for the course.

**Description:**

The course is intended to provide students with a broad overview of the National ITS Architecture and the role it plays in ITS planning, designing and implementation processes. It provides some background (what the National ITS Architecture consists of, how it is defined, why it was established, and what its aims and objectives are), and introduces the notion of User Service. The physical architecture is explained using examples of local implementations of the national ITS Architecture. Specific elements of the physical architecture, such as subsystems and terminators, are presented in some detail.

This course is available at the Consortium for ITS Training and Education (CITE) located at: <http://www.citeconsortium.org/registration.html>. Please go to the CITE Website to register for the course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define the systems engineering process, as it is used with the National ITS Architecture.
- Develop an understanding of the context within which the Architecture is to be applied to the ITS planning, design and implementation process.
- Disseminate updated information on the evolving standards and protocols being developed to support the architecture.
- Recognize the content and procedures associated with the National Architecture.

**Target Audience:**

Public sector audiences, who are involved in ITS planning and deployment, as well as systems integrators and private sector transportation professionals who develop ITS solutions.

	Name	Phone	Email
NHI Training Program Manager	Debbie Gwaltney	(703) 235-1199	<a href="mailto:debbie.gwaltney@fhwa.dot.gov">debbie.gwaltney@fhwa.dot.gov</a>
Technical Information	Ron Giguere	(202) 366-2203	<a href="mailto:ron.giguere@fhwa.dot.gov">ron.giguere@fhwa.dot.gov</a>
WWW ASSISTANCE	Rick DeLeyos	(301) 403-4593	<a href="mailto:rdeleyos@wam.umd.edu">rdeleyos@wam.umd.edu</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137019A**Course Title:** ITS Software Acquisition

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course provides a general understanding of the many issues involved in ITS software development and acquisition processes. It is focused specifically on ITS software issues. It is also a companion course to NHI Course 137020, ITS Procurement.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the basic technologies used in software development.
- Describe the private sector view of software development.
- Describe the intellectual property rights and how they must be considered.
- Manage the procurement of ITS software.
- Write a Request for Proposal for software procurement.
- Describe quality assurance issues.

**Target Audience:**

Federal, State and local transportation professionals who are involved in the planning, decision-making and implementation of ITS projects which have a significant software component, or who are involved in coordinating these ITS projects.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	William S. Jones	(202) 366-2128	<a href="mailto:william.jones@fhwa.dot.gov">william.jones@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137020A

**Course Title:** Intelligent Transportation System (ITS) Procurement

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

Deployment of ITS introduces new challenges to State and local transportation agencies that operate under traditional procurement practices developed to support the design and construction of roads and bridges or to design and construct rail projects. The traditional practices do not readily accommodate the special needs of ITS procurement which is focused on operations. For this reason, the transportation professional must recognize the special considerations required in ITS procurements, and understand how they can be accommodated. This seminar is intended to heighten awareness of the challenges in procuring ITS within the traditional construction project environment. It combines lectures with presentations of case studies to describe the lessons learned from past ITS projects and to help ensure successful ITS procurement. This seminar is a companion to, but not a prerequisite for "ITS Software Acquisition," NHI Course No 137019A.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the nature of intelligent transportation systems and explain why procuring intelligent transportation systems is different from traditional construction procurements.
- Describe the potential barriers that may arise from procuring intelligent transportation systems within the traditional construction oriented environment.
- Describe lessons learned from previous ITS projects.
- Apply innovative contracting mechanisms and flexibilities in existing regulations to mitigate barriers.
- Apply lessons learned to existing policies and procedures to achieve improvements in procuring intelligent transportation systems.

**Target Audience:**

Federal, State, and local transportation professionals who are directly involved in procuring ITS systems. Specifically, those personnel who are responsible for developing and reviewing statements of work for ITS procurement, including program managers, contracting officers, and attorneys.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	William S. Jones	(202) 366-2128	<a href="mailto:william.jones@fhwa.dot.gov">william.jones@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137022A**Course Title:** CORSIM Traffic Simulation Model Training

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting organization is responsible for providing computers with the following minimum requirements: 200 MHz Intel Pentium® II Processor or equivalent with 64 MB RAM, Windows 95 (SR-1) or NT 4.0 with Service Pack 6a, color monitors, 50 MB of available disk space. NOTE: Maximum of two participants per terminal.

**Description:**

This course provides an understanding of CORSIM - a tool that simulates traffic and traffic control conditions on combined surface street and freeway networks. CORSIM determines how traffic engineering and control strategies impact a prescribed network's operational performance, as expressed in terms of various Measures of Effectiveness (MOEs). The MOEs (such as speed, travel time, volume, and delay) provide insights into the effects of the applied strategy on traffic operations and provide the basis for optimizing the applied strategy. CORSIM, the simulation package within the Traffic Software Integrated System (TSIS) suite of tools, is a powerful tool that can be applied to wide areas of interest including:

- 1) Practical traffic engineering activities such as signal retiming, traffic impact studies, analysis of major traffic events, stadium operations, corridor traffic operations, and freeway incident impacts.
- 2) Evaluating ITS technologies, such as real time traffic adaptive control, real time traveler information and route guidance, and network-wide dynamic traffic assignment.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe CORSIM features (including advantages and disadvantages).
- Determine appropriate uses for CORSIM.
- Identify types and sources of data.
- Given real-world data, prepare a link-node diagram, then code for input to CORSIM.
- Input data, run CORSIM, and interpret output for arterial, freeway, and combined networks.
- Identify circumstances and procedures for calibrating models.
- Interpret and fix common error messages.
- Use CORSIM to simulate traffic improvements.

**Target Audience:**

Traffic engineers in the public and private sectors, as well as in academia, who are involved in ITS planning and deployment.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	John Halkias	(202) 366-2183	<a href="mailto:john.halkias@fhwa.dot.gov">john.halkias@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137024A

**Course Title:** Introduction to Systems Engineering for Advanced Transportation

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

This course is an introduction to systems engineering for ITS project managers and project staff. It provides a high-level view of a broad and rich topic area, introducing basic concepts to individuals who are working on ITS projects. The goal is to allow these individuals to understand the benefits of applying systems engineering approaches as a means of developing quality systems. The course covers technical practices such as modeling, prototyping, trade-off analysis and testing, and management practices such as risk assessment and mitigation, which make up "best practices" in the systems engineering arena. A combination of lecture and classroom exercises, with transportation systems examples, are used to illustrate the basic concepts and to introduce the topics to students.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define Systems Engineering and its application to ITS.
- Describe the system's life cycle and its relationship to systems engineering.
- Develop, derive, and validate requirements for a system.
- List the systems engineering tools available to mitigate risk.
- Define and apply the concept of earned value as a tracking mechanism.
- List three alternative strategies that may be applied to decision making under uncertainty.
- Identify where to find appropriate standards for developing ITS projects.
- Identify resources that may help project personnel to look at systems as a whole.

**Target Audience:**

Transportation engineers and other practicing ITS professionals or technical persons at all levels of government and in the private sector. ITS project managers, technical team members, contractors, and staff are all appropriate participants. Project managers would particularly benefit from this course since they direct many peoples' efforts. Any level of professionals involved in ITS may attend to broaden their understanding of complex systems, beyond current technical knowledge.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Ron Giguere	(202) 366-2203	<a href="mailto:ron.giguere@fhwa.dot.gov">ron.giguere@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137026A**Course Title:** Managing High Technology Projects in Transportation

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

This course is also available as a Web-based course at the Consortium for ITS Training and Education (CITE) located at: [www.citeconsortium.org/registration.html](http://www.citeconsortium.org/registration.html)

**Description:**

This course is part of the core Intelligent Transportation Systems (ITS) curriculum established by the ITS Professional Capacity Building (PCB) program. For more information on the core curriculum, go to URL: [www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2](http://www.pcb.its.dot.gov/Catalogs/ITSCurriculum.htm#section2).

The course is designed to improve project management skills of both public and private sector personnel who are responsible for managing the implementation of technology-intensive transportation projects. The course provides training related to: the fundamental principles and practices of good project management; the steps to be taken for the planning, design and implementation of transportation systems projects; the types of project management tools available for managing transportation systems projects; and the basic skills required to be a good project manager.

This course covers project management techniques associated with all phases of system acquisition, from planning through acceptance. The skills required for the ongoing operation and maintenance of systems that are somewhat different are not explicitly covered in this course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe why tailored project management techniques are critical to success in managing advanced transportation projects.
- Define key components in planning the project.
- Identify the primary participants that need to be involved throughout the development of a project.
- Identify the stages of the process and the management tools that are applicable at each stage.
- Identify and describe key general management skills that are applicable to managing projects for advanced transportation systems.

**Target Audience:**

Current and prospective project managers from State DOTs and State and local transportation agencies, as well as those in the private sector who support the implementation of advanced transportation projects.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Pam Kordenbrock	(202) 366-2199	<a href="mailto:pamela.kordenbrock@fhwa.dot.gov">pamela.kordenbrock@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137029A**Course Title:** Turbo Architecture Software Training

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting organization is responsible for providing computers with the following minimum requirements: 200 MHz Intel Pentium® II Processor or equivalent with 64 MB RAM, Windows 95 (SR-1) or NT 4.0 with Service Pack 6a, color monitors, 50 MB of available disk space. NOTE: Maximum of two participants per terminal.

**Description:**

This course provides training on the Turbo Architecture tool, which is a high-level, interactive software training program to assist transportation planners and systems integrators in the development of regional and project architectures using the National Intelligent Transportation Systems (ITS) Architecture as a starting point. Turbo Architecture helps users integrate multiple project architectures both with each other and with a regional architecture. In addition, Turbo Architecture provides an initial start toward both architecture development and consistency with the National ITS Architecture.

**PREREQUISITES:**

- 1) Windows skills-The ability to traverse directories, open/close/resize/minimize windows, switch between open windows, and launch and navigate browser.
- 2) ITS knowledge-Knowledge of common ITS concepts and terminology.
- 3) Architecture knowledge-The ability to translate all ITS elements in their region into architecture entities (subsystems, terminators, architecture flows), and to translate their region's transportation services into market packages.
- 4) National ITS Architecture CD-ROM skills-Proficiency in using the Architecture CD to find information on subsystems, terminators, architecture flows and market packages.

**Outcomes:** Upon completion of the course, participants will be able to:

- List the preparatory decisions and assembly of information needed to create a Regional Architecture or a Project Architecture.
- Describe the six steps in the process used by Turbo Architecture to create a Regional Architecture or Project Architecture.
- Use Turbo Architecture software to create and modify a simple Regional Architecture or Project Architecture, including: entering inventory data, selecting Market Packages, reconciling inventory inconsistencies, building the architecture, customizing interconnects and architecture flows, and printing reports and diagrams.
- Merge a Project Architecture with a Regional Architecture database.
- Describe in general terms how to extend the Regional or Project Architecture by adding architecture flows, subsystems and terminators beyond those defined by the National ITS Architecture.

**Target Audience:**

State DOT and local-agency staff from Metropolitan Planning Organizations (MPOs) and city/county transportation agencies, as well as private sector consultants, who are developing Regional and Project Architectures. Their responsibility is to assemble ITS inventory data for their region or for their project, and to use Turbo to build and customize their regional or project architecture.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Robert Rupert	(202) 366-2194	<a href="mailto:robert.rupert@fhwa.dot.gov">robert.rupert@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137030A**Course Title:** Fundamentals of Road Weather Management

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

This course will be available in Fall 2004.

**Description:**

This course provides training to help those persons involved in highway maintenance and/or highway operations develop tools and strategies for addressing the road weather problem. Course topics include an overview of the scope of the road weather problem and its associated costs; basic meteorology for non-meteorologists; strategies for addressing the road weather problem, including Road Weather Information Systems (RWIS) and the development of crosscutting decision support systems to respond effectively to weather situations; and road weather solutions unique to maintenance management, traffic management, traveler information, and emergency management.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the crosscutting impacts that weather has upon roadway operations.
- Identify the technical and institutional challenges of implementing RWIS, including the fundamentals of meteorology as it pertains to RWIS.
- Explain the range of effective and open solutions to the various types of weather for various management practices, i.e., maintenance, traffic, emergency, and safety management.
- Discuss the variety of operational tools and techniques available to the transportation community to deal with the impacts.

**Target Audience:**

This course is designed for persons engaged in any aspect of highway maintenance, operations, traffic management, emergency management, and highway safety; technical specialists engaged in the implementation of solutions for roadway problems that are caused by weather; State and local transportation/public works agencies, and mid-level managers who direct their agency's resources; and FHWA.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Paul Pisano	(202) 366-1301	<a href="mailto:paul.pisano@fhwa.dot.gov">paul.pisano@fhwa.dot.gov</a>

## Intelligent Transportation Systems (ITS)

**Course Number:** 137041A**Course Title:** ITS Deployment Analysis System (IDAS)

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 24

A limited number of courses are free. The hosting organization is responsible for providing computers with the following minimum requirements: 500 MHz Intel Pentium® II Processor or equivalent with 128 MB of RAM, Windows NT 4.0 with Service Pack 6a, color monitors, 2 GB of available disk space. **IMPORTANT - Maximum of two participants per terminal.**

**Description:**

This course is a hands-on computer training session on the newly developed ITS Deployment Analysis System (IDAS) software. IDAS provides ITS sketch planning capability to calculate the relative costs and benefits of ITS investments. IDAS incorporates a cost module, a benefit module and an internal travel demand model to generate cost/benefit comparisons for alternative ITS deployment scenarios. IDAS uses the output from an existing transportation planning model to establish a best case scenario on which the user can deploy ITS services on specific links in the regional transportation network model.

**Outcomes:** Upon completion of the course, participants will be able to:

- Discuss integrating ITS in the transportation planning process.
- Explain the relationship between travel demand models and IDAS.
- Successfully apply IDAS Input/Output module, Alternatives Generator, Benefits module, Cost module, and Alternatives Comparison module.
- Review, interpret and refine IDAS defaults.
- Interpret IDAS results in terms of impacts and traveler responses to ITS.
- Interpret IDAS results in terms of ITS benefits and costs.
- Conduct sensitivity and risk analysis.

**Target Audience:**

FHWA, State DOT, Metropolitan Planning Organization and local government transportation planning staff. ITS program managers and specialists would benefit as well.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Ron Giguere	(202) 366-2203	<a href="mailto:ron.giguere@fhwa.dot.gov">ron.giguere@fhwa.dot.gov</a>

## Freight and Transportation Logistics

**Course Number:** 139001A**Course Title:** Integrating Freight in the Transportation Planning Process

Fee	Length
\$270 See "notes" concerning the first 24 classes.	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

For the 24 free NHI courses scheduled, participant minimums must be met by hosting agency, or a fee will be assessed to host. A one-hour Executive Summary will also be available through the FHWA National Resource Center (NRC). Please see the NRC contact below for information and scheduling. Available Spring 2004.

**Description:**

Freight transportation issues can be complex and involve many different stakeholders, all of whom have different perspectives on how they view the freight transportation system. The challenge faced by many public sector transportation planners is how to best incorporate these freight issues and perspectives into the transportation planning process, which will result in a safe and efficient transportation system for both people and goods. This course will provide a better understanding of freight transportation, its stakeholders, and its issues so that public sector transportation planners will be better able to incorporate freight into their respective transportation planning processes and programs.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the stakeholders involved in freight transportation.
- Explain the role of different modes in freight transportation.
- Describe some trends affecting freight transportation, and their impact on a State's transportation system and communities.
- Discuss some of the common issues that prevent freight from being fully incorporated in the planning process.
- Identify key resources to help guide statewide and metropolitan freight planning efforts.

**Target Audience:**

Transportation planners and freight transportation planners from State DOTs, MPOs, local governments and Federal agencies.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
National Resource Center	Fawn Thompson	(404) 562-3917	<a href="mailto:fawn.thompson@fhwa.dot.gov">fawn.thompson@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Eloise Freeman-Powell	(202) 366-2068	<a href="mailto:eloise.freeman-powell@fhwa.dot.gov">eloise.freeman-powell@fhwa.dot.gov</a>
	Scott Johnson	(202) 366-9498	<a href="mailto:scott.johnson@fhwa.dot.gov">scott.johnson@fhwa.dot.gov</a>

## Freight and Transportation Logistics

**Course Number:** 139002A**Course Title:** Freight Forecasting in Transportation Planning

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

First 18 course presentations are FREE. After that, the course will be \$400 per participant.

**Description:**

This course provides guidance and improved methods for forecasting freight at both the metropolitan and state levels. It also provides the participant with a basic understanding of freight transportation practices, the key parameters that influence growth and distribution of freight traffic, and currently available tools and data to forecast future freight traffic.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain why freight forecasting is important in the transportation planning process
- Discuss the roles of different freight transportation modes.
- Describe the economic trends that influence freight growth.
- Describe the role of intermodal terminals and their impacts on local traffic.
- Identify the impacts that freight has on travel demand forecasts.
- Identify sources for key freight data used in freight forecasting models.
- Perform basic freight forecasting techniques.

**Target Audience:**

State and Metropolitan Planning Organization (MPO) officials who are involved in transportation planning and/or forecasting; staff of State and local agencies, including DOTs, MPOs, Port Authorities, and local jurisdictions, who are involved in the development and management of freight projects and plans; and staff of Federal agencies, including FHWA, FRA, FAA and other modal agencies that assist State and local agencies involved in transportation and/or freight planning and funding.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
HQ	Bruce Lambert	(202) 366-4241	<a href="mailto:bruce.lambert@fhwa.dot.gov">bruce.lambert@fhwa.dot.gov</a>
	Bruce Spear	(202) 366-8870	<a href="mailto:bruce.spear@fhwa.dot.gov">bruce.spear@fhwa.dot.gov</a>
NHI Training Program Manager	Bud Cribbs	(703) 235-0526	<a href="mailto:bud.cribbs@fhwa.dot.gov">bud.cribbs@fhwa.dot.gov</a>
Technical Information	Bob Gorman	(202) 366-5001	<a href="mailto:bob.gorman@fhwa.dot.gov">bob.gorman@fhwa.dot.gov</a>

## Real Estate

**Course Number:** 141029A**Course Title:** Basic Relocation

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course is designed for the beginning relocation agent or for those persons interested in a basic knowledge of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Act). The purpose is to answer questions, meet technical needs, and broaden the knowledge of those engaged in the relocation of persons as a result of the acquisition of real property required for a Federal or Federally-funded project. The course covers all functional areas of the relocation assistance program, with emphasis on residential displacements.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the principles that govern provisions of the Uniform Act and implementing regulations.
- Provide advisory services within his/her area of expertise.
- Identify services available from other agencies.
- Explain requirements for comparability to include decent, safe and sanitary housing.
- Compute moving costs and replacement housing payments.
- Explain the basic concept of last resort housing.
- Explain the appeal procedures for those displaced.

**Target Audience:**

Federal, State, and local public agencies; FHWA personnel, and other interested persons.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mamie Smith	(202) 366-2529	<a href="mailto:mamie.smith@fhwa.dot.gov">mamie.smith@fhwa.dot.gov</a>

## Real Estate

**Course Number:** 141030A**Course Title:** Advanced Relocation

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course will go beyond the basic functional areas of relocation assistance and concentrate on areas of specific concern, such as: comparability, mortgage interest differential payments, last resort housing, multiple use, tenants, farms, and non-residential moves. The course has been modularized to allow flexibility in adjusting the subject material to meet the needs of the requesting agency.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the principles which govern provisions of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Uniform Act) and implementing regulations.
- Demonstrate an understanding of the factors involved in difficult subject areas, such as mortgage interest differential payments, settlement costs, last resort housing, mobile homes, farms, and other non-residential moving payments.
- Provide directly or assist others in providing advisory assistance in difficult cases.
- Determine directly or assist others in determining eligibility for certain relocation payments in difficult cases.
- Demonstrate an understanding of complex, non-residential moving costs.

**Target Audience:**

Federal, State, and local public agencies, FHWA personnel, and other interested persons. Broad knowledge of the requirements of the Uniform Act and the implementing regulations of 49 Code of Federal Regulation (CFR) Part 24; completion of NHI Course No 141029 - Basic Relocation, or approximately one year of experience working in the relocation program is recommended.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mamie Smith	(202) 366-2529	<a href="mailto:mamie.smith@fhwa.dot.gov">mamie.smith@fhwa.dot.gov</a>

## Real Estate

**Course Number:** 141031A**Course Title:** Business Relocation

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides comprehensive information on the various aspects of business relocation and is designed to address the relocation of businesses, farms, and non-profit organizations. The main topics include: Eligibility; Moving Payments and Benefits; Advisory Services; Actual Direct Loss of Tangible Personal Property; Searching Expenses; Fixed Payments or in lieu of (ILO) payments; and Reestablishment Expense.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain the factors involved in difficult subject areas, such as move cost estimating, farms, non-profit organizations, fixed or ILO payments, and re-establishment payments.
- Provide directly or assist others in providing advisory assistance in relocating businesses, farms, and non-profit organizations.
- Identify the sources and assembling of moving cost data including inventories, specifications, profit and loss relationships, bids and estimates.

**Target Audience:**

State departments of transportation, local public agencies, FHWA personnel, and other Federal agency personnel. Participants must have a basic knowledge of the relocation program.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mamie Smith	(202) 366-2529	<a href="mailto:mamie.smith@fhwa.dot.gov">mamie.smith@fhwa.dot.gov</a>

## Real Estate

**Course Number:** 141036A**Course Title:** Eminent Domain Training for Attorneys and Appraisers

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 35**Description:**

This course is designed to enhance the performance of attorneys, appraisers, and other expert witnesses in the delivery and presentation of testimony and arguments in the courtroom setting to obtain realistic court awards in eminent domain proceedings. It is designed to illustrate the importance of, and how to develop, a team approach for effective presentation in condemnation actions. The course presentation includes lectures with the use of visual aids, handouts, and interactive case studies. Each participant will receive a course manual that should serve as a valuable reference tool.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify valuation techniques, methodology, and practices associated with estimating fair market value and just compensation.
- Describe the legal framework of eminent domain actions necessary to perform effectively as attorneys and expert witnesses.
- Describe the basis for a proposed stipulated settlement, including the respective role of the appraiser and attorney in the consummation of such a settlement, including documentation.
- Recognize the extent to which the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended, and implementing state legislation applies to potential settlements including the relationship of 49 Code of Federal Regulation (CFR) Part 24 to settlements.
- Recognize what constitutes acceptable valuation technique and the approaches used by the appraiser to fully document appraisal estimates for condemnation purposes based on applicable state law.
- Document a report of the trial.
- Formulate a theory of a case that will be acceptable to the jury, based on the facts of the case and the theory's compatibility with the trial team.

**Target Audience:**

State highway and transportation agency and fee or contract attorneys and appraisers, and other potential expert witnesses working for State highway and transportation agencies. Participants should have a basic knowledge of the Uniform Act, including the implementing regulations of 49 CFR Part 24. The course is intended for beginning government attorneys acting as legal counsel in condemnation trials, as well as beginning and intermediate level appraisers acting as expert witnesses in condemnation trials.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mamie Smith	(202) 366-2529	<a href="mailto:mamie.smith@fhwa.dot.gov">mamie.smith@fhwa.dot.gov</a>

## Real Estate

**Course Number:** 141045C**Course Title:** Real Estate Acquisition Under the Uniform Act: An Overview

Fee	Length
\$150 Per Participant	6 Hours (CEU: 0.6 Units)

**Class Size:** N/A**Recommended System Specifications:**

- 600 MHz Intel Pentium III processor or equivalent with a minimum of 128 MB RAM
- Windows 98 Second Edition, ME, NT 4.0 with Service Pack 6a, 2000 with Service Pack 4, or XP
- Audio capability (Windows Media Player or equivalent) with speakers
- Microsoft Internet Explorer v6, Netscape v7, Mozilla v1.1 or higher with JavaApplet and ActiveX enabled
- Flash 5 or higher plug-in installed
- Color Video Display (800x600) with thousands of colors (16-bit)
- DSL or higher speed Internet connection strongly recommended (Audio/animations may be slow at dial-up modem speeds)

**Description:**

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), is the basis for Federally-funded real estate acquisition programs. The goal of this web-based course is to help participants recognize what they need to know when acquiring real estate for a Federally-funded project.

**Outcomes:** Upon completion of the course, participants will be able to:

- Provide a basic overview of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act).
- Discuss the three key elements of the Uniform Act: Valuation/Appraisal, Acquisition and Relocation.
- Explain how to develop an estimate of just compensation through the use of the appraisal process or appraisal waiver procedure(s).
- Define the process through which real estate is acquired.
- Identify relocation benefits and services required by the Uniform Act.
- List places to obtain relevant resource documents/materials.

**Target Audience:**

Federal, state and local government employees and consultants who acquire real estate; who serve as program/project managers; who serve as grant administrators or grant recipients. This includes Acquisition and Relocation Agents, Appraisers, Realty Specialists, Attorneys, Engineers, Planners, etc. Participant must register on-line at [www.nhi.fhwa.dot.gov/registerdl.asp](http://www.nhi.fhwa.dot.gov/registerdl.asp). Participant information, billing address, and credit card information must be provided when registering on-line. Participants will have a userid and password sent to them via e-mail after authorization in order to log in to the course from the distance learning page on the CITE website at [www.citeconsortium.org](http://www.citeconsortium.org).

	Name	Phone	Email
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mamie Smith	(202) 366-2529	<a href="mailto:mamie.smith@fhwa.dot.gov">mamie.smith@fhwa.dot.gov</a>
WWW Assistance	Rick DeLeyos	(301) 403-4593	<a href="mailto:rdeleyos@wam.umd.edu">rdeleyos@wam.umd.edu</a>

## Environment

**Course Number:** 134054A

**Course Title:** Design and Implementation of Erosion and Sediment Control

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

A joint effort between FHWA and the Environmental Protection Agency (EPA), this course reflects the agencies' commitment to providing education and training on planning, design, implementation, enforcement, inspection and maintenance strategies to control erosion and sediment on highway construction projects, as well as to ensure that regulatory issues are addressed accurately and uniformly. Each discipline involved in a highway construction project has a different set of priorities. Reflecting NHI's commitment to learner-centered training, the course offers participants opportunities for discussion and joint problem solving, through which they will gain information about the roles and responsibilities of other team members.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the components of an erosion and sediment control (ESC) plan.
- List the sources of information for the ESC plan.
- Identify management practices and related management measures that are appropriate for typical situations and for a case example.
- List typical construction and inspection problems. Describe both suitable prevention strategies and remedies for failures.
- Link Federal and State environmental regulations to the components of the ESC plan.

**Target Audience:**

A mix of Federal, State and local highway design, construction, inspection and maintenance staff; environmental agency representatives, as well as consultants and members of the construction industry are encouraged to attend to provide their perspectives, learn each other's responsibilities, and explore an array of options to erosion and sediment control.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Patricia Czenas	(202) 366-4085	<a href="mailto:patricia.czenas@fhwa.dot.gov">patricia.czenas@fhwa.dot.gov</a>

## Environment

**Course Number:** 142005A

**Course Title:** NEPA and Transportation Decision Making

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 35

This course was revised in May 2003.

**Description:**

This course considers FHWA's policies and procedures for applying the National Environmental Policy Act (NEPA) to the project development and decision making processes related to transportation facilities. The course examines the evolution of environmental policy and the integration of social, environmental and economic factors into the framework of laws, regulations, policies, and guidance which assist in achieving a decision on a transportation project that is in the best overall public interest.

The course emphasizes utilization of: the Council on Environmental Quality's and FHWA's regulations and guidance for implementing NEPA and Section 4(f) of the Department of Transportation Act; and initiatives for interagency coordination and streamlining the project development process including those provisions contained in TEA-21. Also emphasized are: public involvement; Title VI/Environmental Justice; FHWA's policy for mitigation and enhancement; and the role of transportation in achieving sustainable development.

**Outcomes:** Upon completion of the course, participants will be able to:

- Use the NEPA principles in the development of transportation projects.
- Use the NEPA umbrella concept in transportation decision making.
- Explain the roles and responsibilities of participants in the NEPA process.
- Employ a reasoned, collaborative process when developing and evaluating alternatives.
- Practice balancing an array of interests and values in making transportation decisions.
- List the milestones in transportation planning that link to NEPA project development process.
- Describe documentation requirements of NEPA process.
- Employ environmental streamlining concepts of leadership, stewardship, and conflict resolution in managing the NEPA process.

**Target Audience:**

FHWA, State DOT (including consultants acting on behalf of the State), Federal and State environmental resource agencies, local government and MPOs who participate in the transportation decision making process. We strongly encourage the hosting organization to invite a mix of planning and environmental staff from these agencies.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Aung Gye	(202) 366-2167	<a href="mailto:aung.gye@fhwa.dot.gov">aung.gye@fhwa.dot.gov</a>

## Environment

**Course Number:** 142018A

**Course Title:** Functional Assessment of Wetlands

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides an introduction to assessing wetlands impacts and mitigation planning based on Hydrogeomorphic principles of wetlands analysis. A brief overview of recent changes in wetland regulations is included. The course is comprised of both classroom and field exercises demonstrating the wetlands assessment and analysis techniques including wetland regulations, wetland ecology, and mitigation planning.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize requirements and basic principles for regulatory compliance, wetlands impact assessment and mitigation under National Environmental Policy Act of 1969 (NEPA) and Section 404, Clean Water Act, including the 404b(1) guidelines.
- Identify different wetland types, and be familiar with common definitions, delineation requirements, and wetlands classification, including the U.S.Fish and Wildlife Service and Hydrogeomorphic (HGM) functional classifications.
- Describe the common ecological functions and values of wetlands.
- Identify principles, approaches, and policies for compensatory mitigation, including wetland banking and in lieu fee plans.
- Recognize the HGM Assessment methodology.
- Demonstrate functional assessments of wetlands for alternatives analysis and selection for impact assessment according to principles of HGM, Evaluation of Planned Wetlands (EPW), and Wetland Evaluation Techniques (WET).
- Apply HGM, WET, EPW methods to planning and development of wetland mitigation projects.

**Target Audience:**

State DOT personnel who have professional/technical responsibilities relating to managing wetlands and impacts in a transportation environment. Other Federal, State, local government and industry personnel with related responsibilities may be permitted to attend on a space available basis. A basic understanding of Federal regulations concerning wetlands will be helpful. In addition, participants need at least one of the following: (1) experience in the highway project development process; (2) experience in highway project planning and design; (3) experience in natural resources regulation and management; or (4) experience in ecological assessment and mitigation design.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Paul Garrett	(303) 969-5772 Ext. 332	<a href="mailto:paul.garrett@fhwa.dot.gov">paul.garrett@fhwa.dot.gov</a>

## Environment

**Course Number:** 142036A

**Course Title:** Public Involvement in the Transportation Decision-Making Process

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

Public involvement is about giving the public an opportunity to influence transportation decision making. The public should have a role in every phase of decision making, including the design of the public involvement plan itself. Successful public involvement means addressing the public's procedural, psychological, and substantive needs. Focusing on interests, rather than positions, can make public involvement more meaningful and useful. Public involvement is much more than public hearings and involves creative thinking, the willingness and ability to interact openly, and sensitivity to the public's preferred forms of communication and participation.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify key decision points where the public can/should be involved.
- Select and apply a variety of specific techniques to get information out to the public and elicit input from the public.
- Identify different publics and engage them through targeted techniques.
- Integrate the public-involvement process with the decision-making process.
- Develop public involvement plans.
- Conduct interviews and focus groups to get input on planning relevant public involvement activities.
- Choose to speak and listen in ways that will enhance openness and reduce resistance.
- Differentiate between positions and interests and ask questions which will elicit interests and lead toward problem solving.
- Distinguish between public relations and participatory decision making.
- Track what is learned from the public and transfer that information to decision makers.
- Identify and adapt to different cultural sensitivities.
- Define environmental justice, name the factors that are considered, and describe the public involvement implications of complying with environmental justice policy.

**Target Audience:**

Federal, State and local transportation agency staff, Metropolitan Planning Organization personnel, transit operators, consultants and others who are responsible for planning, implementing or participating in any phase of the public involvement process.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	KLynn Berry	(404) 562-3618	<a href="mailto:klynn.berry@fhwa.dot.gov">klynn.berry@fhwa.dot.gov</a>

## Environment

**Course Number:** 142042A

**Course Title:** Fundamentals of Title VI/Environmental Justice

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

Environmental Justice and Title VI apply to every stage of transportation programs. USDOT and its partners are committed to nondiscrimination in all Federal-aid programs. Many opportunities exist to establish partnerships with other public and private organizations to create more livable communities. This course presents a framework for using a variety of approaches and tools for accomplishing environmental justice goals.

**Outcomes:** Upon completion of the course, participants will be able to:

- Define Environmental Justice and describe its relationship to Title VI of the Civil Rights Act of 1964.
- Explain the fundamental principles of Environmental Justice.
- Apply the principles of Environmental Justice to transportation decisions.
- Identify how Environmental Justice applies to every stage of transportation decision making.
- Describe the benefits of Environmental Justice in transportation decision making.
- Develop proactive strategies, methods and techniques to implement Environmental Justice in transportation programs and projects.

**Target Audience:**

Federal, State and local transportation agency transit or planning personnel (including consultants acting on their behalf) who interact with minority and low-income communities. State and local agency personnel providing community services. Elected officials and their representatives.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	David Kuehn	(202) 366-6072	<a href="mailto:david.kuehn@fhwa.dot.gov">david.kuehn@fhwa.dot.gov</a>

## Environment

**Course Number:** 142044A**Course Title:** Implications of Air Quality Planning for Transportation

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The Clean Air Act Amendments (CAAA) of 1990, the Intermodal Transportation Efficiency Act of 1991 (ISTEA), and the Transportation Equity Act for the 21st Century (TEA-21) reinforced the close linkage between clean air goals and transportation investments. These statutes also specify requirements that apply to transportation and air quality agencies throughout the United States. However, after more than ten years of implementation, it is clear that more educational opportunities are needed to explain how clean air and transportation rules and regulations interrelate. This course was developed to provide this linkage.

The course goes beyond the statutes to explain how the integrated transportation and air quality planning process has been defined and reinforced over the past decade by regulations, guidance, and litigation. It provides a context for the various statutory and regulatory requirements, including a comprehensive review of the 1990 CAAA requirements, Environmental Protection Agency (EPA) policies related to transportation, and the process of developing State Implementation Plans (SIPs). It also provides information on emission trends, forecasting techniques, technology improvements, emerging issues, and demonstrates how transportation planning and air quality planning fit together under the Transportation Conformity Rule. Finally, it includes hands-on information based upon practitioners' experiences, a review of key court cases, and practical exercises which enable participants to reinforce the classroom instructional materials through addressing real-life challenges they may face within their organizations or agencies.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain to agency officials, elected officials and others why clean air requirements exist.
- Identify key federal laws, regulations and policies related to transportation-air quality planning activities.
- Describe how vehicle emission budgets and transportation control strategies are developed and their relationship to the SIP.
- Identify agency conformity responsibilities, and explain how key conformity objectives relate to other transportation-air quality planning processes.
- Describe key components of the transportation planning and project development processes related to air quality planning.
- Describe how stakeholder interactions affect air quality and transportation planning.

**Target Audience:**

The course is intended for transportation and air quality planners and engineers from State and local departments of transportation (DOT), metropolitan transportation organizations (MPO), transit agencies, Federal agencies (e.g., Federal Highway Administration, Federal Transit Administration, Environmental Protection Agency, Department of Energy, etc.), and State and local environmental agencies. Others include transportation and environmental consultants, public officials and staff members, community and interest groups, as well as other stakeholders in the planning process (e.g., Clean Cities, environmental organizations, Chambers of Commerce, Fleet Managers, etc.).

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Kevin N. Black	(202) 366-9485	<a href="mailto:kevin.black@fhwa.dot.gov">kevin.black@fhwa.dot.gov</a>

## Environment

**Course Number:** 142045A

**Course Title:** Pedestrian Facility Design

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course was developed to provide information and application opportunities for those involved in the design of pedestrian facilities. The Americans with Disabilities Act (ADA) requires newly constructed and altered sidewalks to be accessible and usable for people with disabilities, and accessibility improvements need to be implemented for existing facilities. To emphasize the importance of planning for pedestrians, the instruction centers on two case examples: one involving corridor design issues; one involving intersection design issues. Participants are engaged through lecture, discussion, video demonstrations of problem areas in corridors and intersections, small group problem identification, and the development of design alternatives.

**Outcomes:** Upon completion of the course, participants will be able to:

- List the characteristics of pedestrians and motorized traffic that influence pedestrian facility design.
- Apply the concepts of universal design and applicable design reference material to redesigning an existing location and/or designing a new location that meets the needs of motorized and nonmotorized users.
- Use the reference manual provided in the course to support design decisions for the case example.
- Given a case example, identify potential conflicts between pedestrians and other traffic and propose design options that improve access and safety.
- Given a case example, analyze the network for improvement options to meet the needs of pedestrian and other traffic.

**Target Audience:**

Engineers with planning, design, construction, or maintenance responsibilities; pedestrian and bicycle specialists; planners; disability and orientation specialists, transportation planners, architects, landscape architects, as well as decisionmakers at the project planning level.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	John Fegan	(202) 366-5007	<a href="mailto:john.fegan@fhwa.dot.gov">john.fegan@fhwa.dot.gov</a>

## Environment

**Course Number:** 142046A

**Course Title:** Bicycle Facility Design

Fee	Length
\$225 Per Participant (includes a copy of AASHTO Guide for the Development of Bicycle Facilities)	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

Bicycle facility design is an emerging subject. The availability of Federal, State, and local transportation funding for bicycle facilities that serve transportation and recreational users is resulting in a dramatic increase in the number of facilities being planned and built. Although there are no Federal design standards for bicycle facilities, a newly adopted American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, or a modification thereof, is being used by many States and localities as the design guide. However, designing bicycle facilities often requires not only the use of the AASHTO Guide as well as other documents, but also the application of engineering judgement where specific information is not provided. This course will assist planners and designers in learning how to apply the existing standards and how to deal with other technical issues involved.

**Outcomes:** Upon completion of the course, participants will be able to:

- List the needs of bicyclists as facility users.
- Identify common roadway and traffic conditions that affect bicyclists.
- Describe the characteristics of a roadway and a shared-use path that are designed to accommodate bicyclists.
- List the benefits to the transportation system of accommodating bicyclists with different abilities.
- Recognize opportunities to accommodate bicyclists during the planning, design, construction and operational phases of a project.

**Target Audience:**

Federal, State or local engineers with planning, design, construction, or maintenance responsibilities; bicycle specialists; transportation planners; landscape architects, as well as decision makers at the project planning level

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	John Fegan	(202) 366-5007	<a href="mailto:john.fegan@fhwa.dot.gov">john.fegan@fhwa.dot.gov</a>

## Statewide Planning

**Course Number:** 151018A**Course Title:** Application of the FHWA Traffic Monitoring Guide

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course covers the application of procedures used as published in the FHWA's Traffic Monitoring Guide (TMG) and other recent developments in traffic monitoring, including:

- An overview of the application of the TMG procedures to develop data and information needed to support State and National programs including the Highway Performance Monitoring System (HPMS), pavement management, safety management, congestion management, and environmental management.
- Discussion with attendees on specific issues that impact the application of the TMG procedure in traffic counting, vehicle weighing, etc.
- Discussion of automated procedures for data collection and analysis and presentation of examples.
- Discussion of the AASHTO guidelines for traffic monitoring and the coordination of data collection to other Federal and national programs.
- Discussion of Traffic Monitoring System required in Intermodal Surface Transportation Efficiency Act (ISTEA).

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the purpose and appropriate use of the TMG procedures.
- Use the procedures for obtaining data for Federal and State programs.
- Apply the data obtained to answer specific questions on Federal and State issues regarding traffic monitoring.

**Target Audience:**

FHWA field office planners, and State transportation or planning personnel responsible for or interested in traffic counting, vehicle classification, or truck weight data programs.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Jeff Patten	(202) 366-5052	<a href="mailto:jeff.patten@fhwa.dot.gov">jeff.patten@fhwa.dot.gov</a>

## Statewide Planning

**Course Number:** 151021A

**Course Title:** Administration of FHWA Planning Grants

Fee	Length
\$235 Per Participant	1.5 Days (CEU: 0.9 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

The course covers the responsibilities and relationships among Federal, State, and local agencies involved in administration of FHWA planning grants to States and State subgrants to Metropolitan Planning Organizations (MPOs) and local governments. It provides a forum for FHWA planning and financial staff, State, MPO, and other local agency staff to discuss the Federal requirements associated with highway planning program grant administration.

The course covers current changes to relevant administrative regulations and directives including: Office of Management and Budget (OMB) Circular A-102; 49 Code of Federal Regulation (CFR) Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments (US DOT's regulations implementing Circular A-102); and 23 CFR Part 420 (FHWA's regulations for highway planning and research funds). Limited coverage of allowable costs, cost allocation plans, and audit requirements is also included.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply FHWA's regulations for administration of highway planning program grants and subgrants and the relationships among these regulations and 49 CFR Part 18 and applicable OMB Circulars.
- Identify the relationships among the FHWA regulations, 49 CFR Part 18 and applicable OMB Circulars.
- Discuss the administrative responsibilities of each agency involved in administration of FHWA highway planning program grants and subgrants.

**Target Audience:**

FHWA, State, MPO's and local planning agencies who are involved with the use and administration of FHWA planning and research funds. Experience in the use and administration of FHWA planning and research funds would be beneficial.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Tony Solury	(202) 366-5003	<a href="mailto:tony.solury@fhwa.dot.gov">tony.solury@fhwa.dot.gov</a>

## Statewide Planning

**Course Number:** 151034A**Course Title:** Development and Implementation of Travel Surveys

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The course provides transportation planners with information on the development and implementation of the most common types of travel surveys, including: household travel and activity, vehicle intercept, transit on-board, commercial vehicle, work place and establishment, special generator, hotel/visitor, and parking surveys. Much of the course material includes information from the 'Travel Survey Manual,' published by the FHWA. The course is oriented toward those responsible for survey work and those who use the data collected such as modeling practitioners, however, it will not address travel demand modeling explicitly. In addition, the course provides guidance for avoiding common problems encountered in performing travel surveys. The goal of the course is to increase the quality of travel survey results and to promote the efficient utilization of data collection resources.

This three-day course can be taught with computer or manual exercises. For the computer exercise option, computers will be required for three days and course organizers should arrange for one computer for every two students. A self-instructional CD ROM will be provided to each participant for both the computer and non-computer options.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize various types of travel surveys and identify principles behind each. Define the relationship of each survey to the travel forecasting process.
- Develop and manage a process for implementing surveys in their local area.
- Develop high quality requests for proposals for survey efforts, and effectively evaluate the proposals.
- Identify emerging survey techniques and new technologies related to travel surveys.

**Target Audience:**

Metropolitan Planning Organization, State DOT and FHWA planning practitioners.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Michael Culp	(202) 366-9229	<a href="mailto:michael.culp@fhwa.dot.gov">michael.culp@fhwa.dot.gov</a>

## Statewide Planning

**Course Number:** 151038A**Course Title:** Introduction to Statewide Transportation Planning

Fee	Length
TBD	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

This is a new course, available Spring 2004. The course was jointly developed by NHI and National Transit Institute (NTI). Please contact NTI for further information.

**Description:**

The course is a collaborative effort among the FHWA Office of Planning, the National Highway Institute, the Federal Transit Administration, the National Transit Institute and various statewide planning, transit and industry representatives to develop a basic-- yet comprehensive-- course that will serve as an introduction to statewide transportation planning. Designed as an instructor-led, two-day presentation, the overall course objective is to transfer to participants the necessary knowledge and skills for them to constructively participate in the statewide transportation planning process.

**Outcomes:** Upon completion of the course, participants will be able to:

- Illustrate the continuous statewide transportation planning process.
- List the players, their roles and the issues involved in the statewide transportation planning process.
- Explain the relationship of statewide planning to Federal regulations and differing state and local requirements.
- List the required products of the statewide transportation planning process.
- Describe the major elements of a statewide transportation plan.
- Discuss the variety of methods, techniques and strategies to implement the plan.
- Recognize how evaluation methods and performance measures are used in the statewide transportation planning process.
- Recognize noteworthy statewide planning processes.

**Target Audience:**

New planners (recent graduates without a transportation background); urban planners; DOT staff who are actively involved in statewide planning; engineers who are assigned planning duties but lack academic background in planning; Metropolitan Planning Organization staff; Rural/Regional Planning Organization staff; Regional Development Commissions staff; transit agency staff; those from other Federal resource or regulatory agencies: EPA, Federal Lands, Tribal Governments; college graduates without planning degrees; and consultants involved in transportation planning activities.

	Name	Phone	Email
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
NTI Course Scheduling	Ginny Stern	(732) 932-1700	<a href="mailto:gstern@nti.rutgers.edu">gstern@nti.rutgers.edu</a>
Technical Information	Bob Gorman	(202) 366-5001	<a href="mailto:bob.gorman@fhwa.dot.gov">bob.gorman@fhwa.dot.gov</a>

## Statewide Planning

**Course Number:** 151039A**Course Title:** Applying Spatial Data Technologies to Transportation

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course was developed by FHWA - in cooperation with the Bureau of Transportation Statistics - to train participants in how to implement transportation planning applications that rely on spatial data technologies. Examples of applications using today's major spatial data technologies are described. Aspects of the example applications (i.e., level of effort for development, technological challenges, training needs, and evaluation measures) are discussed. Particular emphasis is placed on cross-cutting implementation issues, both technological and organizational. Exercises are focused on how to make use of spatial data technologies in an environment where data sharing and cooperative agreements are essential components for success. Reflecting NHI's commitment to learner-centered training, the course offers participants opportunities for discussion and joint problem solving, through which they will gain information about the roles and responsibilities of other team members.

The overall course goal is to prepare participants to evaluate and plan for the implementation of a variety of transportation planning applications that rely on spatial data technologies.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize emerging/current spatial data technologies.
- List the technologies.
- List the benefits and limitations of each technology.
- Benchmark the trends in terms of high, medium and low risk for implementation.
- List why a transportation planner would want to apply the technology.
- Describe specific examples of applications utilizing spatial data technologies in transportation planning.
- Identify common obstacles when implementing each technology.
- Recognize the value of cooperative efforts - both internal and external - when implementing the technologies.

**Target Audience:**

Participants should have a basic understanding of Geographic Information Systems (GIS) or have completed NHI Course 151029, Applications of GIS for Transportation. Various professional users of spatial data technologies from State departments of transportation, Metropolitan Planning Organizations, County/City governments; professional staff from State/Federal agencies that have cooperative efforts with other agencies such as environmental data warehouses (e.g., Florida, North Carolina, etc.); transit agencies; Airport/Port authorities; consultants.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Mark Sarmiento	(202) 366-4828	<a href="mailto:mark.sarmiento@fhwa.dot.gov">mark.sarmiento@fhwa.dot.gov</a>

## Metropolitan Planning

**Course Number:** 152054A**Course Title:** Introduction to Urban Travel Demand Forecasting

Fee	Length
\$530 Per Participant	4 Days (CEU: 2.4 Units)

**Class Size:** Minimum 20; Maximum 30

The hosting organization is responsible for providing MS-DOS microcomputers with color graphics, color monitors and at least 10 MB hard disk space. No more than two participants per computer station.

**Description:**

This is a 4-day introductory course in travel demand forecasting. Through classroom lecture and interactive workshops, the course covers the traditional four-step planning process of trip generation, trip distribution, mode choice and traffic assignment. It also includes presentations on the development of land use forecasts, network and zone structures and use of Geographic Information Systems. The course also includes software applications to problems previously solved manually to reinforce the concepts taught in the classroom.

The course is offered in the field upon request and is periodically sponsored by the FHWA Resource Center.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the principles of trip generation, trip distribution, mode choice, and traffic assignment.
- Apply the input data necessary for each of the models.
- Illustrate the significance of the outputs and results of travel demand forecasting models.
- Describe the role of urban transportation planning in decision making.

**Target Audience:**

Relatively new Federal, State and local planners who wish to gain a better understanding of the principles and techniques of travel demand forecasting. Computer experience is required.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Michael Culp	(202) 366-9229	<a href="mailto:michael.culp@fhwa.dot.gov">michael.culp@fhwa.dot.gov</a>

## Metropolitan Planning

**Course Number:** 152060A**Course Title:** Advanced Urban Travel Demand Forecasting for Large Urban Areas

Fee	Length
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

An introductory level NHI training course on urban travel demand forecasting (NHI Course No. 152054) is currently offered by FHWA. The purpose of NHI Course No. 152060 is to build upon the introductory travel demand forecasting course, emphasizing advanced practices for travel demand modeling at the system level for large urban areas. The course consolidates the best procedures and methodologies to estimate demand impacts of a broad range of multimodal infrastructure investment and transportation/land use policy options for system planning. Topics covered include advanced practices for modeling of trip generation inputs, mode choice, time-of-day analysis, traffic and transit trip assignment, and feedback loops, and overall model validation and reasonableness checks. Special issues relating to estimating travel impacts of Intelligent Transportation System (ITS) strategies are also discussed. Applications in each topic area are demonstrated through workshops exercises.

**Outcomes:** Upon completion of the course, participants will be able to:

- Select appropriate procedures and model structures to improve the capability of their four-step models.
- Assess the contribution of various potential model input variables toward accuracy of their model forecasts and the sensitivity of their models to policy input variables.
- Evaluate the level of accuracy and reasonableness of model outputs.

**Target Audience:**

This course is designed for FHWA, FTA, State DOT, Metropolitan Planning Organization, transit agency and local government modeling practitioners with modeling responsibilities for large urban areas. A thorough understanding of the four-step travel demand forecasting process and a minimum of two years of hands-on experience with this process is essential.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Michael Culp	(202) 366-9229	<a href="mailto:michael.culp@fhwa.dot.gov">michael.culp@fhwa.dot.gov</a>

## Metropolitan Planning

**Course Number:** 152069A**Course Title:** Metropolitan Transportation Planning

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 35

This course was jointly developed by NHI and the National Transit Institute (NTI). The first 8 sessions per year are free to all Federal, State and local governments and private non-profit transit providers. Contractors, consultants and for-profit providers will be charged the standard NTI fee of \$400. Call Danielle Mathis-Lee at (703) 235-0528 for additional sessions.

**Description:**

This course provides a general introduction and overview of the metropolitan transportation planning process, underscoring its relationship to informed decision making. Aspects covered include: key elements of the planning process; planning requirements; visioning, goals, objectives and measures of effectiveness; program and project development; alternatives and tools for their analysis.

**Outcomes:** Upon completion of the course, participants will be able to:

- Explain why the metropolitan transportation planning process exists and why it is important.
- Identify the requirements of the metropolitan transportation planning process and describe the products.
- Identify the players in the process and describe their roles and responsibilities.
- Distinguish among vision, goals, objectives and measures of effectiveness (MOEs) and describe the proper use of each.
- Explain how to identify transportation needs and problems and how to analyze and evaluate alternative strategies.
- Recognize the components of the Transportation Plan and the Transportation Improvement Program.
- Explain the relationship between planning and project development.
- Describe why planning is a continuous process, requiring monitoring of the system condition and performance.

**Target Audience:**

Planning, transportation planning, programming or project development staff working or participating in the metropolitan transportation planning process. These include participants from: Metropolitan Planning Organizations, state or local departments of transportation, transit agencies or Federal DOT. In addition, Federal or state resource and regulatory agencies, (e.g., EPA, Army Corps of Engineers, US Coast Guard, Fish And Wildlife Service, or Park Service, etc.).

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
NTI Course Scheduling	Ginny Stern	(732) 932-1700	<a href="mailto:gstern@nti.rutgers.edu">gstern@nti.rutgers.edu</a>
Technical Information	Sherry Ways	(202) 366-1589	<a href="mailto:sherry.ways@fhwa.dot.gov">sherry.ways@fhwa.dot.gov</a>

## Metropolitan Planning

**Course Number:** 152071A**Course Title:** Estimating Regional Mobile Source Emissions

Fee	Length
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

The transportation conformity provisions of Clean Air Act Amendments of 1990 (CAAA) and planning provisions of the Transportation Equity Act for the 21st Century (TEA-21) require areas that violate the National Ambient Air Quality Standards (NAAQS) to demonstrate that through the transportation conformity process, transportation investments have air quality impacts consistent with the clean air goal of the State Implementation Plan (SIP). Estimating the amount of mobile source emissions is a crucial part of this process. Metropolitan Planning Organizations (MPOs) and State departments of transportation (DOTs) have the responsibility of creating mobile source emissions estimates to support transportation conformity determinations in areas that violate NAAQS. These emissions estimates are based on travel demand models, Highway Performance Monitoring System (HPMS) data, and emission rate models. In addition, planners from air agencies are responsible for developing mobile source emissions inventories based on a similar set of assumptions and techniques. It is in the interest of the MPOs and DOTs as well as air agencies to perform this analysis using best practice analysis techniques. The focus of this training course is to develop the skills of planners and practitioners responsible for estimating mobile source emissions so that they can incorporate these techniques into practice in their areas. This course has been developed in coordination with the US Environmental Protection Agency (EPA).

**Outcomes:** Upon completion of the course, participants will be able to:

- Develop estimates of Vehicle Miles Traveled (VMT) by speed.
- Develop MOBILE 6 emissions factors.
- Develop regional emissions estimates.
- Describe techniques to estimate emission benefits of selected transportation control measures (TCMs).

**Target Audience:**

Participants should have 1-3 years experience in travel demand forecasting, conformity or air quality analysis or have completed NHI Course 152054, Introduction to Travel Demand Forecasting and/or the National Transit Institute's Introduction to Transportation/Air Quality Conformity course. This course is targeted to: Transportation Planning staff from State DOTs and MPOs; staff from other governmental agencies who are responsible for developing mobile source emissions estimates to support conformity determinations; FHWA, FTA and EPA staff involved in the conformity process as it relates to travel demand forecasting and mobile source emissions estimates; transit operators who participate in developing mobile source emissions estimates; and consultants who are involved in this field.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Michael Culp	(202) 366-9229	<a href="mailto:michael.culp@fhwa.dot.gov">michael.culp@fhwa.dot.gov</a>

## Financial Management

**Course Number:** 231013A**Course Title:** Highway Program Financing

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 40

This course is "Not Being Scheduled" until the new Federal-Aid authorization bill is passed.

**Description:**

This course covers the various aspects of Federal-aid highway financing unique to the FHWA program. Topics include, but are not limited to:

- The content and policy implication of authorizing and appropriating legislation.
- The way Federal-aid highway funds are distributed to the States, including discussion of contract authority, apportionment and allocation, deductions, earmarking, transferability, and obligation.
- The effect of policy and budget considerations on the use of Federal-aid funds, especially as manifested through obligation limitations.
- The operation of the Highway Trust Fund and its significance to the funding level for the Federal-Aid Highway Program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the flow of Federal financing from authorization to reimbursement, including the apportionment and allocation processes, deductions, earmarkings, and obligations.
- Use correct terminology to describe the financing process.
- Discuss the impact contract authority and the obligation limitation have on the use of Federal funds.
- Interpret how the Federal budgetary process applies to the Federal-Aid Highway Program.
- Describe the significance of the Highway Trust Fund to the funding levels for the Federal-Aid Highway Program.

**Target Audience:**

State and local government employees and private sector participants interested in the process by which the Federal-Aid Highway Program receives and distributes funding. Course hosting organizations are encouraged to invite attendees from a variety of sources.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Mila Plosky	(703) 235-0527	<a href="mailto:mila.plosky@fhwa.dot.gov">mila.plosky@fhwa.dot.gov</a>
Technical Information	Bob Meredith	(202) 366-6786	<a href="mailto:robert.meredith@fhwa.dot.gov">robert.meredith@fhwa.dot.gov</a>

## Corporate Management

**Course Number:** 310108A**Course Title:** Federal Lands 101

Fee	Length
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

The course will be available in Spring 2004.

**Description:**

During these times of economic expansion and growth, there are dramatic workforce changes taking place. With the passage of TEA-21, the program for Federal Lands Highway (FLH) nearly doubled and there is the prospect that it will again increase under pending transportation reauthorization. This coupled with the increasing demand by our partners and customers for more technical assistance, FLH needs to develop their new/mid-career hires in the area of FLH operations and regulations.

Therefore, the overall course goal is to provide FLH employees with an overview of how FLH operates in order to administer programs; deliver projects; develop and transfer technology; and provide external training.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the role and authorities of FLH within the FHWA and its interactions with Federal-aid Divisions.
- Describe unique aspects of FLH customers and programs.
- Describe how FLH delivers projects.
- Describe how FLH conducts business, including processes and resources.

**Target Audience:**

New hires to FLH in all positions and grades and Federal-aid (particular new employees) and Federal Lands Management Agency employees upon request.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Debbie Gwaltney	(703) 235-1199	<a href="mailto:debbie.gwaltney@fhwa.dot.gov">debbie.gwaltney@fhwa.dot.gov</a>
Technical Information	Don Tuggle	(703) 404-6201	<a href="mailto:don.tuggle@fhwa.dot.gov">don.tuggle@fhwa.dot.gov</a>

## Corporate Management

**Course Number:** 310109A**Course Title:** Federal-Aid 101 (FHWA Employee Session)

Fee	Length
\$460 Per Participant	3.5 Days (CEU: 2.1 Units)

**Class Size:** Minimum 25; Maximum 30

Highway Program Finance Course would be helpful but is not required.

**Description:**

During this time of economic expansion and growth, there are dramatic workforce changes taking place. Given the increasing demand by our partners and customers for more technical assistance, FHWA needs to develop their new/mid-career hires in the area of the Federal-aid processes and regulations.

Therefore, the overall course goal is to provide FHWA employees, particularly mid-career hires, with an overview of the key elements of the Federal-Aid Highway Program. Specifically, this course focuses on general requirements and laws that govern the Federal-Aid Highway Program; processes and procedures followed in the project development; and identifying flexibility inherent in the Federal-Aid Program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the key elements of the overall project development process.
- Identify the FHWA Civil Rights Programs (i.e., Title VI, Disadvantaged Business Enterprise (DBE), EEO Contract Compliance, Title VII, Americans with Disabilities Act (ADA), Indian Outreach) and their relationship to the Federal-Aid Highway Program and the Federal/State relationships.
- Integrate Environmental Justice into all aspects of project planning, development and construction.
- Develop a flowchart of the project development process from the initial planning concept through the environmental and right-of-way processes, on to construction and opening to traffic.
- Identify the roles of Safety, Intelligent Transportation Systems, Operations, Research and Development in the Federal-Aid process.
- Identify ways used for public involvement early in the process.
- Learn the fundamentals of several innovative financing techniques that will maximize the use of Federal-Aid funds.
- Develop a network of professionals that can be contacted for help.
- Discuss how the Federal-Aid laws and regulations relate to the other laws (i.e., NEPA, Uniform Act, the Davis Bacon Act, OMB Circular A-87, 49 CFR part 18 (Common Rule)).

**Target Audience:**

New/Mid Career Hires - This course is for all disciplines, (i.e., planners, engineers, environmental specialists, financial specialists or managers).

	Name	Phone	Email
Course Scheduling	Carolyn Eberhard	(703) 235-0010	<a href="mailto:carolyn.eberhard@fhwa.dot.gov">carolyn.eberhard@fhwa.dot.gov</a>
NHI Training Program Manager	Debbie Gwaltney	(703) 235-1199	<a href="mailto:debbie.gwaltney@fhwa.dot.gov">debbie.gwaltney@fhwa.dot.gov</a>
Technical Information	Michael Graf	(302) 734-1946	<a href="mailto:michael.graf@fhwa.dot.gov">michael.graf@fhwa.dot.gov</a>

## Corporate Management

**Course Number:** 310110A**Course Title:** Federal-Aid Highways - 101 (State Version)

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** N/A**Description:**

During this time of economic expansion and growth, there are dramatic workforce changes taking place. Given the increasing demand by our partners and customers, it is critical to develop State DOT employees in the area of the Federal-aid highway development processes and regulations.

Therefore, the overall course goal is to provide participants with an overview of the key elements of the Federal-Aid Highway Program. Specifically, this course focuses on general requirements and laws that govern the Federal-Aid Highway Program; processes and procedures followed in the entire project development process including: financing, planning, environment, right of way, highway and bridge design, construction, operations/ITS, maintenance and technology; and identifying flexibility inherent in the Federal-Aid Program.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify the key elements of the overall highway project development process.
- Identify the elements and requirements of the Federal-Aid Highway Program and the associated Federal/State relationships.
- Develop a flowchart of the project development process from the initial planning concept through the environmental and right-of-way processes, on through design, construction and opening to traffic.
- Identify the roles of Safety, Intelligent Transportation Systems, Operations, Research and Development in the Federal-aid process.
- Identify the need for public involvement early in the process; opportunities for application of the principles of environmental justice/civil rights; context sensitive solutions, etc.
- Learn the fundamentals of federal-aid financing, including several innovative financing techniques that will maximize the use of Federal-aid funds.
- Develop a network of professionals that can be contacted for help.
- Discuss how the Federal-aid laws and regulations relate to other laws (i.e., NEPA, Uniform Act, the Davis Bacon Act, OMB Circular A-87, 49 CFR part 18 (Common Rule); the application of FHWA regulations, policies, technical guidance, etc.

**Target Audience:**

State and local government employees and private sector participants interested in the process by which the Federal-Aid Highway Program is carried out.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Debbie Gwaltney	(703) 235-1199	<a href="mailto:debbie.gwaltney@fhwa.dot.gov">debbie.gwaltney@fhwa.dot.gov</a>
Technical Information	Michael Graf	(302) 734-1946	<a href="mailto:michael.graf@fhwa.dot.gov">michael.graf@fhwa.dot.gov</a>

## Civil Rights

**Course Number:** 361019A**Course Title:** On the Road to Equality: Women in Highway Construction

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 40

The essential material covered in this course is currently available in the 4 1/2 day course titled "Basic FHWA Civil Rights Program Management" which is presented by the FHWA Civil Rights Office.

**Description:**

This course provides State Highway Agencies (SHAs) and construction contractors with information and tools which will aid them in increasing the employment and retention of women in the skilled trades in the highway construction workforce. A variety of instructional techniques are employed, including lectures, group discussions, case studies, team consensus, and visual aids. Each participant receives a copy of the manual "On the Road to Equality: Women in Highway Construction," which serves as a valuable reference.

Course host agrees to provide 20 to 40 participants, with a minimum of one-third construction contractors. For the purpose of a short panel presentation on the second day, host agrees to provide three to four women currently working in the skilled crafts of construction.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe the past and current status of women in highway construction.
- Describe the benefits of women in highway construction.
- Identify and interpret the current and specific laws and regulations that impact women in highway construction.
- Identify ways to increase employment opportunities and the strategies necessary to retain women in highway construction.
- Identify methods and techniques to prevent sexual harassment in highway construction.
- Identify skills training and understand the need for training women in highway construction.
- Recognize the importance of contractor equal opportunity compliance reviews and provide strategies to correct identified deficiencies relative to women in construction.
- Identify national and local agencies and groups that can assist contractors and women to increase women's involvement in highway construction work.

**Target Audience:**

State personnel and highway construction contractors. The State personnel should have responsibility for assuring equal employment opportunity in highway construction. Community-based organizations that provide orientation for women in non-traditional occupations are invited.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Humbert R. Martinez	(817) 978-3671	<a href="mailto:humberto.martinez@fhwa.dot.gov">humberto.martinez@fhwa.dot.gov</a>

## Civil Rights

**Course Number:** 361020A

**Course Title:** Partnering for Native American Employment in Highway Construction

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides State Transportation Agencies (STAs), highway construction contractors, and Tribal representatives with information and tools which will assist them in working together to increase the employment and retention of Native Americans in the highway construction workforce. A variety of instructional techniques are employed, including lectures, group discussion, team consensus, and visual aids. Emphasis is placed on the creation of an "Action Plan" for the host State to increase the employment of Native Americans in highway construction. Participants receive a copy of the "Partnering for Indian Employment in Highway Construction" manual which serves as a valuable reference.

Course hosts must agree to provide 20 to 30 participants, with a balanced mix of participants from the three groups: State, Tribal, and contractors.

The National Highway Institute requires at least 3 months advance notice to schedule this course.

**Outcomes:** Upon completion of the course, participants will be able to:

- Outline the benefits associated with the increased employment of Native Americans in Federal-aid highway construction.
- Recognize the need for partnering among Tribal, State and Federal governments, and highway construction contractors.
- Identify Federal and State laws, regulations, and directives related to Indian employment preference for Federal-aid highway construction on and near Reservations.
- Explain the purpose and nature of Tribal employment laws and requirements.
- Recognize the cultural differences among the stakeholders--Tribes, Federal/State governments, and highway construction contractors.
- Identify potential employment barriers caused by cultural differences among the stakeholders.
- Create practical and innovative strategies to increase the employment of Native Americans in highway construction.

**Target Audience:**

State transportation agencies, Tribal employment representatives, and highway construction contractors. The State personnel should have direct or indirect responsibility for assuring equal employment opportunity in highway construction.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Teresa Banks	(404) 562-3592	<a href="mailto:teresa.banks@ga.fhwa.dot.gov">teresa.banks@ga.fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380003A

**Course Title:** Design and Operation of Work Zone Traffic Control

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides participants with information on the safest and most efficient work zone traffic controls, including: the application of effective design and installation concepts; and using signs and markings for detours, construction zones and maintenance sites. The legal, administrative, and operational aspects also will be discussed. Classroom presentations include lectures, case histories and workshops.

**Outcomes:** Upon completion of the course, participants will be able to:

- Describe each step involved in providing work zone traffic controls.
- Identify and apply workable concepts and techniques for designing, installing, and maintaining controls in construction, maintenance, and utility operations.
- Identify appropriate principles in the design of traffic control plans.
- Apply traffic control plans to site conditions, monitor traffic controls, and make changes indicated by traffic accidents and incidents.
- Discuss techniques and procedures used by different agencies.
- Assess the legal consequences of action and inaction relative to work zone traffic control and identify risk management procedures.

**Target Audience:**

Design, construction, and maintenance personnel responsible for designing, installing, and monitoring work zone traffic control.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Michael Robinson	(202) 366-2193	<a href="mailto:mike.robinson@fhwa.dot.gov">mike.robinson@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380005A

**Course Title:** Railroad-Highway Grade Crossing Improvement Program

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

The training provides information on rail-highway crossings, grade crossing components, including program/project development and administration. Workshops will provide the participants a chance to make "hands-on" applications of the training material, which include such topics as:

- Historical background
- Railroad-highway intersection definition and components
- Collection and maintenance of data
- Assessment of crossing safety and operations
- Identification and selection of alternate improvements
- Program and project development and implementation
- Maintenance
- Other topics (i.e., private crossings, operation lifesaver)

**Outcomes:** Upon completion of the course, participants will be able to:

- Develop and implement improvements to railroad-highway grade crossings.
- Identify and evaluate techniques and engineering principles used for all crossings.

**Target Audience:**

Federal, State, and local transportation agencies responsible for the design, construction, and/or maintenance of railroad-highway crossings. State and local traffic engineers responsible for highway-railroad grade crossing safety.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Dee Chappell	(202) 366-0087	<a href="mailto:debra.chappell@fhwa.dot.gov">debra.chappell@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380032A

**Course Title:** AASHTO Roadside Design Guide

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides an overview of the AASHTO "Roadside Design Guide." Emphasis is on current highway agency policies and practices. Each student will receive a copy of the AASHTO "Roadside Design Guide" as the course text.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply the clear zone concept to all classes of roadways.
- Recognize unsafe roadside design features and elements and make appropriate changes.
- Identify the need for a traffic barrier.
- Select, design and install a traffic barrier.
- Apply safety concepts to roadside features and appurtenance selection/use in work zones.
- Compare alternate safety treatments and select a cost-effective design.
- Identify policies and practices that are inconsistent with current state-of-the-art.

**Target Audience:**

Federal, State and local highway engineers involved in the formulation and/or application of policies and standards relating to the design of safer roadsides.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Richard Powers	(202) 366-1320	<a href="mailto:richard.powers@fhwa.dot.gov">richard.powers@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380032C**Course Title:** AASHTO Roadside Design Guide, Web Based

Fee	Length
\$230 Per Participant	14 Hours (CEU: 1.4 Units)

**Class Size:** Minimum 1; Maximum 1**Recommended System Specifications:**

- 600 MHz Intel Pentium III processor or equivalent with a minimum of 128 MB RAM
- Windows 98 Second Edition, ME, NT 4.0 with Service Pack 6a, 2000 with Service Pack 4, or XP
- Audio capability (Windows Media Player or equivalent) with speakers
- Microsoft Internet Explorer v6, Netscape v7, Mozilla v1.1 or higher with JavaApplet and ActiveX enabled
- Flash 5 or higher plug-in installed
- Color Video Display (800x600) with thousands of colors (16-bit)
- DSL or higher speed Internet connection strongly recommended (Audio/animations may be slow at dial-up modem speeds)

**Description:**

This course provides an overview of the AASHTO "Roadside Design Guide." Emphasis is on current highway agency policies and practices. Each student will receive a copy of the AASHTO "Roadside Design Guide" as the course text.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply the clear zone concept to all classes of roadways.
- Recognize unsafe roadside design features and elements and make appropriate changes.
- Identify the need for a traffic barrier.
- Select, design and install a traffic barrier.
- Apply safety concepts to roadside features and appurtenance selection/use in work zones.
- Compare alternate safety treatments and select a cost-effective design.
- Identify policies and practices that are inconsistent with current state-of-the-art.

**Target Audience:**

Federal, State and local highway engineers involved in the formulation and/or application of policies and standards relating to the design of safer roadsides.

Participant must register on-line at [www.nhi.fhwa.dot.gov/registerdl.asp](http://www.nhi.fhwa.dot.gov/registerdl.asp). Participant information, billing address, and credit card information must be provided when registering on-line. Participants will have a userid and password sent to them via e-mail after authorization in order to log in to the course from the distance learning page on the CITE website at [www.citeconsortium.org](http://www.citeconsortium.org).

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Richard Powers	(202) 366-1320	<a href="mailto:richard.powers@fhwa.dot.gov">richard.powers@fhwa.dot.gov</a>
WWW Assistance	Rick Deleyos	(301) 403-4593	<a href="mailto:rdeleyos@wam.umd.edu">rdeleyos@wam.umd.edu</a>

## Highway Safety

**Course Number:** 380034A

**Course Title:** Design, Construction, and Maintenance of Highway Safety Appurtenances and Features

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)
\$270 Per Participant	2 Days (CEU: 1.2 Units)
\$400 Per Participant	3 Days (CEU: 1.8 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

The course has been developed for a 3-day course presentation but can also be structured into a 1- or 2-day training course. The hosting agency will be able to choose the modules for presentation that will best meet their needs. The course covers the design, construction, and maintenance of highway safety appurtenances and features. It covers the purpose and performance requirements of state-of-the-art highway safety features, such as breakaway sign supports, breakaway utility poles, traffic barriers, impact attenuators, traversable terrain and hardware features such as drainage inlets. The course describes how these features function, what can go wrong, and how to recognize and correct improper installations.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify advantages and disadvantages of different types of longitudinal barriers and crash cushions.
- Identify National Cooperative Highway Research Program 350 tested safety appurtenances.
- Identify application of highway safety appurtenances, why they are used, when and where they should be used, and what is necessary to ensure their function.
- Design the placement of, and determine the need for, longitudinal barriers.
- Use required installation, construction, and maintenance procedures for proprietary longitudinal barriers, terminals, transitions, crash cushions, bridge railings, and sign supports.
- Recognize substandard or potentially hazardous highway appurtenances and features.
- Develop alternatives to eliminate, correct, or mitigate unsatisfactory operational characteristics of existing safety devices.

**Target Audience:**

Highway engineers, including local personnel involved in the design, construction, or maintenance of highway safety appurtenances and features. This course is suitable for all local, State and Federal employees that are involved with the installation and repair of highway appurtenances.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Harry Taylor	(202) 366-2249	<a href="mailto:harry.taylor@fhwa.dot.gov">harry.taylor@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380060A**Course Title:** Work Zone Traffic Control for Maintenance Operations (Short Term)

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)

**Class Size:** Minimum 20; Maximum 30**Description:**

This course provides guidance and training for field personnel working in the planning, selection, application, and operation of short-term work zones. The course addresses typical short-term maintenance activities occurring on two-lane rural highways and multi-lane urban streets and highways. The course covers the applicable standards for work zone protection contained in the Manual on Uniform Traffic Control Devices (MUTCD), discussing the need for proper application of devices, while addressing liability issues of highway agencies and individuals. Classroom presentation includes practical exercises to plan, set up, operate, and remove work zone safety devices, including appropriate flagging procedures for these operations.

**Outcomes:** Upon completion of the course, participants will be able to:

- Apply traffic control through short term and mobile work areas.
- Use national work zone standards and requirements as contained in Part VI of the MUTCD.
- Use standard traffic control devices in work zones.
- Design and install traffic control schemes for short term and mobile operations on rural two- and multi-lane streets and highways.
- Apply proper flagging procedures.
- Minimize liability exposure for agencies performing utility and maintenance operations.

**Target Audience:**

State, county, and utility personnel who are responsible for establishing traffic controls through short-term, utility and maintenance work areas such as maintenance crews, survey crews, and utility crews.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Michael Robinson	(202) 366-2193	<a href="mailto:mike.robinson@fhwa.dot.gov">mike.robinson@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380063A

**Course Title:** Construction Zone Safety Inspection

Fee	Length
\$200 Per Participant	1 Day (CEU: 0.6 Units)
\$235 Per Participant	1.5 Days (CEU: 0.9 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

This course provides training in the management of traffic control plans and the inspection of construction zone safety devices. Participants receive instruction in traffic control plan review, inspection of traffic control procedures and safety devices, and the resolution of discrepancies from the traffic control plan, as well as on deficiencies in safety hardware maintenance. The following major topics are covered:

- Inspection of traffic control plan operation
- Maintenance of work zone signs and markings
- Inspection of construction safety hardware
- Resolution of discrepancies from contract requirements

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the importance of construction zone safety devices.
- Identify the contract requirements for selected devices.
- Inspect the installation and operation of safety devices, including discrepancies and deficiencies in safety devices.
- Resolve discrepancies from the contract requirements and ensure corrections in the deficient safety devices.

**Target Audience:**

FHWA safety engineers, FHWA highway engineers, and State and local personnel involved in the management of traffic control plans and the inspection of construction zone safety devices.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Michael Robinson	(202) 366-2193	<a href="mailto:mike.robinson@fhwa.dot.gov">mike.robinson@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380069A

**Course Title:** Road Safety Audits and Road Safety Audit Reviews

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**Description:**

Participants in this training will learn how to improve transportation safety by applying a new proactive approach "Road Safety Audits (RSA) and Road Safety Audit Review (RSAR)." This technique provides an examination of a future or existing roadway by an independent, qualified audit team. The RSA is a way for your agency to improve safety and to communicate to the public how you are working toward accident reductions.

This course includes "hands-on" application of the training materials which include such topics as:

- Road Safety Audit definition and history
- Why care about safety
- Stages of a Road Safety Audit
- Details on how to conduct a Road Safety Audit
- Easy-to-use-checklists
- Legal considerations

This training provides practical information on how to conduct a Road Safety Audit. Students will receive a copy of the "Road Safety Audits and Road Safety Audit Reviews Reference Manual."

**Outcomes:** Upon completion of the course, participants will be able to:

- Express the Road Safety Audit process terminology.
- Perform a simple Road Safety Audit, as a member of a team.
- Assess the benefits of a Road Safety Audit on a statewide basis.

**Target Audience:**

Federal, State and local transportation personnel who are likely to serve on a Road Safety Audit team. Consultants who conduct highway safety studies also may attend.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Louisa Ward	(202) 366-2218	<a href="mailto:louisa.ward@fhwa.dot.gov">louisa.ward@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380070A

**Course Title:** Safety and Operational Effects of Geometric Design Features for Two-Lane Rural Highways

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 20; Maximum 30

**VERY IMPORTANT:** Bring a scientific notation calculator as we will be doing calculations of decimal value to decimal power for crash prediction values.

**Description:**

This course provides quantitative safety assessment methods to the design process for two-lane rural highways. Emphasis is on the application of safety research results to design decisions for application of the requirements and guidelines detailed in the 2001 AASHTO Green Book for curvature, lane width, shoulder width, grade, and intersection. Each student will receive a copy of the "Safety and Operation Effects of Highway Design Features for Two-Lane Rural Highways" manual.

**Outcomes:** Upon completion of the course, participants will be able to:

- Identify changes in geometric design practices detailed in the AASHTO 2001 Green Book.
- Recognize the safety effects of geometric design features.
- Calculate the quantitative safety measures of geometric design features.
- Apply reconstruction to only those segments/features with higher than expected crash experience.
- Compare alternative designs based upon an assessment of the safety effects of geometric design features.

**Target Audience:**

State and local highway engineers and consultants involved in the design of two-lane rural highways.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Fred Ranck	(708) 283-3545	<a href="mailto:fred.ranck@fhwa.dot.gov">fred.ranck@fhwa.dot.gov</a>

## Highway Safety

**Course Number:** 380071A**Course Title:** Interactive Highway Safety Design Model

Fee	Length
\$270 Per Participant	2 Days (CEU: 1.2 Units)

**Class Size:** Minimum 18; Maximum 30

The first 6 courses delivered will be subsidized by the Office of Safety and Office of Safety Research and Development. Minimum based availability of computers. No more than 2 participants per computer.

Minimum System Configuration:

- 300 MHz Pentium III or better processor with 128 MB RAM
- Windows 95 (Service Release 1), 98 (Second Edition), NT 4.0 with Service Pack 6a
- Microsoft Internet Explorer 6 with 128-bit encryption, Netscape Navigator 7.1, or Mozilla 1.5
- Color Video Display (800x600) with high colors (16 bit)
- 300 MB free disk space

**Description:**

This course will instruct highway design project managers, planners, designers, and traffic and safety reviewers in the application of the Interactive Highway Safety Design Model (IHSDM) software and will provide guidance on interpretation of the output.

IHSDM is a suite of software tools to evaluate safety of two-lane rural highways. The software, developed for FHWA, was released in 2003 after several years of research and development to provide state-of-the-art techniques for safety analysis. IHSDM contains 5 tools that can be used to apply the most recent safety analysis techniques in a relatively straightforward and automated manner.

**Outcomes:** Upon completion of the course, participants will be able to:

- Use the IHSDM software to analyze existing or proposed two-lane rural highway alignments.
- Interpret IHSDM output to assist in making project design decisions.
- Recognize how IHSDM capabilities can be used to advantage for a variety of project types throughout the highway design process.

**Target Audience:**

Highway design project managers, planners, designers, and traffic and safety reviewers with at least one or two years of experience with highway design, preferably two-lane rural highway design.

	Name	Phone	Email
Course Scheduling	Danielle Mathis-Lee	(703) 235-0528	<a href="mailto:danielle.mathis-lee@fhwa.dot.gov">danielle.mathis-lee@fhwa.dot.gov</a>
NHI Training Program Manager	Bill Williams	(703) 235-0539	<a href="mailto:bill.williams@fhwa.dot.gov">bill.williams@fhwa.dot.gov</a>
Technical Information	Clayton Chen	(202) 366-4656	<a href="mailto:clayton.chen@fhwa.dot.gov">clayton.chen@fhwa.dot.gov</a>
	Ray Krammes	(202) 493-3312	<a href="mailto:ray.krammes@fhwa.dot.gov">ray.krammes@fhwa.dot.gov</a>



# Other FHWA Training



**Basic FHWA Civil Rights Program Management****Length:** 4.5 Days**Class Size:** 30**Description:**

A basic, yet concentrated overview of the major FHWA civil rights programs and an introduction to the principles of complaints processing and investigation. The course focuses on authorities for each of the programs, as well as how to administer the programs at the Division Office and the State DOT levels, including development, review and approval of State program documents. The course is divided into six separate modules and reference manuals are provided for each module: State DOT Internal EEO/Affirmative Action, EEO Contractor Compliance, Investigation of Discrimination Complaints, Title VI/Environmental Justice, Disadvantaged Business Enterprise, and Americans with Disabilities Act.

**Target Audience:**

All FHWA, State DOT and other recipient personnel assigned civil rights responsibilities on either a full or part-time basis. In addition, FHWA Division Administrators, Assistant Division Administrators, Staff Officers and State DOT management personnel in any discipline with significant civil rights implications (e.g., planning, contract administration, legal, environment, safety, right-of-way and relocation, research). A minimum of 15, not to exceed 30, participants is required to hold a session.

**Contact: Headquarters Office of Civil Rights**

Humbert R. Martinez

(817) 978-3671

 [humberto.martinez@fhwa.dot.gov](mailto:humberto.martinez@fhwa.dot.gov)**Construction of Pavement Subsurface Drainage Systems****Length:** 1 Day**Class Size:** 35**Description:**

This workshop provides participants with techniques for quality construction and maintenance of pavement drainage systems. It provides good guidance for the construction of permeable bases, aggregate separator layer and edgedrain systems. Inspection and maintenance of the system are also covered in the workshop.

**Target Audience:**

Pavement design engineers, construction and maintenance personnel.

**Contact:**

Angel Correa

(404) 562-3907

 [angel.correa@fhwa.dot.gov](mailto:angel.correa@fhwa.dot.gov)

Charles Luedders

(303) 716-2185

 [charles.luedders@fhwa.dot.gov](mailto:charles.luedders@fhwa.dot.gov)**HIPERPAV Workshop****Length:** 1 Day**Class Size:** 35**Description:**

HIPERPAV is a software program that models early-age development of concrete strength and stresses that result from moisture and temperature changes within the pavement. In this workshop the participants will become familiar with using the software and its capabilities to extend the useful life of concrete pavements.

**Target Audience:**

Pavement engineers, construction and maintenance personnel.

**Contact:**

Angel Correa

(404) 562-3907

 [angel.correa@fhwa.dot.gov](mailto:angel.correa@fhwa.dot.gov)

Charles Luedders

(303) 716-2185

 [charles.luedders@fhwa.dot.gov](mailto:charles.luedders@fhwa.dot.gov)

## Highway Performance Monitoring System (HPMS) Software Workshop

**Length:** 2 Days

**Description:**

This workshop will provide hands-on instruction on the use of the newest HPMS software package for submitting 2003 HPMS data in June 2004. Workshops are offered on an as-needed basis.

**Target Audience:**

State and FHWA field personnel working with the HPMS data program and responsible for preparing or evaluating a State's HPMS submittal package.

**Contact: Office of Highway Policy Information**

Thomas Roff (202) 366-5035  [thomas.roff@fhwa.dot.gov](mailto:thomas.roff@fhwa.dot.gov)

## Highway Traffic Noise Analysis and Abatement Workshop

**Length:** 10 Hours (Two 5-hour days)

**Description:**

The workshop provides a basic understanding of highway traffic noise and FHWA's noise regulations. It addresses the following topics: basic acoustics, regulations, noise measurement, highway traffic noise prediction, noise mitigation, construction noise, and documentation of noise analysis.

**Target Audience:**

FHWA, State DOT, and MPO staff; other Federal, State, and local agency staff.

**Contact: Office of Natural Environment**

Bob Armstrong (202) 366-2073  [robert.armstrong@fhwa.dot.gov](mailto:robert.armstrong@fhwa.dot.gov)

## Human Factors for Transportation Engineers

**Length:** 6.5 Hours

**Class Size:** 20

**Description:**

This one-day workshop includes interactive modules on information reception, decision making, driver responses, and human factors principles. The relationship between specific highway standards and human needs is emphasized. Human skills and capabilities are discussed and demonstrated and micro-case studies are included to allow participants to apply the knowledge they have gained.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize that Human Factors has a role in highway design, operations, and safety decisions.
- Describe Human Factors information that is included in today's guidelines and standards.
- Identify human capabilities needed for using roadways.
- Apply basic human factors principles to resolve issues related to highway design, operations, and safety.

**Target Audience:**

Traffic Engineers, Highway Designers, Traffic Safety Specialists.

**Contact: FHWA, Office of Safety**

Erin Kenley (202) 366-8556  [erin.kenley@fhwa.dot.gov](mailto:erin.kenley@fhwa.dot.gov)

**137035A - Fiber Optic Installation on Freeway Right-of-Way Workshop****Length:** 2 Days**Class Size:** 20**Description:**

This two-day workshop walks participants through project development, design and approval. Participants work with a scale model to see how and why project concepts and principals work together. The workshop is based on the "Design Guide for Fiber Optic Installation on Freeway Right-of-Way," a copy of which is provided to each participant.

**Outcomes:** Upon completion of the course, participants will be able to:

- Recognize the importance of shared resource agreements for installing fiber.
- Describe the issues associated with creating and administering a shared resource project.
- Appreciate the perspective of the telecommunication providers.
- Describe the impacts of fiber installation on corridor quality.
- Discuss the methods of installation.
- Delineate the steps and sequence in a fiber optics installation from project development through operations and maintenance.
- Navigate the "Design Guide for Fiber Optic Installation on Freeway Right-of-Way".

**Target Audience:**

The workshop is designed for both State DOT practitioners and telecommunication providers, and welcomes local transportation agency personnel.

**Contact: ITS Joint Program Office**

Ron Giguere (202) 366-2203  [ron.giguere@fhwa.dot.gov](mailto:ron.giguere@fhwa.dot.gov)  
William S. Jones (202) 366-2128  [william.jones@fhwa.dot.gov](mailto:william.jones@fhwa.dot.gov)

**137036A - ITS Foundation Course****Length:** 4.5 Days**Class Size:** 20

There are no prerequisite. Note: the Foundation Course should not be considered a substitute for any of the core courses. Typically, the core subjects are presented at a high level in the Foundation Course. ITS Specialists should plan on taking most, or all, of the individual core courses in order to develop the appropriate knowledge and skills needed for their jobs.

**Description:**

The foundation course provides Federal staff with basic knowledge and skills in the core areas for Intelligent Transportation Systems (ITS). Elements of the ten "core" courses found in the ITS Professional Capacity Building (PCB) curriculum are incorporated in the Foundation course. The courses are: Deploying ITS - Metropolitan (137002), ITS Public/Private Partnerships (137003), ITS Telecommunication Overview (137005), Rural ITS Toolbox (137007), Using the National ITS Architecture for Deployment (137013), ITS Software Acquisition (137019), ITS Procurement (137020), Introduction to Systems Engineering (137024), ITS Standards Overview (137038), Managing High Technology Projects for Transportation (137026), and Managing Incidents and Roadway Emergencies (133048).

There will be a module that addresses current policies and initiatives in ITS. Also, there will be a primer on the eligibility of federal-aid funds for ITS deployment. A team of existing course instructors, and a number of federal ITS officials will present the course.

**Target Audience:**

This course is intended for FHWA, FTA, and FMCSA headquarters and field staff. It is of considerable value to ITS specialists with limited experience and/or incomplete core knowledge in ITS. Non-specialist in ITS as well as those only peripherally involved with ITS could gain valuable knowledge and insight from attending this course.

**Contact: ITS Joint Program Office**

Ron Giguere (202) 366-2203  [ron.giguere@fhwa.dot.gov](mailto:ron.giguere@fhwa.dot.gov)

**MOBILE 6.0: Emission Factor Modeling****Length:** 1.5 Days**Class Size:** 14

Computer requirements are: 486DX33 or higher with math coprocessor and min. 8MB RAM. DOS editor and CD ROM drive.

**Description:**

This course is intended to familiarize individuals with the mechanics of EPA's MOBILE 6. Model structure, hardware/software and data requirements needed to execute the model will be covered as well as creating/editing input files and analyzing output data. There will be a review of emission sources and how they are affected by user inputs. Commonly used and essential commands will also be highlighted. The training includes several hands-on exercises and culminates with an intensive final case study. This course is interactive throughout and is intended to give the student hands-on experience.

**Target Audience:**

State DOTs, State Air Quality Agencies, MPOs, transit operators with primary responsibility or interest in transportation/air quality modeling and requirements for project-level and regional emissions analyses or motor vehicle emissions budgets.

**Contact: Southern Resource Center**

Michael Roberts

(404) 562-3928

✉ [michael.roberts@fhwa.dot.gov](mailto:michael.roberts@fhwa.dot.gov)**Pavement Life-Cycle Cost Analysis (LCCA) Software Workshop****Length:** 12 Hours**Class Size:** 10

The recipients provide the training facility.

**Description:**

This workshop provides instruction on life-cycle cost analysis for pavement design and on the FHWA's pavement Life-Cycle Cost Analysis (LCCA) software product. Attendees learn about LCCA, user costs, and probability and risk analysis. Several exercises provide hands-on instruction in how to use the software.

**Target Audience:**

State DOT pavement design and materials engineers and those who make pavement materials selection decisions.

**Contact: Office of Asset Management**

Tom Canick

(202) 366-4657

✉ [tom.canick@fhwa.dot.gov](mailto:tom.canick@fhwa.dot.gov)**Pedestrian Safety Roadshow****Length:** 4 Hours**Description:**

This workshop is designed to educate, inspire, and organize a community to develop a pedestrian advocacy group to advocate for facilities and programs to improve the walkability and safety for pedestrians in their community.

**Target Audience:**

Broad-based community members who are (or should be) concerned about pedestrian issues. This might include: decision makers, law enforcement representatives, engineers and planners, city/county health department personnel, community advocacy groups representing seniors and the disabled, school officials, local safety coalitions, business leaders, local activist groups, local media outlets and youth groups.

**Contact: Resource Center San Francisco**

Aida Berkovitz

(415) 744-2614

✉ [aida.berkovitz@fhwa.dot.gov](mailto:aida.berkovitz@fhwa.dot.gov)

**Prestressed Concrete Beam Design Workshop: Load and Resistance Factor Design****Length:** 2.5 Days**Class Size:** 30**Description:**

This workshop is an introduction to the design of precast prestressed pretensioned concrete beams for bridges using the AASHTO Load and Resistance Factor Design (LRFD) Specifications. The goals of this workshop are to introduce the LRFD specification provisions for common types of prestressed concrete beams and provide hands-on interactive training using design examples and exercises. Time is provided for the host agency to present local LRFD implementation and design practices. The participant's workbook includes copies of the presentation slides, exercise worksheets and a design example of a simple span prestressed concrete beam.

**Target Audience:**

The primary audience is agency and consultant structural designers. The workshop is intended for engineers who are familiar with the AASHTO Standard Specifications for Highway Bridges and have designed at least two bridges.

**Contact: Southern Resource Center**

Jeff Smith

(404) 562-3905  [jeff.smith@fhwa.dot.gov](mailto:jeff.smith@fhwa.dot.gov)**Preventing Discrimination in the Federal-Aid Program: A Systematic Interdisciplinary Approach****Length:** 1.5 - 2 Days**Class Size:** 15**Description:**

A presentation on the creation of a preventive, proactive and inter-disciplinary team strategy to implementing Title VI and Environmental Justice requirements. The inter-relationship between Title VI and Environmental Justice, as well as roles and responsibilities of program and civil rights officials are also covered. A comprehensive reference manual is provided to all participants. Note: In order for the course to be delivered effectively, an inter-disciplinary audience must be guaranteed, and a 1 to 2 hour Executive Session with the State DOT's Chief Administrative Officer and immediate staff must be scheduled on the day prior to the course.

**Target Audience:**

FHWA, State DOT, MPOs and other recipient personnel involved in the following fields: Civil Rights; Planning; Environment; Engineering and Construction; Right of Way and Relocation; Legal; Research; Contract Administration; or Social Science. In order to schedule a session, a minimum of 15, not to exceed 30, participants is required.

**Contact: Headquarters Office of Civil Rights**

Humbert R. Martinez

(817) 978-3671  [humberto.martinez@fhwa.dot.gov](mailto:humberto.martinez@fhwa.dot.gov)**TMIP Land Use Forecasting Seminar****Length:** 1 Day**Description:**

This course will be sponsored by the Travel Model Improvement Program (TMIP). The focus of the seminar is to discuss different methods used in socioeconomic and demographic forecasting, potential data sources and data reliability.

**Target Audience:**

MPO, DOT, transit agency planners.

**Contact: Office of Metropolitan Planning**

Michael Culp

(202) 366-9229  [michael.culp@fhwa.dot.gov](mailto:michael.culp@fhwa.dot.gov)

**TMIP Travel Model Calibration and Validation Seminar****Length:** 1 Day**Description:**

This course will be sponsored by the Travel Model Improvement Program (TMIP) and will be based on the new TMIP publication, Model Validation and Reasonableness Checking Manual. The focus will be on step-by-step fundamentals of calibrating and validating base year models and reasonableness checks for forecasts.

**Target Audience:**

MPO, DOT, transit agency planners.

**Contact: Office of Metropolitan Planning**

Michael Culp (202) 366-9229  [michael.culp@fhwa.dot.gov](mailto:michael.culp@fhwa.dot.gov)

**Transportation Air Pollutant Modeling and Estimating****Length:** 1.5 Days**Class Size:** 15**Description:**

This course provides fundamental training on the use of CALME4 and CAL3QHC to estimate air pollutant concentrations near roadway (both intersections and linear roadway). The course will cover both the fundamental theory and the software application techniques. Participants will be able to code and run real case study examples.

**Target Audience:**

MPO, DOT, transit agency planners, State DOT and any other transportation project development sponsors involved in the transportation NEPA process.

**Contact: Southern Resource Center**

Michael Roberts (404) 562-3928  [michael.roberts@fhwa.dot.gov](mailto:michael.roberts@fhwa.dot.gov)

Tianjia Tang (404) 562-3673  [tianjia.tang@fhwa.dot.gov](mailto:tianjia.tang@fhwa.dot.gov)

**Transportation Air Quality Dispersion Modeling****Length:** 1.5 Days**Class Size:** 15**Description:**

This course covers both the fundamentals and practices of CAL3QHC dispersion modeling program. In the first module, both dispersion and traffic movement theories will be taught. There are seven sections in the practice module. These seven sections cover materials ranging from data collection, data compilation, program runs, to results interpretation. There are eight hands-on exercises in this section. The last module is policy guidance related to hot spot analysis. Following successful completion of the course, participants shall be able to independently conduct quality dispersion modeling and analysis.

**Target Audience:**

MPO, DOT, transit agency planners, State DOT and any other transportation project development sponsors involved in the transportation NEPA process.

**Contact: Southern Resource Center**

Tianjia Tang (404) 562-3673  [tianjia.tang@fhwa.dot.gov](mailto:tianjia.tang@fhwa.dot.gov)



# Other Organizations' Training



**American Society of Civil Engineers (ASCE)**[www.asce.org](http://www.asce.org)

ASCE's mission is to provide essential value to our customers by developing leadership, advancing technology, advocating lifelong learning and promoting professionalism. ASCE provides numerous opportunities to develop knowledge, skills, and ability by offering training programs on almost every civil engineering topic and delivering the programs via institution lead or web access courses and seminars.

**Contact:** ASCE

☎ (800) 548-2723

✉ [member@asce.org](mailto:member@asce.org)**American Traffic Safety Services Association (ATSSA)**[www.atssa.com](http://www.atssa.com)

ATSSA, founded in 1977 provides high caliber, quality educational training courses specific to Temporary Traffic Control in Work Zones.

**Contact:** Training Coordinator

☎ (877) 642-4637

✉ [training@atssa.com](mailto:training@atssa.com)**Consortium for ITS Training Education (CITE)**[www.citeconsortium.org](http://www.citeconsortium.org)

CITE is an organization of universities and industry associations focused on providing comprehensive, advanced transportation training and education. To date, CITE has developed over two dozen interactive web-based courses and offers two advanced transportation certificates in ITS Systems and Traffic Engineering Operations. CITE offers courses for transportation technicians, professionals and college students. Some examples of CITE's courses include: Traffic Signal Timing, Applied Systems Engineering, Introduction to Telecommunications Technology, Fundamentals of ITS and Traffic Management, and Incident and Emergency Management. Emphasis areas: Information Technology, Traffic Engineering, Project Management, Systems Engineering, ITS Technology.

**Contact:** Kathleen Frankle, CITE Program Manager ☎ (410) 414-2925✉ [kfrankle@umd.edu](mailto:kfrankle@umd.edu)**Eno Transportation Foundation**[www.enotrans.com](http://www.enotrans.com)

The foundation provides executive/management training to develop leaders in all modes of transportation. Manages AASHTO's National Transportation Management Conferences for mid-level managers in State and Federal departments of transportation.

**Contact:** Kathryn Harrington-Hughes

☎ (202) 879-4718

✉ [khh@enotrans.com](mailto:khh@enotrans.com)**Federal Motor Carrier Safety Administration (FMCSA)**[www.fmcsa.dot.gov/ntc](http://www.fmcsa.dot.gov/ntc)

A primary mission of the Federal Motor Carrier Safety Administration is to reduce the number of fatalities stemming from large truck crashes. The National Training Center supports this mission by providing training to Federal, State, and local law enforcement offices. Training covers a variety of topics involving commercial motor vehicles.

**Contact:** Carol Green

☎ (703) 235-0501

✉ [carol.green@fmcsa.dot.gov](mailto:carol.green@fmcsa.dot.gov)**Georgia Institute of Technology**[www.pe.gatech.edu](http://www.pe.gatech.edu)

Georgia Institute of Technology offers a number of professional education programs. For example, the annual Traffic Signal Workshop courses have been offered for over 30 years. Also the Logistics Institute is a part of the School of Industrial and Systems Engineers. It offers two certificate series of courses in Logistics but both series offer other transportation related courses. All programs provide high caliber educational training courses.

**Contact:** Greg Stenzoski

☎ (404) 385-3543

✉ [greg.stenzoski@dlpe.gatech.edu](mailto:greg.stenzoski@dlpe.gatech.edu)**Institute of Transportation Engineers (ITE)**[www.ite.org](http://www.ite.org)

ITE offers outreach, education and training programs in several areas including road safety audits, management and operations, red light camera systems, traffic calming as well as a traffic operations engineering refresher course. In the area of intelligent transportation systems, ITE offers the following courses: ITS Standards Overview, Center-to-Center ITS Standards, Dynamic Message Signs for ITS Standards, Actuated Traffic Signal ITS Standards and NTCIP and ITS Standards—What Do They Mean for You?

**Contact:** Heather Talbert (General Program Info)

☎ (202) 289-0222 x138

✉ [htalbert@ite.org](mailto:htalbert@ite.org)

James M. Cheeks (ITS Standards and Training)

☎ (202) 289-0222 x131

✉ [jcheeks@ite.org](mailto:jcheeks@ite.org)**International Right of Way Association (IRWA)**[www.irwaonline.org](http://www.irwaonline.org)

The IRWA is a not-for-profit organization dedicated to the advancement of professionals engaged in the acquisition, management, or disposition of real property or interests therein in connection with public, quasi-public or private activities. Founded in 1934, the IRWA comprises a dynamic global community of more than 10,000 dedicated right-of-way professionals. Members receive cutting-edge solutions to industry challenges through specialized education courses and seminars, a program of professional

development, as well as thought-provoking forums for the exchange and advancement of ideas. Operating in the United States and Canada, the IRWA is a single corporation with approximately 100 entities that manage and deliver the Association's quality services. IRWA is the pre-eminent professional source of right-of-way educational and professional services worldwide.

**Contact:** Connie Sanchez ☎ (310) 538-0233 x124 ✉ [sanchez@irwaonline.org](mailto:sanchez@irwaonline.org)

**National Transit Institute** [www.ntionline.com](http://www.ntionline.com)

The National Transit Institute (NTI) was established under the Intermodal Surface Transportation Efficiency Act of 1991. NTI provides a comprehensive program of training and education related to public transit and other forms of transportation. The courses designed to be interactive and participatory, utilize hands-on practice when possible and are intended to allow maximum interaction and networking.

**Contact:** Ginny Stern ☎ (732) 932-1700 x 226 ✉ [gstern@nti.rutgers.edu](mailto:gstern@nti.rutgers.edu)

**Northwestern University Center for Public Safety** [www.northwestern.edu/ncups](http://www.northwestern.edu/ncups)

The Center for Public Safety provides traffic and transportation engineering continuing education training courses covering a wide range of topics including geometric design, highway capacity analysis, traffic signal operation, traffic control devices, traffic management of land development, bicycle and pedestrian facility design, urban congestion management, identification and treatment of high hazard locations, accident reconstruction, and legal liability. These courses are presented annually on-campus in Evanston, Illinois, and under contract to public and private engineering organizations throughout the country.

**Contact:** Robert K. Seyfried, Director Transportation Safety Division  
☎ (847) 491-3431 or (800) 323-4011 ✉ [r-seyfried@northwestern.edu](mailto:r-seyfried@northwestern.edu)

**Rochester Institute of Technology** [www.rit.edu/ENG/CQAS](http://www.rit.edu/ENG/CQAS)

Rochester Institute of Technology offer a three-day course on Statistical Analysis in Transportation Applications (in Rochester, NY, as well as on the customer site). This hands-on course covers statistical methods for transportation safety, graphical methods, one-sample and two-sample problems, categorical data analysis, and trend analysis (other statistical topics may also be requested).

**Contact:** Peter Bajorski ☎ (585) 475-7889 ✉ [pxbeqa@rit.edu](mailto:pxbeqa@rit.edu)

**United States Merchant Marine Academy** [www.usmma.edu/gmats](http://www.usmma.edu/gmats)

The primary mission of the USMMA Global Maritime and Transportation School (GMATS) is to offer leading edge education and training programs that will benefit professionals from the maritime and transportation industry (private sector, military, and government). Through its education, training, and research initiatives, the USMMA GMATS is dedicated to optimizing America's economic and strategic, intermodal transportation system and its global transportation interests.

Further, the USMMA Global Maritime and Transportation School seeks to encourage worldwide trade by providing mariners and international transportation, and business professionals with the requisite skills needed to operate safe, efficient, and environmentally compliant intermodal transportation systems in the worldwide economy.

**Contact:** JoAnne Moreland ☎ (516) 773-5120 ✉ [morelandj@usmma.edu](mailto:morelandj@usmma.edu)

**University of California – Berkeley** [www.its.berkeley.edu/techtransfer](http://www.its.berkeley.edu/techtransfer)

With more than half a century experience in transportation research and technology transfer, ITS Tech Transfer offers one of the largest programs of open enrollment short courses in transportation in the nation. Topics range from transportation planning and policy to the federal aid process to pavement rehabilitation, air quality, traffic engineering, traffic and work zone safety, and project management. Aviation, surface modes, bicycle and pedestrian design and operations are addressed.

**Contact:** Michele Cushnie ☎ (510) 231-5674 ✉ [mcushnie@uclink.berkeley.edu](mailto:mcushnie@uclink.berkeley.edu)

**The University of Rhode Island Transportation Center (URITC)** [www.uritc.uri.edu](http://www.uritc.uri.edu)

The University of Rhode Island (URI) conducts multidisciplinary education, research, technology transfer and outreach for surface transportation systems and advanced transportation infrastructure.

**Contact:** Jeffrey Cathcart ☎ (401) 874-9405 ✉ [cathcart@etal.uri.edu](mailto:cathcart@etal.uri.edu)



# General Information



## Programs Under FHWA Office of Professional Development

The Federal Highway Administration (FHWA) Office of Professional Development (OPD) serves as an “in-house coordinator” for training and learning, providing access to assistance and expertise for all FHWA employees, as well as our external partners and customers.

OPD’s vision is to educate, train, and develop the transportation workforce to improve the safety, efficiency, effectiveness, and quality of America’s surface transportation system.

OPD’s mission is to:

- Serve as an advocate for promoting professional development throughout the transportation community;
- Serve as a catalyst to strengthen the tie between training/learning and performance;
- Provide strategic direction for professional development by developing and delivering a coordinated program that reflects FHWA’s vital few: safety, environmental stewardship and streamlining, congestion mitigation and customer needs;
- Identify and implement new technologies in learning; and
- Form partnerships and alliances for learning.

### Workforce Development

The U.S. population has increased by 32 million since 1990 to total more than 276 million today, and is expected to be 300 million in 2020. Vehicle miles traveled is growing twice as fast as the population and creating new challenges in addressing issues of highway capacity, safety, land use and resource utilization. The workforce needed to effectively address these issues is changing too with the baby boom generation approaching retirement and as much as 40 percent of the federal, state and local transportation workforce eligible to retire in the next 5 to 15 years. They will take with them years of experience, institutional knowledge and competencies that will be difficult to replace.

Increasing demand, limited resources and greater expectations will be major concerns for transportation managers and policy makers into the new century. Resource limitations on every front will drive the need for improved efficiencies. Technology innovation is the essence of efficiency and it is only through the application of technology by a skilled workforce that transportation can hope to close the gap between growing demand and available resources.

The Office of Professional Development is addressing the growing concern with transportation workforce development by actively pursuing strategies to raise awareness, and by working with its transportation community partners to develop policies and programs to effectively address the issue. The “Transportation Workforce Development” website has more information about OPD and transportation community efforts and can be found at [www.nhi.fhwa.dot.gov/transworkforce](http://www.nhi.fhwa.dot.gov/transworkforce)

### NHI – National Highway Institute

NHI is composed of three programs: *Training*, *Affiliate*, and *Universities and Grants* that constitute the external education and training arm of the FHWA.

NHI’s mission is to provide proactive leadership, expertise, resources, and information to the transportation community through development and administration of transportation-related training that covers a broad spectrum including safety, environmental stewardship and streamlining, and congestion mitigation. Through the three programs, NHI assists the transportation industry in the application of new technologies.

We partner with many organizations to coordinate and leverage training resources, identify new training needs in the transportation community and develop and deliver courses to meet those needs. We also promote transportation education through the award of grants and fellowships. These programs improve the quality of the U.S. transportation system in order to enhance economic growth, quality of life, and the environment.

## NHI 2003 Accomplishments

- Authorized provider of International Association of Continuing Education and Training (IACET) continuing education units (CEUs) for courses completed after January 1, 2004.
- Delivered over 556 training sessions to more than 13,428 participants from Federal, State, local agencies, as well as the private sector, academia and international affiliate organizations.
- In collaboration with the Federal Transit Administration, Environmental Protection Agency and US Department of Energy, developed *Air Quality and Transportation Planning* and *The Congestion Mitigation and Air Quality Program: Purpose and Practice and Erosion and Sediment Control*.
- Partnered with National Transit Institute, the Federal Transit Administration and FHWA Office of Planning for courses supporting the Federal Transportation Planning Capacity Building Program.
- Developed, revised or updated 15 courses and have 22 courses in development.
- There have been approximately 2,000 Dwight David Eisenhower Transportation Fellowship (DDETF) recipients since inception of the program and 126 DDETFs were awarded in 2003.
- Former Eisenhower recipients (85-90%) are in the transportation education pipeline due to Universities and Grants Programs' efforts toward workforce development.
- Created FasTrack program to develop need-specific information and training sessions.
- Using LTAP funding, LTAP Centers provided over 4000 training events and over 48,000 technical assistance actions for more than 117,000 people.
- Conducted Maintenance and Safety Technical Peer Exchanges in Pennsylvania.
- Developed safety work plan with FHWA Office of Highway Safety.
- Completed a course based on AASHTO's Load and Resistance Factor Design (LRFD) code.
- Offered Web-based courses, *Real Estate Acquisition Under the Uniform Act* and *AASHTO Roadside Design Guide*.
- Conducted train-the-trainer instructor development for international partners in Mexico, Russia and Korea.
- Initiated Web conferencing services in conjunction with Office of Administration. Used by FHWA Headquarters, Divisions and Technical Service Teams to deliver short courses.
- Trained 25 safety engineers for national teaching team to deliver *AASHTO Roadside Guide 2000*.



# Appendix A

## **Affiliate Programs**

The Affiliate Programs' mission is to promote education, training, and technology sharing among local, state, national, and international transportation partners. These programs will enhance existing partnerships and develop new partnerships to create a continuous learning environment for the transportation community. The Affiliate Programs is an umbrella program encompassing the Local Technical Assistance Program (LTAP), Partnership Program, and International Program.

### **Local Technical Assistance Program/Tribal Technical Assistance Program (TTAP)**

The Local Technical Assistance Program (LTAP) advances partnerships with professional associations, furthers international professional development, and provides outreach to transportation agencies, industry and academia.

There are 58 LTAP/TTAP centers, one in each state, Puerto Rico, and seven regional TTAP centers serving American Indian tribal governments. LTAP/TTAP mission is to foster a safe, efficient, environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer, including institutional and program building activities. LTAP/TTAP customers are primarily the 38,000 local agencies and tribal governments. LTAP/TTAP technology transfer centers provide more than 5,000 training sessions to over 120,000 participants per year.

Under the umbrella of LTAP, the Affiliate Programs Team established a network of local road coordinators, one per state. The network provides direct communication among local agencies, State departments of transportation, and FHWA to share ideas and experiences.

### **Partnership Program**

The Partnership Program is responsible for maintaining relationships with the American Public Works Association (APWA) and the National Association of County Engineers (NACE) and carrying out the professional development aspects of all partnerships as well as outreach to industry, affiliates and other members of the transportation community.

### **International Program**

The Affiliate Programs Team coordinates and arranges for international training and professional development activities. These activities inform the U.S. transportation community of technological and innovative programs abroad, promote U.S. transportation expertise internationally and increase technology sharing between the U.S. and the international community.

### **FasTrack**

The FasTrack Program provides instructional development resources to FHWA units, particularly the Resource Center Technical Service Teams, Program Offices, and Research, Development, and Technology. The program supports internal FHWA customers by developing training that effectively meets their need to advance emerging transportation technologies and changing policies through training and technical assistance. As a service of NHI, the FasTrack program ensures that FHWA training is coordinated agency wide and delivers the FHWA corporate message.

The program emphasis is on development of courses that must be delivered within six months. FasTrack provides a variety of services and customers may choose the services they need ranging from development, instructional systems design, instructor and participant material development and support for training delivery. Services include the use of Web conferencing. NHI can assist with determining the types of services customer needs based on the training outcomes identified. Training developed through the FasTrack Program will be made available via the NHI Website. FasTrack courses will be delivered by various units so contact information will change. For more information call Jon Schans at (703) 235-0509 or e-mail: [jon.schans@fhwa.dot.gov](mailto:jon.schans@fhwa.dot.gov).

**ALABAMA**

Alabama Technology Transfer Center  
Auburn University  
Department of Civil Engineering  
238 Harbert Engineering Center  
Auburn, AL 36849-5337

**Robert L. Vecellio**

☎ (334) 844-4320 ☎ (334) 844-6290

✉ tsqjrmc@eng.auburn.edu

🌐 www.AlabamaT2.org

**ALASKA**

Alaska Transportation Technology Transfer Center  
2301 Peger Road  
Fairbanks, AK 99709-5399

**David Waldo**

☎ (907) 451-5320 ☎ (907) 451-5340

✉ david\_waldo@dot.state.ak.us

🌐 www.dot.state.ak.us

**ARIZONA****Arizona LTAP**

1130 N 22 Avenue  
Phoenix, AZ 85009

**Annie Parris**

☎ (602) 712-8461 ☎ (602) 712-3007

✉ aparris@dot.state.az.us

🌐 www.azltap.org

**ARKANSAS**

Arkansas Technology Transfer Program  
PO Box 2261  
Little Rock, AR 72209

**Danny Moore**

☎ (501) 569-2380 ☎ (501) 569-2070

✉ ltap@ahtd.state.ar.us

🌐 www.ahtd.state.ar.us/planning/T2/index.html

**CALIFORNIA****California LTAP**

Technology Transfer Program UC Berkeley RFS  
1301 South 46th Street, Bldg. 155  
Richmond, CA 94804

**Linda Howe-Steiger**

☎ (510) 231-9590 ☎ (510) 231-9402

✉ lkhs@uclink.berkeley.edu

🌐 www.techtransfer.berkeley.edu

**COLORADO****Colorado LTAP**

University of Colorado at Boulder  
UCD 561, 3100 Marine Street  
Boulder, CO 80309-0561

**Renee Cusson**

☎ (303) 735-3530 ☎ (303) 735-2968

✉ cltap@colorado.edu

🌐 ltap.colorado.edu

**CONNECTICUT**

Connecticut Technology Transfer Center  
University of Connecticut  
Connecticut Transportation Institute  
179 Middle Turnpike, Unit - 5202  
Storrs, CT 06269-5202

**Donna M. Shea**

☎ (860) 486-5400 ☎ (860) 486-2399

✉ shea@engr.uconn.edu

🌐 www.cti.uconn.edu/ti/technology/technology.htm

**DELAWARE****Delaware T2 Center**

Delaware Center for Transportation  
University of Delaware  
360 Dupont Hall  
Newark, DE 19716

**Lawrence Klepner**

☎ (302) 831-6241 ☎ (302) 831-0674

✉ lklepner@mail.ce.udel.edu

🌐 www.engr.udel.edu/outreach/DelawareT2courses.html

**FLORIDA****Florida Transportation Technology Transfer Center**

University of Florida

PO Box 116587

2088 NE Waldo Rd. Suite B

Gainesville, FL 32611-6587

**Gib Peaslee**

☎ (352) 392-2371 ☎ (352) 392-3224

✉ t2@ce.ufl.edu

🌐 t2.ce.ufl.edu

**GEORGIA****Georgia Dept of Transportation LTAP Center**

276 Memorial Drive SW

Atlanta, GA 30303

**Dennis Rice**

☎ (404) 656-4664 ☎ (404) 463-3564

✉ dennis.rice@dot.state.ga.us

🌐 www.dot.state.ga.us/dot/personnel/training/tran/

**HAWAII****Hawaii Local Technical Assistance Program**

University of Hawaii

Dept. of Civil Engineering

2540 Dole Street, Holmes Hall #383

Honolulu, HI 96822

**Juli Kobayashi**

☎ (808) 956-6538, (808) 956-9006 ☎ (808) 956-8851

✉ juli@wiliki.eng.hawaii.edu

🌐 www.eng.hawaii.edu/~hltap

## IDAHO

Idaho Technology Transfer (T2) Center - LTAP  
University of Idaho  
PO Box 440911  
Moscow, ID 83844-0911

**Doug R. Moore**

☎ (208) 885-4334 ☎ (208) 885-2877  
✉ idahot2@uidaho.edu  
🌐 www.webs1.uidaho.edu/idahot2/

## ILLINOIS

Illinois Technology Transfer Center  
Illinois Department of Transportation  
2300 S. Dirksen Parkway, Room 205  
Springfield, IL 62764

**Kevin Burke III**

☎ (217) 785-5048 ☎ (217) 785-7296  
✉ t2lrtdot@nt.dot.state.il.us  
🌐 www.dot.state.il.us/blr/t2center.html

## INDIANA

Indiana LTAP  
VisTech 1  
1435 Win Hentschel Blvd, Ste. B100  
West Lafayette, IN 47906-4150

**Tom Martin**

☎ (765) 494-2210 ☎ (765) 496-1176  
✉ tcmartin@ecn.purdue.edu  
🌐 www.ecn.purdue.edu/INLTAP/

## IOWA

Iowa LTAP, Center for Transportation Research  
and Education (CTRE)  
Iowa State University Research Park  
2901 S Loop Drive, Suite 3100  
Ames, IA 50010-8632

**Duane Smith**

☎ (515) 294-8103 ☎ (515) 294-0467  
✉ desmith@iastate.edu  
🌐 www.ctre.iastate.edu/ltap/

## KANSAS

Kansas University Transportation Center  
1530 W 15th St., 2011 Learned Hall  
Lawrence, KS 66045

**Tom Mulinazzi/Pat Weaver**

☎ (785) 864-5658 ☎ (785) 864-3199  
✉ kutc@ku.edu  
🌐 www.ksltap.kutc.ku.edu

## KENTUCKY

Kentucky Transportation Center  
University of Kentucky  
176 Raymond Building  
Lexington, KY 40506-0281

**Patsy Anderson**

☎ (859) 257-4513 ☎ (859) 257-1061  
✉ panderso@engr.uky.edu  
🌐 www.kyt2.com

## LOUISIANA

Louisiana LTAP Technology Transfer Center  
4101 Gourrier Avenue  
Baton Rouge, LA 70808-4443

**Kirt Clement**

☎ (225) 767-9117 ☎ (225) 767-9156  
✉ kclement@ltrc.lsu.edu  
🌐 www.ltrc.lsu.edu

## MAINE

Maine Local Roads Center  
Maine Department of Transportation  
Sta. 16, Community Services Division  
Augusta, ME 04333-0016

**Peter Coughlan**

☎ (207) 624-3270 ☎ (207) 624-3301  
✉ peter.coughlan@maine.gov  
🌐 http://www.state.me.us/mdot/mlrc/mlrc-home.php

## MARYLAND

Maryland Technology Transfer Center  
Dept of Civil Engineering, University of Maryland  
Myers Building 806, Suite 3102  
College Park, MD 20742

**Ed Stelfox**

☎ (301) 403-4623 ☎ (301) 403-4591  
✉ ttc@eng.umd.edu  
🌐 www.ence.umd.edu/mdt2center/index.htm

## MASSACHUSETTS

Baystate Roads Program - Massachusetts  
UMass Transportation Center  
Marston Hall 214  
Amherst, MA 01003-5205

**Christopher J. Ahmadjian**

☎ (413) 545-2604 ☎ (413) 545-6471  
✉ ahmadjia@ecs.umass.edu  
🌐 www.ecs.umass.edu/baystate\_roads/

## MICHIGAN

Michigan Local Technical Assistance Program  
309 Grover C. Dillman Hall  
1400 Townsend Drive  
Houghton, MI 49931-1295

**Terry McNinch**

☎ (906) 487-2102 ☎ (906) 487-3409  
✉ ltap@mtu.edu  
🌐 www.MichiganLTAP.org

## MINNESOTA

Minnesota LTAP  
Center for Transportation Studies  
200 Transportation and Safety Building  
511 Washington Avenue SE  
Minneapolis, MN 55455

**Cheri Marti**

☎ (612) 626-1077 ☎ (612) 625-6381  
✉ cts@tc.umn.edu  
🌐 www.cts.umn.edu/T2/

**MISSISSIPPI**

Mississippi Center for Technology Transfer  
Jackson State University  
PO Box 18125  
Jackson, MS 39217-0625

**Ivory L. Williams**

☎ (601) 979-2339 ☎ (601) 973-3703  
✉ tsquare@jsums.edu  
🌐 www.jsums.edu/~www/t2/

**MISSOURI**

Missouri Local Transportation Resource Center  
University of Missouri-Rolla, Civil Engineering Dept.  
1870 Miner Circle, Butler-Carlton Hall  
Rolla, MO 65409-0030

**Mohammad Qureshi**

☎ (573) 341-7200 ☎ (573) 341-4729  
✉ mltrc@umr.edu  
🌐 campus.umr.edu/mltrc

**MONTANA**

Montana Local Technical Assistance Program  
PO Box 173910  
Bozeman, MT 59717-3910

**Donnetta Bohrman**

☎ (800) 541-6671 ☎ (406) 994-1697  
✉ mltlap@coe.montana.edu  
🌐 www.coe.montana.edu/ltap

**NEBRASKA**

Nebraska Technology Transfer Center  
PO Box 880560  
Lincoln, NE 68588-0560

**Daniel R. Cady**

☎ (402) 472-5748 ☎ (402) 472-0685  
✉ jstasenska1@unl.edu  
🌐 www.nuengr.edu/t2/

**NEVADA**

Nevada Transportation Technology Transfer Center  
University of Nevada  
Nevada T2 Center/257  
Reno, NV 89557

**Maria Ardila-Coulson**

☎ (775) 784-1433 ☎ (775) 784-1429  
✉ maria@unr.edu  
🌐 www.t2.unr.edu

**NEW HAMPSHIRE**

University of New Hampshire Technology Transfer Center  
33 College Road  
Durham, NH 03824-3591

**Kathy L. DesRoches**

☎ (603) 862-2826 ☎ (603) 862-2364  
✉ t2.center@unh.edu  
🌐 www.t2.unh.edu

**NEW JERSEY**

Center for Advanced Infrastructure and Technology - LTAP

Rutgers the State University of New Jersey  
Civil and Environmental Engineering  
623 Bowser Road  
Piscataway, NJ 08854-8014

**Joseph Orth**

☎ (732) 445-3632, (732) ☎ (732) 445-5636  
445-5236  
✉ jorth@rci.rutgers.edu or jleli@rci.rutgers.edu  
🌐 www.ltap.rutgers.edu/

**NEW MEXICO**

New Mexico LTAP Center

PO Box 94690  
Albuquerque, NM 87199-4690

**Timothy J. Olivas**

☎ (505) 841-9152 ☎ (505) 841-9163  
✉ timothy.olivas@nmshtd.state.nm.us  
🌐 www.nmshtd.state.nm.us/general/gen\_depts/en\_depts\_tpd/gen\_depts\_tpd\_rb/LTAP.html

**NEW YORK**

Cornell Local Roads Program (New York LTAP)

416 Riley-Robb Hall  
Ithaca, NY 14853-5701

**Lynne Irwin, P.E.**

☎ (607) 255-8033 ☎ (607) 255-4080  
✉ clrp@cornell.edu  
🌐 www.clrp.cornell.edu/

**NORTH CAROLINA**

North Carolina Technology Transfer Center

ITRE at NC State University  
Campus Box 8601  
Raleigh, NC 27695-8601

**Ronnie Williams/Pam Cloer**

☎ (919) 515-8033 ☎ (919) 515-8898  
✉ ronnie\_williams@ncsu.edu  
pcloer@unity.ncsu.edu  
🌐 itre.ncsu.edu/LTAP

**NORTH DAKOTA**

North Dakota Transportation Technology Transfer LTAP Center

NDSU, Civil/Industrial Eng Bldg, Room 201H  
 Fargo, ND 58105

**Donald A. Andersen**

☎ (701) 231-7051 ☎ (701) 231-6185  
✉ donald\_andersen@ndsu.nodak.edu  
🌐 www.ce.ndsu.nodak.edu/ndltap

**OHIO**

The Ohio LTAP Center

ODOT Central Office  
1980 West Broad St, 2nd Floor  
Columbus, OH 43223

**Leonard Brown**

☎ (614) 387-7359 ☎ (614) 466-2120  
✉ leonard.brown@dot.state.oh.us  
🌐 www.dot.state.oh.us/LTAP

**OKLAHOMA****Oklahoma Center for Local Government Technology**

Oklahoma State University  
200 Cordell North  
Stillwater, OK 74078-8808

**Doug Wright**

☎ (405) 744-6049      ☎ (405) 744-7268  
✉ wright@okstate.edu

**OREGON****Oregon Technology Transfer Center**

200 Hawthorne SE, Suite B-240  
Salem, OR 97301-5192

**Bob Raths**

☎ (503) 986-2855      ☎ (503) 986-2844  
✉ bob.raths@odot.state.or.us  
🌐 www.odot.state.or.us/tddt2/

**PENNSYLVANIA****LTAP - The Pennsylvania Local Roads Program**

Penn State Eastgate Center  
1010 North 7th Street, Suite 304  
Harrisburg, PA 17102

**Kevin Mahoney**

☎ (717) 772-1972      ☎ (717) 772-1998  
✉ ltap@psu.edu  
🌐 www.ltap.psu.edu/

**PUERTO RICO****Puerto Rico Transportation Technology Transfer Center**

University of Puerto Rico at Mayaguez Campus  
Civil Engineering Dept, PO Box 9041  
Mayaguez, PR 00681-9041

**Gisela Gonzalez**

☎ (787) 832-4040 Ext.      ☎ (787) 265-5695  
3393/3403 or 834-6385  
✉ t2center@prt2.org  
🌐 www.prt2.org

**RHODE ISLAND****Rhode Island Technology Transfer Center**

URI Transportation Center  
85 Briar Lane  
Kingston, RI 02881

**Jeff Cathcart**

☎ (401) 874-9405      ☎ (401) 874-2297  
✉ cathcart@etal.uri.edu  
🌐 www.uritc.uri.edu

**SOUTH CAROLINA****South Carolina Transportation Technology Transfer Service**

Civil Engineering Dept.  
114 Lowry Hall  
Clemson, SC 29634-0911

**Sandra Priddy**

☎ (864) 656-1456      ☎ (864) 656-2670  
✉ t3s@ces.clemson.edu  
🌐 www.ce.clemson.edu/t3s

**SOUTH DAKOTA****South Dakota LTAP**

Box 2220, SDSU, Harding Hall  
Brookings, SD 57007

**Ali A. Selim**

☎ (605) 688-4185      ☎ (605) 688-5880  
✉ sdsu\_sdltap@sdstate.edu

**TENNESSEE****Tennessee Transportation Assistance Program (TTAP)**

309 Conference Center Building  
Knoxville, TN 37996-4133

**Frank Brewer/Matt Cate**

☎ (865) 974-5255      ☎ (865) 974-3889  
✉ ttap@utk.edu  
🌐 ctr.utk.edu/ttap/

**TEXAS****Texas Local Technical Assistance Program**

Engineering, Utilities and Public Works Training Institute

Texas Engineering Extension Service

301 Tarrow, Suite 119

College Station, TX 77840-7896

**J.W. Chism**

☎ (979) 458-6768      ☎ (979) 458-6771  
✉ jw.chism@teemail.tamu.edu  
🌐 teexcit.tamu.edu/texasltap/

**UTAH****Utah Technology Transfer Center**

Utah State University  
4111 Old Main Hill  
Logan, UT 84322-4111

**Doyt Y. Bolling or Keri Shoemaker**

☎ (435) 797-2931      ☎ (435) 797-1582  
✉ utaht2@cc.usu.edu  
🌐 www.utaht2.usu.edu/

**VERMONT****Vermont Local Roads Program**

Saint Michael's College  
One Winooski Park, Box 260  
Colchester, VT 05439

**Henry R. Lambert**

☎ (802) 654-2652      ☎ (802) 654-2555  
✉ hlambert@smcvt.edu  
🌐 personalweb.smcvt.edu/vermontlocalroads/

**VIRGINIA****Virginia Transportation Technology Transfer Center**

530 Edgemont Road  
Charlottesville, VA 22903

**Russ Neyman**

☎ (434) 293-1964      ☎ (434) 293-1429  
✉ vttrc@viriniadot.org  
🌐 www.vtrc.net/vttrc

**WASHINGTON****Washington State Technology Transfer Center (WST2)**

Transportation Building, PO Box 47390  
310 Maple Park Avenue SE  
Olympia, WA 98504-7390

**Dan Sunde, PE**

☎ (360) 705-7386 ☎ (360) 705-6858

✉ wst2center@wsdot.wa.gov

🌐 www.wsdot.wa.gov/TA/T2Center/T2hp.htm

**WEST VIRGINIA****West Virginia Transportation Technology Transfer Center**

653 AND 651-B Engineering Sciences Bldg.  
PO Box 6103  
Morgantown, WV 26506-6103

**Mike Blankenship**

☎ (304) 293-3031 Ext. 2612 ☎ (304) 293-7109

✉ mblanken@wvu.edu

🌐 www.cemr.wvu.edu/~wwwtt

**WISCONSIN****Wisconsin Transportation Information Center**

University of Wisconsin-Madison  
432 N. Lake Street, Room 805  
Madison, WI 53706

**Don Walker**

☎ (608) 262-7988 ☎ (608) 263-3160

✉ donald@enr.wisc.edu

🌐 tic.enr.wisc.edu

**WYOMING****Wyoming Technology Transfer Center (WyT2/LTAP)**

University of Wyoming, PO Box 3295  
Laramie, WY 82071-3295

**Khaled Ksaibati**

☎ (307) 766-6230 ☎ (307) 766-6784

✉ khaled@uwyo.edu

🌐 wwweng.uwyo.edu/wyt2

**TTAP - Alaska & Northwest****Northwest and Alaska TTAP**

*Serving Tribes in Idaho, Oregon, Washington, and Western Montana*

Eastern Washington University  
Urban Planning Programs  
216 Isle Hall  
Cheyene, WA 99004

**Richard A. Rolland**

☎ (509) 359-6828 ☎ (509) 359-7485

✉ rrolland@ewu.edu

🌐 www.cbpa.ewu.edu/~LTAP/

*NW Coordinator*

*NW & AK TTAP*

711 S. Capitol Way, Suite 501  
Olympia, WA 98501

**David Frey**

☎ (360) 753-9415 ☎ (360) 753-9889

✉ dfrey@mail.ewu.edu

*Alaska Coordinator*

*NW & AK TTAP*

2702 Gambell St., Suite 101  
Anchorage, AK 99524

**D. Jeff Harman**

☎ (907) 277-6451 ☎ (907) 277-6443

✉ jharman@mail.ewu.edu

**TTAP - California****TTAP - California - Nevada**

*Serving Tribes in California, Nevada*

The National Center for American Indian  
Enterprise Development  
11138 Valley Mall, Suite 200  
El Monte, CA 91731

**Evan Hong**

☎ (626) 350-4446 ☎ (626) 442-7115

✉ ehong@ncaied.org

**TTAP - Colorado****Tribal Technical Assistance Program at Colorado State University**

*Serving Tribes in Arizona, Colorado, New Mexico, and Utah*

Colorado State University  
Rockwell Hall, Rm. 321  
Fort Collins, CO 80523-1276

**Ronald Hall**

☎ (800) 262-7623 ☎ (970) 491-3502

✉ ronald.hall@colostate.edu

🌐 ttap.colostate.edu

**TTAP - Michigan****Tribal Technical Assistance Program (TTAP)***Serving Tribes East of the Mississippi*

Michigan Technological University

TTAP/301-E Dillman Hall

1400 Townsend Drive

Houghton, MI 49931-1295

**Bernard D. Alkire**

☎ (888) 230-0688 ☎ (906) 487-1834

✉ balkire@mtu.edu

🌐 www.ttap.mtu.edu

**TTAP - North Dakota****Northern Plains Tribal Technical Assistance Program***Serving Tribes in Montana, Wyoming, and the Dakotas*

United Tribes Technical College

3315 University Drive

Bismarck, ND 58504

**Dennis Trusty**

☎ (701) 255-3285 ext. 262 ☎ (701) 530-0635

✉ nddennis@hotmail.com

🌐 www.unitedtribestech.com/orgs/nttap/npttap.sp

**TTAP - Oklahoma****Oklahoma Tribal Technical Assistance Program***Serving Tribes in Kansas, Nebraska, Oklahoma, and Texas*

Oklahoma State University

200 Cordell North

Stillwater, OK 74078-8808

**James Self**

☎ (405) 744-6049 ☎ (405) 744-7268

✉ selfjt@okstate.edu

🌐 clgt.okstate.edu/tribal.htm



# Appendix B





## Universities and Grants Programs

The mission of the Universities and Grants Programs (U&GP) is to promote the benefits of transportation education and encourage the pursuit of transportation research among university students and faculty. U&GP is responsible for the administration of the Dwight David Eisenhower Transportation Fellowship Program (DDETFP). The DDETFP is congressionally mandated by legislation (ISTEA and TEA-21) and funded at \$2 million annually, dating back to 1992. U&GP works cooperatively with more than 800 colleges and universities (including HBCUs, HSIs and TCs) and more than 100 transportation related disciplines.

U&GP's primary objectives are to:

- enhance FHWA university-based programs and other academic programs;
- provide fellowships, internships and partnerships;
- conduct data analyses related to retention, recruitment, diversity and workforce development;
- conduct research on DOT and FHWA's transportation related academic programs

## Dwight David Eisenhower Transportation Fellowship Program (DDETFP)

The goal of the Fellowship Program is to attract and retain the nation's brightest minds in transportation. DDETFP awards 100 - 130 fellowships annually. In 2003, 126 Eisenhower Fellowships were awarded, including two pilot Legal Intern Fellowships. Through a partnership, under the auspices of the Eisenhower program, with the Office of Transportation Planning, U&GP was able to split fund three Eisenhower Fellowships.

The U&GP database is a unique program management tool which enables U&GP staff to track recipients through the transportation education pipeline into the transportation workforce. The U&GP database can also track other Department Of Transportation university-based program activities.

There are six Eisenhower Fellowship Categories:

***Eisenhower Graduate (GRAD) Fellowships***

***Eisenhower Grants for Research Fellowships (GRF)***

***Eisenhower Faculty Fellowships (FF)***

***Eisenhower Historically Black Colleges and Universities (HBCU) Fellowships***

***Eisenhower Hispanic Serving Institutions (HSI) Fellowships***

***Eisenhower Tribal Colleges Fellowships (TCF)***

## Six major Transportation Education Pipeline initiatives are:

### Dwight David Eisenhower Transportation Fellowship Program (DDETFP)

**Contact:** Dr. Ilene D. Payne, NHI  
 ☎ (703) 235-0538    ✉ [ilene.payne@fhwa.dot.gov](mailto:ilene.payne@fhwa.dot.gov)    🌐 [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov)

### University Transportation Centers Program (UTCP)

**FHWA Contact:** Dr. Ilene D. Payne, NHI  
 ☎ (703) 235-0538    ✉ [ilene.payne@fhwa.dot.gov](mailto:ilene.payne@fhwa.dot.gov)    🌐 [utc.dot.gov](http://utc.dot.gov)

### Summer Transportation Intern Program for Diverse Groups (STIPDG)

**Contact:** Lorraine Day, Office of Human Resources, FHWA  
 ☎ (202) 366-1159    ✉ [lorraine.day@fhwa.dot.gov](mailto:lorraine.day@fhwa.dot.gov)  
 🌐 <http://www.fhwa.dot.gov/education/stipdg.htm>

### National Summer Transportation Institutes for Secondary Students (NSTI)

**Contact:** Hattie Brown, Office of Civil Rights, FHWA  
 ☎ (202) 366-1591    ✉ [hattie.brown@fhwa.dot.gov](mailto:hattie.brown@fhwa.dot.gov)    🌐 [www.nrc.scsu.edu](http://www.nrc.scsu.edu)

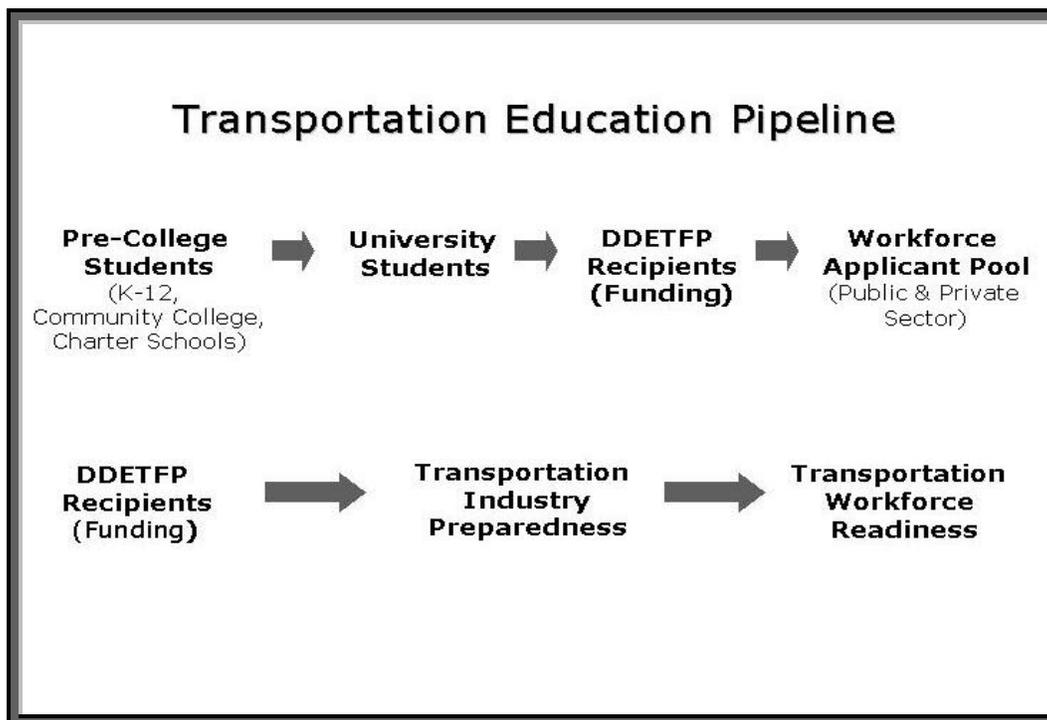
### Minority Institutions of Higher Education Cooperative Agreement Program (CAP)

**FHWA Contact:**

- Linda Brown, Office of Civil Rights, FHWA  
 ☎ (202) 366-1593    ✉ [linda.brown@fhwa.dot.gov](mailto:linda.brown@fhwa.dot.gov)
- Frank Waltos, Office of Acquisition Management, FHWA  
 ☎ (202) 366-4205    ✉ [frank.waltos@fhwa.dot.gov](mailto:frank.waltos@fhwa.dot.gov)

### Garrett A. Morgan Transportation and Technology Futures Program (GAMTTFP)

**Contact:** Lorraine Day, Office of Human Resources, FHWA  
 ☎ (202) 366-1159    ✉ [lorraine.day@fhwa.dot.gov](mailto:lorraine.day@fhwa.dot.gov)    🌐 [education.dot.gov](http://education.dot.gov)



The following is a current listing of University Transportation Centers (UTCs). All of the centers can be accessed through the UTC Website at <http://utc.dot.gov>

### University Transportation Centers, TEA-21, Section 5110

University	UTC Theme
<b>Group A</b>	
Massachusetts Institute of Technology	Strategic Management of Transportation Systems
City College of New York	Regional Mobility and Accessibility-Investment Strategies
Pennsylvania State University	Advanced Technologies in Transportation Operations and Management
University of Tennessee	Transportation Safety
University of Wisconsin-Madison	Transportation Investment and Operations
Texas A and M University	Sustainable Transportation for Mobility and Economic Strength
Iowa State University	Transportation Management Systems and Operations
North Dakota State University	Rural and Non-Metropolitan Transportation
University of California, Berkeley	Improving Accessibility for All
University of Washington	Management and Planning of Intermodal Operations
<b>Group B</b>	
University of Central Florida	Advanced Transportation Simulation
University of Southern California and California State University, Long Beach	Metropolitan Transportation Research
Rutgers University	Advanced Infrastructure and Transportation
University of Missouri at Rolla	Advanced Materials and Non-Destructive Testing Technologies
South Carolina State University	Transportation Intermodalism
<b>Group C</b>	
University of Arkansas	Rural Transportation
University of Idaho	Advanced Transportation Technology
University of Alabama	Management and Safety of Transportation Systems ITS
San Jose State University	Surface Transportation Policy Studies
University of Southern Florida	Urban Transportation
<b>Group D</b>	
University of Minnesota	ITS
Marshall University	Economic Growth and Productivity in Rural Appalachia through Transportation
George Mason University, University of VA, and VA Polytechnic Institute and State University	ITS
Montana State University, Bozeman	ITS, Rural Transportation
University of Rhode Island	Advance Transportation Infrastructure and Systems
Northwestern University	Infrastructure Technology

UTC University Transportation Center  
 ITS Intelligent Transportation System

As of 11/01/2003

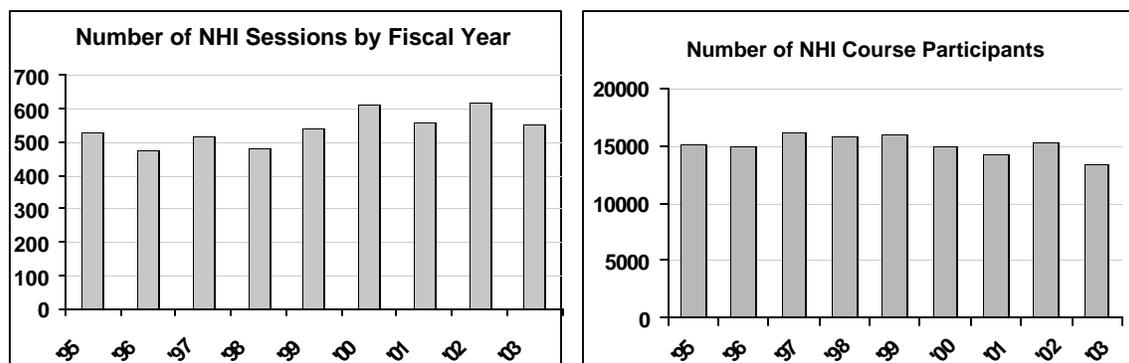


# Appendix C



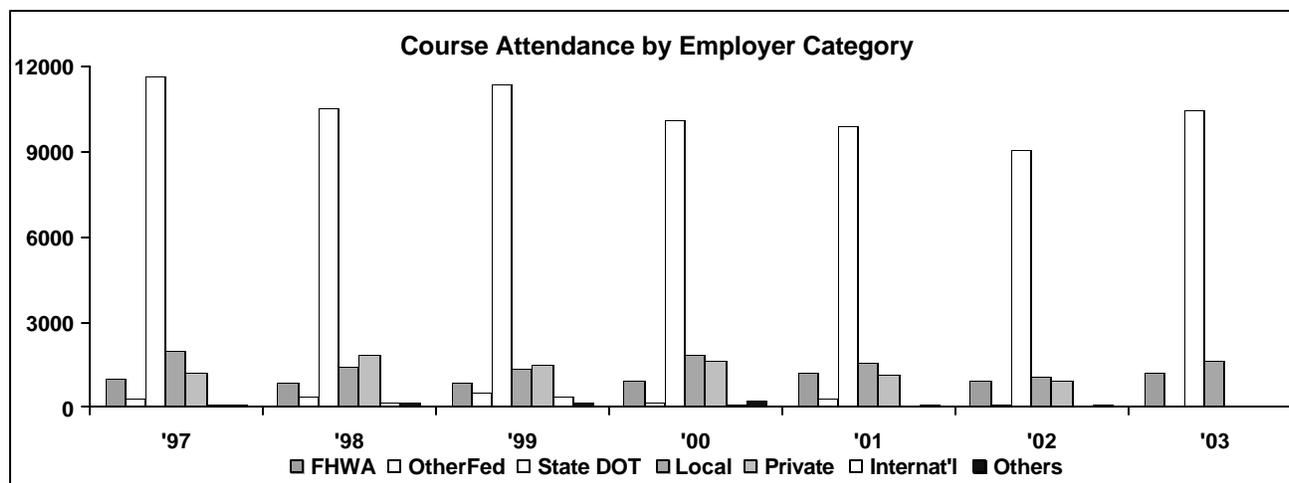
## NHI Training Programs

Since its inception in 1970, NHI has developed courses in over 200 topics and delivered over 11,000 training sessions to more than 350,000 students, principally from the highway community. Currently, 135 courses are offered through the NHI catalog. In 2003, NHI delivered 556 training sessions to 13,428 students in the U.S. and abroad.



Numbers tell only part of the story. NHI courses are crucial not only in developing core competencies and new skills of its customers, but also transferring leading technology and current transportation policies throughout the nation and abroad.

## NHI Customers



Our customers are grouped as follows:

- **Federal, State and Local Surface Transportation Agencies**—This group accounts for the majority of participants.
- **Private Transportation Providers, Firms and Associations**—NHI is expanding its efforts to provide private sector organizations, especially those that work with public agencies, with instruction and training materials.
- **Universities and Other Academic Institutions**—NHI provides technical course materials for inclusion in undergraduate and graduate curricula, and collaborates with community colleges, technical schools, and secondary and grade schools to identify the transportation professionals of tomorrow.
- **International Transportation Community**—NHI develops and coordinates highway training in the U.S. and other countries for international agencies, organizations, groups, and individuals. Courses are primarily conducted in English, although special arrangements can be made to present the training in other languages.

By far, the largest customer group is the State Departments of Transportation (DOTs). Of the 13,428 total training attendees in FY2003, 70 percent were from state DOTs, followed by locals at 11 percent, and private sector and FHWA each at 8 percent.

## International Association for Continuing Education and Training

The International Association of Continuing Education and Training (IACET) recently approved the National Highway Institute (NHI) to award IACET continuing education units (CEUs). Courses successfully completed after January 1, 2004 are eligible for IACET CEUs.

IACET is an independent, non-profit association whose goal is to ensure quality continuing education for professionals. For an organization to become an IACET approved continuing education unit provider, it must demonstrate that it designs and develops training in accordance with proven adult learning theory and recognized instructional systems design practices. Each course description in the NHI Catalog includes the number of CEUs awarded upon successful completion of the course.

There is a trend by states to require annual professional education for professional employees coupled with the need to make every dollar committed to training count. Recognition by IACET assures both the employee and the employer that taking a NHI course is a valuable use of time and scarce training dollars. One CEU is awarded for every ten contact hours of training led by a qualified instructor. Lunch periods and breaks are not calculated when determining the number of contact hours. Thus, in an eight hour day, there are six contact hours of instruction for an award of 0.6 CEU per day. In addition, NHI is approved to award CEUs for its distance learning training. That training may take the form of Web based training, Web based conferencing, video conferencing, self-paced or any combination of the various methods.

On occasion, there may be adjustments to the course length to accommodate course hosting location conditions. In that event, the number of CEUs awarded will be adjusted to reflect the actual contact hours.

NHI will maintain individual training records for seven years for the CEUs awarded for successful completion of courses effective January 1, 2004. Individuals and their employers are also encouraged to maintain their own training records including course name, class dates, instructor name, class roster and CEUs awarded.

## Instructor Certification Program

### Purpose:

To provide a method to assess continuous skill improvement of NHI instructors, NHI has developed a unique approach for certification. This approach is built on a set of instructor competencies selected from a validated list of the American Society of Training and Development (ASTD) competencies. With these competencies, a skilled trainer will emphasize the use of experiential learning techniques, such as problem solving analysis, discussions, as well as exercises that tap into the knowledge and skills that an adult learner brings to the classroom.

### Goal:

To provide quality instruction and skill attainment and to stress the value of "adult learning principles" in the classroom. With this in mind, FHWA and contract instructors who are currently, or will soon be teaching NHI courses, are required to become NHI certified. Upon successful demonstration of the required competencies and skills, candidates will receive certification from a Master Trainer, using one of the following three methods:

- Providing Instructor Certification Surveys of three consecutive live classroom presentations
- Providing a 2-hour video-taped classroom presentation for review
- Providing access to a two-hour videoconference to observe

### Audience:

NHI instructor certification is reserved for FHWA and contract instructors who are currently or will be involved in the delivery of NHI courses within 12 months. A NHI course is defined as a course offered through the NHI Catalog and scheduled through NHI. When someone uses NHI course materials to provide training without going through the NHI scheduler, the courses are not NHI courses. Contact Debbie Gwaltney, ICP Manager, for more information at (703) 235-1199 or e-mail: [debbie.gwaltney@fhwa.dot.gov](mailto:debbie.gwaltney@fhwa.dot.gov).

## New, Revised and In-Development Courses

NHI partners with FHWA Program Offices, other agencies and the States to respond to training requirements. As a training product moves into the development or delivery phase, it is announced on the NHI Website. Check the Website frequently to identify new courses ready to be scheduled.

## NHI Courses - Available

Course No	Course Title	Status
<b>Materials, Pavements and Base Design</b>		
131032A	Hot Mix Asphalt Construction	Updated
131033A	Construction of Portland Cement Concrete Pavements	Updated
131044A	Hot Mix Asphalt Production Facilities	Updated
131045A	Hot Mix Asphalt Materials, Characteristics and Control	Updated
131050A	Asphalt Pavement Recycling Technologies	Updated
131060A	Concrete Pavements Design Details and Construction Practices	Updated
131064A	Introduction to Mechanistic Design for New and Rehabilitated Pavements	New
131100A	Pavement Smoothness: Use of Inertial Profiler Measurements for Construction Quality Control	New
131105A	Analysis of Pavement Management System Data for Engineering Applications	New
131106A	Transportation Asset Management	New
<b>Geotechnical</b>		
132021A	Driven Pile Foundations - Design and Construction	Updated
132022A	Soil Slope and Embankment Design	Updated
<b>Construction and Maintenance</b>		
134029A	Bridge Maintenance Training	Updated
<b>Hydraulics</b>		
135046A	Stream Stability and Scour at Highway Bridges	Updated
135047A	Stream Stability and Scour at Highway Bridges for Bridge Inspectors	Updated
135048A	Countermeasure Design for Bridge Scour and Stream Instability	Updated
<b>Intelligent Transportation Systems (ITS)</b>		
137001A	ITS Awareness	New
<b>Real Estate</b>		
141045C	Real Estate Acquisition Under the Uniform Act (Web-based)	New
<b>Environmental</b>		
142005A	NEPA and Transportation Decision Making	Updated
142044A	Air Quality	New
<b>Statewide Planning</b>		
151039A	Applying Spatial Data Technologies to Transportation Planning	New
<b>Metropolitan Planning</b>		
152071A	Estimating Regional Mobile Source Emissions	New
<b>Highway Safety</b>		
380069A	Road Safety Audits and Road Safety Audit Reviews	Updated

## Coming in Calendar Year 2004

Course No	Course Title	Available
<b>Mathematical Sciences</b>		
123002A	Scientific Approaches to Transportation Research	Spring
<b>Structures</b>		
130082A	LRFD for Highway Bridge Substructures, Earth Retaining Structures and Culverts	Fall
130087A	Inspection and Maintenance of Anchillary Highway Structures	Summer
130090A	Introduction to Tunnel Engineering	Summer
<b>Materials, Pavements, and Base Design</b>		
131103A	Pavement Preservation: Design and Construction of Quality Preventive Maintenance Treatments	Summer
131104A	Pavement Preservation: Integrating Pavement Preservation and Pavement Management	Spring
<b>Geotechnical</b>		
132034A	Ground Improvement Methods	Spring
132040A	Geotechnical Aspects of Pavements	Summer
132078A	Micropile Design and Construction	Fall
<b>Design and Traffic Operations</b>		
133028A	Traffic Control Signalization and Software	Spring

Course No	Course Title	Available
133048A	Managing Traffic Incidents and Roadway Emergencies	Winter
133072A	HOV Facilities	Fall
133075A	Freeway Management and Traffic Operations	Fall
<b>Hydraulics</b>		
135081A	Introduction to Highway Hydraulics Software	Summer
<b>ITS</b>		
137002A	Deploying ITS in Metropolitan Areas	Winter
137030A	Fundamentals of Road Weather Management	Fall
<b>Freight and Transportation Logistics</b>		
139001A	Integrating Freight in the Transportation Planning Process	Spring
139002A	Freight Forecasting in Transportation Planning	Spring
<b>Statewide Planning</b>		
151021A	Administration of FHWA Planning Grants	TBD
151038A	Introduction to Statewide Planning (NHI/NTI)	Spring
<b>Corporate Management</b>		
310108A	Federal Lands 101	Spring
<b>Highway Safety</b>		
380005A	Railroad-Highway Grade Crossing Improvement Program	Spring
380034A	Design, Construction, and Maintenance of Highway Safety Appurtenances and Features	Winter
380071A	Interactive Highway Safety Design Model	Winter

## Distance Learning

Distance Learning continues to receive attention. Development emphasis is currently centered on short courses and those that involve policy or defined processes. Regardless of the delivery medium, NHI courses are taught to the same standard and to the same course outcomes. However, instructional methods are adapted to the delivery medium.

Some of the e-Learn@NHI initiatives:

- Offering Web conferencing services to 70 sites throughout the United States. While in its infancy, the Web conferencing option is proving to be a valuable information and training medium.
- Working with several states to deliver video conferencing courses.
- Contracting to develop interactive Web based training. Titles will be announced throughout the year.

As more states require CEUs for professional education and development, distance learning may prove to be the methodology of choice for busy engineers. Customers can access courses using a variety of delivery systems without having to leave their home base. Web based training responds to the professional engineer's need for flexible, time-sensitive, cost-effective training without travel or even time away from work. Courses can be taken anytime from any location with Web access using a 56K modem.

The e-Learn@NHI Team is eager to discuss how our initiatives can help you meet your professional development needs. Please contact Debbie Gwaltney for further information at 703-235-1199.

**FHWA Division Contacts****State Highway Agency Contacts****ALABAMA****Linda Shippey**

Division Secretary  
Federal Highway Administration  
500 Eastern Blvd., Suite 200  
Montgomery, AL 36117-2018  
☎ (334) 223-7374 📠 (334) 223-7325  
✉ linda.shippey@fhwa.dot.gov

**Willie Franklin**

Assistant Training Director  
Alabama Department of Transportation  
State Highway Building, 1409 Coliseum Boulevard  
Montgomery, AL 36130-3050  
☎ (334) 242-6567 📠 (334) 353-6506  
✉ franklinw@dot.state.al.us

**ALASKA****Elizabeth Hoffman**

Division Administrator  
Federal Highway Administration  
709 West 9th Street, Room 851  
Juneau, AK 99802-1648  
☎ (907) 586-7188 📠 (907) 586-7420  
✉ elizabeth.hoffman@fhwa.dot.gov

**Dave Waldo**

NHI Manager  
Alaska Department of Transportation  
2301 Peger Road  
Fairbanks, AK 99709-5399  
☎ (907) 451-5323 📠 (907) 451-5340  
✉ david\_waldo@dot.state.ak.us

**ARIZONA****Ed Stillings**

Planning and Research Engineer  
FHWA, One Arizona Center  
400 East. VanBuren Street, Suite 410  
Phoenix, AZ 85004  
☎ (602) 379-3645 Ext. 109 📠 (602) 379-3608  
✉ ed.stillings@fhwa.dot.gov

**Anne Parris**

Technical Training Manager  
Arizona Department of Transportation  
1130 North 22nd Avenue - 069R  
Phoenix, AZ 85009  
☎ (602) 712-8461 📠 (602) 712-3007  
✉ aparris@dot.state.az.us

**ARKANSAS****Lavern Collier**

Administrative Program Assistant  
Federal Highway Administration  
Federal Office Building  
700 West Capitol Avenue, Room 3130  
Little Rock, AR 72201-3298  
☎ (501) 324-5625 📠 (501) 324-6423  
✉ lavern.collier@fhwa.dot.gov

**Lynn Caple**

Training Specialist  
Arkansas State Highway Transportation Dept.  
PO Box 646, Little Rock, AR 72203  
10324 I-30  
Little Rock, AR 72209  
☎ (501) 569-2620 📠 (501) 569-2693  
✉ lynn.caple@ahtd.state.ar.us

**CALIFORNIA****Linda Garcia**

Program Assistant  
Federal Highway Administration  
980 9th Street, Suite 400  
Sacramento, CA 95814-2724  
☎ (916) 498-5024 📠 (916) 498-5008  
✉ linda.garcia@fhwa.dot.gov

**Anthony Ampania**

Training Consultant  
CALTRANS  
1727 30th Street MS53  
Sacramento, CA 95816  
☎ (916) 227-9759 📠 (916) 227-2058  
✉ anthony.ampania@dot.ca.gov

**COLORADO****Kathie Kelly**

Financial Manager  
Federal Highway Administration  
555 Zang Street, Room 250  
Lakewood, CO 80228  
☎ (303) 969-6730 Ext. 377 📠 (303) 969-6740  
✉ katherine.kelly@fhwa.dot.gov

**Melissa (Mo) Clayton**

Program Assistant I  
Colorado Department of Transportation  
4201 East Arkansas Avenue  
Denver, CO 80222  
☎ (303) 757-9678 📠 (303) 512-4384  
✉ melissa.d.clayton@dot.state.co.us

**CONNECTICUT****Jennifer Beliveau**

Administrative Assistant  
Federal Highway Administration  
628-2 Hebron Avenue, Suite 303  
Glastonbury, CT 06033-5007  
☎ (860) 659-6703 Ext. 3001 📠 (860) 659-6724  
✉ jennifer.beliveau@fhwa.dot.gov

**Joseph Kanachovski**

Director, Staff Development - Training Division  
Connecticut Department of Transportation  
2780 Berlin Turnpike  
Newington, CT 06111-4113  
☎ (860) 594-3600 📠 (860) 594-3611  
✉ joseph.kanachovski@po.state.ct.us

**FHWA Division Contacts****State Highway Agency Contacts****DELAWARE****Michael Graf**

Assistant Division Administrator  
Federal Highway Administration  
300 South New Street, Suite 2101  
Dover, DE 19904-6726

☎ (302) 734-1946      📠 (302) 734-3066  
✉ michael.graf@fhwa.dot.gov

**Lawrence H. Klepner**

Director, T2 Center  
Delaware T2 Center, University of Delaware  
355 DuPont Hall  
Newark, DE 19716

☎ (302) 760-2158      📠 (302) 831-0674  
✉ lklepner@ce.udel.edu

**DISTRICT OF COLUMBIA****Louis Varnado**

Financial Manager  
Federal Highway Administration  
1990 K Street NW Suite 510  
Washington, DC 20002-1103

☎ (202) 219-3512      📠 (202) 219-3545  
✉ louis.varnado@fhwa.dot.gov

**Dianne Quinn**

Human Resource and Training Manager  
D.C. Department of Transportation  
2000 14th Street NW, 5th Floor  
Washington, DC 20009

☎ (202) 671-2833      📠 (202) 671-0561  
✉ diane.quinn@dc.gov

**FLORIDA****Maxine Robinson**

Division Secretary  
Federal Highway Administration  
227 N. Bronough Street, Suite 2015  
Tallahassee, FL 32301

☎ (850) 942-9650 Ext. 301      📠 (850) 942-9691  
✉ maxine.g.robinson@fhwa.dot.gov

**William J. Bryan**

Training and Development Administrator  
Florida Department of Transportation  
605 Suwannee Street (MS-56)  
Tallahassee, FL 32399-0450

☎ (850) 921-7337      📠 (850) 922-3867  
✉ bill.bryan@dot.state.fl.us

**GEORGIA****Vanessa Ross**

EEO Specialist  
Federal Highway Administration  
61 Forsyth Street, SW, Suite 17T100  
Atlanta, GA 30303-3104

☎ (404) 562-3646      📠 (404) 562-3703  
✉ vanessa.ross@fhwa.dot.gov

**Jim Davis**

Director of Employee Development, T2 Center  
Georgia Department of Transportation  
276 Memorial Drive SW  
Atlanta, GA 30303

☎ (404) 656-5181      📠 (404) 657-5193  
✉ jim.davis@dot.state.ga.us

**HAWAII****Bessie Yagi**

Financial Specialist  
Federal Highway Administration  
Prince Jonah Kuhio Kalaniana'ole Federal Building  
300 Ala Moana Blvd, Room 3-306, PO Box 50206  
Honolulu, HI 96850

☎ (808) 541-2700 Ext. 303      📠 (808) 541-2704  
✉ bessie.yagi@fhwa.dot.gov

**Casey Abe**

Engineering Program Manager  
Hawaii Department of Transportation  
Highways Division  
2530 Likelike Highway  
Honolulu, HI 96819

☎ (808) 832-3403      📠 (808) 832-3407  
✉ casey-abe@exec.state.hi.us

**IDAHO****Keith Jordan**

Staff Assistant  
Federal Highway Administration  
3050 Lakeharbor Lane, Suite 126  
Boise, ID 83703-6217

☎ (208) 334-9180 Ext. 110      📠 (208) 334-1691  
✉ keith.jordan@fhwa.dot.gov

**Greg T. Frederickson**

Training Specialist  
Idaho Transportation Department  
P.O. Box 7129  
Boise, ID 83707-1129

☎ (208) 332-2021      📠 (208) 334-8595  
✉ gfrederi@itd.state.id.us

**ILLINOIS****Barbara Dragoo**

Program Assistant  
Federal Highway Administration  
3250 Executive Park Drive  
Springfield, IL 62703-4514

☎ (217) 492-4641      📠 (217) 492-4300  
✉ barbara.dragoo@fhwa.dot.gov

**Brad Risinger**

Manager, Training & Education  
Illinois Department of Transportation  
2300 South Dirksen Parkway, Room 313  
Springfield, IL 62764

☎ (217) 782-3708      📠 (217) 524-7260  
✉ WILLIAMSD@nt.dot.state.il.us

**FHWA Division Contacts****State Highway Agency Contacts****INDIANA****Mari Huscio**

Program Assistant  
Federal Highway Administration  
575 North Pennsylvania Street, Room 254  
Indianapolis, IN 46204-1576  
☎ (317) 226-7484 ☎ (317) 226-7341  
✉ mari.huscio@fhwa.dot.gov

**Lin Gritzer**

Training Coordinator  
Indiana Department of Transportation  
100 North Senate Avenue, Room N750  
Indianapolis, IN 46204-2217  
☎ (317) 232-6769 ☎ (317) 234-1930  
✉ lgritzer@indot.state.in.us

**IOWA****Paula Litchfield**

Administrative Assistant  
Federal Highway Administration  
105 Sixth Street  
Ames, IA 50010-6337  
☎ (515) 233-7326 ☎ (515) 233-7499  
✉ paula.litchfield@fhwa.dot.gov

**Valerie Anderson**

Training Officer, Employee Services  
Iowa Department of Transportation  
800 Lincoln Way  
Ames, IA 50010  
☎ (515) 239-1277 ☎ (515) 233-7988  
✉ valerie.anderson@dot.state.ia.us

**KANSAS****Jane Clouse**

Staff Associate  
Federal Highway Administration  
3300 S. Topeka Blvd., Suite 1  
Topeka, KS 66611-2237  
☎ (785) 267-7281 ☎ (785) 267-7290  
✉ jane.clouse@fhwa.dot.gov

**William L. Jacobs**

T2 Engineer, Materials & Research Center  
Kansas Department of Transportation  
2300 S.W. Van Buren  
Topeka, KS 66611-1195  
☎ (785) 291-3847 ☎ (785) 296-2526  
✉ bill.jacobs@ksdot.org

**KENTUCKY****Teresa Witt**

Administrative Assistant  
Federal Highway Administration  
John C. Watts Federal Building  
330 West Broadway, P.O. Box 536  
Frankfort, KY 40601  
☎ (502) 223-6720 Ext. 760 ☎ (502) 223-6735  
✉ teresa.witt@fhwa.dot.gov

**Stephanie Teasley**

Division of Employee Recruitment & Development  
Kentucky Transportation Cabinet  
State Office Building, 6th Floor  
200 Mero Street  
Frankfort, KY 40622  
☎ (502) 564-2720 ☎ (502) 564-2739  
✉ stephanie.teasley@mail.state.ky.us

**LOUISIANA****Cherie Harvey**

Financial Specialist  
Federal Highway Administration  
5304 Flanders Dr. Suite A  
Baton Rouge, LA 70808-4348  
☎ (225) 757-7608 ☎ (225) 757-7601  
✉ cherie.harvey@fhwa.dot.gov

**Wilma M. Chustz**

Training and Development Manager  
Louisiana Dept of Transportation & Development  
4101 Gourrier Avenue, P.O. Box 94245  
Baton Rouge, LA 70804-9245  
☎ (225) 767-9134 ☎ (225) 767-9156  
✉ wchustz@dotd.state.la.us

**MAINE****Simona Petrick**

Operations Assistant  
FHWA, Federal Building  
40 Western Avenue, Room 614  
Augusta, ME 04330  
☎ (207) 622-8350 Ext. 100 ☎ (207) 622-9133  
✉ simona.petrick@fhwa.dot.gov

**Helen Wiczorek**

Director of Training  
Maine DOT, Transportation Building  
16 Statehouse Station  
Augusta, ME 04333  
☎ (207) 624-3064 ☎ (207) 624-3051  
✉ helen.wiczorek@state.me.us

**MARYLAND****Janice Harrison**

Secretary  
Federal Highway Administration  
The Rotunda, Suite 220  
711 West 40th Street  
Baltimore, MD 21211  
☎ (410) 962-4342 Ext. 111 ☎ (410) 962-4054  
✉ janicee.harrison@fhwa.dot.gov

**Gerald Poggi**

Chief, Learning Officer  
Maryland Department of Transportation  
Maryland State Highway Administration  
707 N. Calvert Street (Mail Stop C-603)  
Baltimore, MD 21202  
☎ (410) 545-8660 ☎ (410) 209-5019  
✉ gpoggi@sha.state.md.us

## FHWA Division Contacts

## State Highway Agency Contacts

## MASSACHUSETTS

**Debbie McDermott**

Training Coordinator  
Federal Highway Administration  
Transportation System Center, 10th Floor  
55 Broadway  
Cambridge, MA 02142  
☎ (617) 494-2416      📠 (617) 494-3355  
✉ [debra.mcdermott@fhwa.dot.gov](mailto:debra.mcdermott@fhwa.dot.gov)

**Adam Landry**

Training Director  
Massachusetts Department of Transportation  
Massachusetts Highway Department  
10 Park Plaza, Room 5450  
Boston, MA 02116-3973  
☎ (617) 973-7409      📠 (617) 973-8075  
✉ [adam.landry@state.ma.us](mailto:adam.landry@state.ma.us)

## MICHIGAN

**Rosa Davis**

Secretary  
Federal Highway Administration  
315 W. Allegan Street, Room 207  
Lansing, MI 48933  
☎ (517) 702-1828      📠 (517) 702-1804  
✉ [rosa.davis@fhwa.dot.gov](mailto:rosa.davis@fhwa.dot.gov)

**Terri LaVoy**

Technical Training Coordinator  
Michigan Department of Transportation  
P.O. Box 30049  
Lansing, MI 48909  
☎ (517) 322-6792      📠 (517) 322-1034  
✉ [lavoymt@michigan.gov](mailto:lavoymt@michigan.gov)

## MINNESOTA

**Donna Zappa**

Administrative Operator  
Federal Highway Administration  
380 Jackson Street, Suite 500  
St. Paul, MN 55101-2901  
☎ (651) 291-6103      📠 (651) 291-6000  
✉ [donna.zappa@fhwa.dot.gov](mailto:donna.zappa@fhwa.dot.gov)

**Sandy Servatius**

Technical Training Program Coordinator  
Minnesota Department of Transportation  
395 John Ireland Blvd. Mail Stop 650  
St. Paul, MN 55155  
☎ (651) 296-3124      📠 (651) 296-3811  
✉ [sandy.servatius@dot.state.mn.us](mailto:sandy.servatius@dot.state.mn.us)

## MISSISSIPPI

**Vernon Price**

Financial Manager  
Federal Highway Administration  
666 North Street, Suite 105  
Jackson, MS 39202-3199  
☎ (601) 965-4224      📠 (601) 965-4231  
✉ [vernon.price@fhwa.dot.gov](mailto:vernon.price@fhwa.dot.gov)

**Danada McMurtry**

Director, Professional Development Division  
Mississippi Department of Transportation  
P. O. Box 1850  
Jackson, MS 39215-1850  
☎ (601) 359-7074      📠 (601) 359-7834  
✉ [dmcmurtry@mdot.state.ms.us](mailto:dmcmurtry@mdot.state.ms.us)

## MISSOURI

**Carolyn Bartel**

Administrative Assistant  
Federal Highway Administration  
209 Adams Street  
Jefferson City, MO 65101  
☎ (573) 636-7104      📠 (573) 636-9283  
✉ [carolyn.bartel@fhwa.dot.gov](mailto:carolyn.bartel@fhwa.dot.gov)

**Keith McGowan**

Technical Support Engineer  
Missouri Department of Transportation  
P.O. Box 270  
Jefferson City, MO 65102  
☎ (573) 751-4641      📠 (573) 526-4337  
✉ [mcgowk@mail.modot.state.mo.us](mailto:mcgowk@mail.modot.state.mo.us)

## MONTANA

**Laura Rich**

Staff Assistant  
Federal Highway Administration  
2880 Sky Way Drive  
Helena, MT 59602-1230  
☎ (406) 449-5302 x-221      📠 (406) 449-5314  
✉ [laura.rich@fhwa.dot.gov](mailto:laura.rich@fhwa.dot.gov)

**Luella Schultz**

Training and Development Specialist  
Montana Department of Transportation  
2701 Prospect Avenue  
Helena, MT 59620  
☎ (406) 444-6262      📠 (406) 444-7685  
✉ [lschultz@state.mt.us](mailto:lschultz@state.mt.us)

## NEBRASKA

**Gloria Shaw**

Office Support Manager  
Federal Highway Administration  
100 Centennial Mall North, Rm 220  
Lincoln, NE 68508-3851  
☎ (402) 437-5960      📠 (402) 437-5146  
✉ [gloria.shaw@fhwa.dot.gov](mailto:gloria.shaw@fhwa.dot.gov)

**Blane Osterman**

Human Resource Manager  
Nebraska Department of Roads  
P.O. Box 94759, 1500 NE Highway 2  
Lincoln, NE 68509-4759  
☎ (402) 479-4582      📠 (402) 479-3765  
✉ [bosterma@dor.state.ne.us](mailto:bosterma@dor.state.ne.us)

**FHWA Division Contacts****State Highway Agency Contacts****NEVADA****Cathy Merritt**

Administrative Assistant  
Federal Highway Administration  
705 North Plaza Street, Suite 220  
Carson City, NV 89701  
☎ (775) 687-1207    📠 (775) 687-3803  
✉ cathy.merritt@fhwa.dot.gov

**Mark Evans**

NDOT Training Manager  
Nevada Department of Transportation  
1263 South Stewart Street  
Carson City, NV 89712  
☎ (775) 888-7808    📠 (775) 888-7812  
✉ mevans@dot.state.nv.us

**NEW HAMPSHIRE****Colleen Sinotte**

Program Assistant  
Federal Highway Administration  
Federal Building, Room 204  
279 Pleasant Street  
Concord, NH 03301  
☎ (603) 228-3057 Ext. 110    📠 (603) 228-2829  
✉ colleen.m.sinotte@fhwa.dot.gov

**Jenn Cunningham**

Director of Human Resources  
New Hampshire Department of Transportation  
P.O. Box 483  
One Hazen Drive  
Concord, NH 03302  
☎ (603) 271-8025    📠 (603) 271-3102  
✉ jcunningham@dot.state.nh.us

**NEW JERSEY****Helen Calhoun**

Information Management Specialist  
Federal Highway Administration  
840 Bear Tavern Road, Suite 310  
Trenton, NJ 08628-1019  
☎ (609) 637-4217    📠 (609) 538-4913  
✉ helen.calhoun@fhwa.dot.gov

**Mr. Patrick Vannozzi**

Training Coordinator  
New Jersey Department of Transportation  
1035 Parkway Avenue, P.O. Box 600  
Trenton, NJ 08625  
☎ (609) 530-4942    📠 (609) 530-2532  
✉ patrick.vannozzi@dot.state.nj.us

**NEW MEXICO****Sonja Wilson**

Office Automation Secretary  
Federal Highway Administration  
604 W. San Mateo Road  
Santa Fe, NM 87505  
☎ (505) 820-2021    📠 (505) 820-2040  
✉ sonja.wilson@fhwa.dot.gov

**Prakash Bhakta**

Management Analyst  
New Mexico Department of Transportation  
P.O. Box 1149  
Santa Fe, NM 87505  
☎ (505) 827-5187    📠 (505) 827-3237  
✉ prakash.bhakta@nmshtd.state.nm.us

**NEW YORK****Paula Morse**

Staff Assistant  
Federal Highway Administration  
Leo W. O'Brien Federal Building, Room 719  
Clinton Avenue and North Pearl Street  
Albany, NY 12207  
☎ (518) 431-4125 x-222    📠 (518) 431-4121  
✉ paula.morse@fhwa.dot.gov

**Sandy Lupe**

Employee Development Unit  
New York State Department of Transportation  
50 Wolf Road  
First Floor  
Albany, NY 12232  
☎ (518) 485-8288    📠 (518) 457-1736  
✉ slupe@gw.dot.state.ny.us

**NORTH CAROLINA****Donald Voelker**

Assistant Division Administrator  
Federal Highway Administration  
310 New Bern Avenue, Suite 410  
Raleigh, NC 27601  
☎ (919) 856-4347 Ext. 121    📠 (919) 856-4353  
✉ don.voelker@fhwa.dot.gov

**Steve Sheppard**

Manager of Training and Development  
North Carolina Department of Transportation  
P.O. Box 25201  
Raleigh, NC 27611  
☎ (919) 622-3582    📠 (919) 662-4325  
✉ ssheppard@dot.state.nc.us

**NORTH DAKOTA****Linda Lueneburg**

Administrative Program Assistant  
Federal Highway Administration  
1471 Interstate Loop  
Bismarck, ND 58501-0567  
☎ (701) 250-4343 Ext. 104    📠 (701) 250-4395  
✉ linda.lueneburg@fhwa.dot.gov

**Judy Froseth**

Director, Human Resources Division  
North Dakota Department of Transportation  
608 East Boulevard Avenue  
Bismarck, ND 58505-0700  
☎ (701) 328-2453    📠 (701) 328-1415  
✉ jfroseth@state.nd.us

**FHWA Division Contacts****State Highway Agency Contacts****OHIO****Patrick Bauer**

Assistant Division Administrator  
Federal Highway Administration  
200 North High Street, Room 328  
Columbus, OH 43215  
☎ (614) 280-6821      📠 (614) 280-6876  
✉ [patrick.bauer@fhwa.dot.gov](mailto:patrick.bauer@fhwa.dot.gov)

**Donna Toy**

Administrative Assistant  
Ohio Department of Transportation  
1980 West Broad Street  
Columbus, OH 43223  
☎ (614) 752-5713      📠 (614) 752-8403  
✉ [donna.toy@dot.state.oh.us](mailto:donna.toy@dot.state.oh.us)

**OKLAHOMA****Carmen Evans**

Transportation Finance Specialist  
Federal Highway Administration  
300 N. Meridian, Suite 105-S  
Oklahoma City, OK 73107-6560  
☎ (405) 605-6043 x-306      📠 (405) 605-6170  
✉ [carmen.evans@fhwa.dot.gov](mailto:carmen.evans@fhwa.dot.gov)

**Ann Simon**

Training Specialist  
Oklahoma Department of Transportation  
200 NE 21st Street  
Oklahoma City, OK 73105  
☎ (405) 521-4141      📠 (405) 522-6202  
✉ [ASimon@odot.okladot.state.ok.us](mailto:ASimon@odot.okladot.state.ok.us)

**OREGON****Mary Alison**

Office Automation Assistant  
Federal Highway Administration  
The Equitable Center, Suite 100  
530 Center Street, NE  
Salem, OR 97301-3740  
☎ (503) 399-5749      📠 (503) 399-5838  
✉ [mary.alison@fhwa.dot.gov](mailto:mary.alison@fhwa.dot.gov)

**Liz Hunt**

Technology Transfer Engineer  
Oregon Department of Transportation  
Oregon Technology Transfer Center  
200 Hawthorne St. SE, Suite B-240  
Salem, OR 97310-5192  
☎ (503) 986-2854      📠 (503) 986-2844  
✉ [elizabeth.a.hunt@odot.state.or.us](mailto:elizabeth.a.hunt@odot.state.or.us)

**PENNSYLVANIA****Nancy Morgan**

Division Secretary  
Federal Highway Administration  
228 Walnut Street, Room 536  
Harrisburg, PA 17101-1720  
☎ (717) 221-3461      📠 (717) 221-4553  
✉ [nancy.morgan@fhwa.dot.gov](mailto:nancy.morgan@fhwa.dot.gov)

**Mary Sharp**

Human Resource Development Officer  
Pennsylvania Department of Transportation  
400 North Street, 7th Floor  
Harrisburg, PA 17120-0094  
☎ (717) 705-4170      📠 (717) 783-8217  
✉ [marsharp@state.pa.us](mailto:marsharp@state.pa.us)

**PUERTO RICO****Angel Ruiz**

Financial Manager  
FHWA, US Courthouse and Federal Building  
Carlos Chardon Street, Room 329  
San Juan, PR 00918-1755  
☎ (787) 766-5600 x-238      📠 (787) 766-5924  
✉ [angel.ruiz@fhwa.dot.gov](mailto:angel.ruiz@fhwa.dot.gov)

**Iván Flores Pérez**

Training Officer  
Puerto Rico Highway & Transportation Authority  
Minillas Station, PO Box 42007  
San Juan, PR 00940-2007  
☎ (787) 721-8787 Ext.2323      📠 (787) 722-7845  
✉ [iflores@act.dtop.gov.pr](mailto:iflores@act.dtop.gov.pr)

**RHODE ISLAND****William P. Campos**

Financial Manager  
Federal Highway Administration  
380 Westminster Mall, Room 547  
Providence, RI 02903  
☎ (401) 528-4546      📠 (401) 528-4542  
✉ [william.campos@fhwa.dot.gov](mailto:william.campos@fhwa.dot.gov)

**Marie McGlynn**

Human Resource Coordinator  
Rhode Island Department of Transportation  
Two Capitol Hill  
Providence, RI 02903  
☎ (401) 222-2572 x4612      📠 (401) 222-2574  
✉ [mmcglynn@dot.state.ri.us](mailto:mmcglynn@dot.state.ri.us)

**SOUTH CAROLINA****Mariko Anso**

Financial Manager  
Federal Highway Administration  
Strom Thurmond Federal Building  
1835 Assembly Street, Suite 758  
Columbia, SC 29201  
☎ (803) 253-3886      📠 (803) 253-3989  
✉ [mariko.anso@fhwa.dot.gov](mailto:mariko.anso@fhwa.dot.gov)

**Karen Long**

Training Coordinator  
South Carolina Department of Transportation  
Training Unit, Room 327  
P.O. Box 191  
Columbia, SC 29202  
☎ (803) 737-1525      📠 (803) 737-1966  
✉ [longkk@dot.state.sc.us](mailto:longkk@dot.state.sc.us)

**FHWA Division Contacts****State Highway Agency Contacts****SOUTH DAKOTA****Todd Jorgensen**

Assistant Division Administrator  
FHWA, The Sibley Building  
116 East Dakota Avenue  
Pierre, SD 57501-3110

☎ (605) 224-7326 x-3043    📠 (605) 224-1766  
✉ [todd.jorgensen@fhwa.dot.gov](mailto:todd.jorgensen@fhwa.dot.gov)

**Todd Hanson**

Training Specialist, BOP Training  
SD DOT, Foss Building  
523 East Capitol Ave, 3rd Floor  
Pierre, SD 57501

☎ (605) 773-5442    📠 (605) 773-5389  
✉ [todd.hanson@state.sd.us](mailto:todd.hanson@state.sd.us)

**TENNESSEE****Linda F. Baldwin**

Training Program Coordinator  
Federal Highway Administration  
640 Grassmere Park, Suite 112  
Nashville, TN 37211

☎ (615) 781-5770    📠 (615) 781-5773  
✉ [linda.baldwin@fhwa.dot.gov](mailto:linda.baldwin@fhwa.dot.gov)

**Kay Moore**

Personnel Manager  
TN DOT, James K. Polk Building, Suite 400  
505 Deaderick Street  
Nashville, TN 37219

☎ (615) 741-5998    📠 (615) 253-1477  
✉ [d.kay.moore@state.tn.us](mailto:d.kay.moore@state.tn.us)

**TEXAS****Julia Cowan**

Division Secretary, FHWA  
Federal Office Building, Room 826  
300 East Eighth Street  
Austin, TX 78701

☎ (512) 536-5900    📠 (512) 536-5990  
✉ [julia.cowan@fhwa.dot.gov](mailto:julia.cowan@fhwa.dot.gov)

**Marilyn J. Dell**

Program Administrator  
Texas Department of Transportation  
125 E 11th Street  
Austin, TX 78701-2483

☎ (512) 486-5428    📠 (512) 486-5464  
✉ [mdell@dot.state.tx.us](mailto:mdell@dot.state.tx.us)

**UTAH****Debra Sauers**

Program Assistant  
Federal Highway Administration  
2520 West 4700 South, Suite 9A  
Salt Lake City, UT 84118

☎ (801) 963-0078 Ext. 222    📠 (801) 963-0093  
✉ [debra.sauers@fhwa.dot.gov](mailto:debra.sauers@fhwa.dot.gov)

**Jeffery Saddler**

Training Manager  
Utah Department of Transportation  
4501 South 2700 West  
Salt Lake City, UT 84119

☎ (801) 965-4912    📠 (801) 965-4338  
✉ [jsaddler@utah.gov](mailto:jsaddler@utah.gov)

**VERMONT****Valerie Wolffe**

Administrative Secretary  
FHWA, Federal Building  
87 State Street, P.O. Box 568  
Montpelier, VT 05602

☎ (802) 828-4423 Ext. 221    📠 (802) 828-4424  
✉ [vermont.fhwa@fhwa.dot.gov](mailto:vermont.fhwa@fhwa.dot.gov)

**Rick Carey**

Human Resource Section  
Vermont Agency of Transportation  
133 State Street, 3rd Floor  
Montpelier, VT 05633

☎ (802) 828-3411    📠 (802) 828-2894  
✉ [rick.carey@state.vt.us](mailto:rick.carey@state.vt.us)

**VIRGINIA****Alice Murphey**

Administrative Program Assistant  
Federal Highway Administration  
400 North 8th Street, Room 750  
P.O. Box 10249  
Richmond, VA 23240-0249

☎ (804) 775-3334    📠 (804) 775-3356  
✉ [alice.murphey@fhwa.dot.gov](mailto:alice.murphey@fhwa.dot.gov)

**Donna Anderson**

Director, Organizational Development & Training  
Virginia Department of Transportation  
James Monroe Building, Mezzanine Level  
1401 E. Broad Street  
Richmond, VA 23219

☎ (804) 371-6812    📠 (804) 786-4290  
✉ [anderso1n\\_dr@vdot.state.va.us](mailto:anderso1n_dr@vdot.state.va.us)

**WASHINGTON****Jodi L. Petersen**

Division Civil Rights Program Designee  
Federal Highway Administration  
Evergreen Plaza  
711 South Capitol Way, Suite 501  
Olympia, WA 98501-1284

☎ (360) 534-9325    📠 (360) 753-9889  
✉ [jodi.petersen@fhwa.dot.gov](mailto:jodi.petersen@fhwa.dot.gov)

**David Supensky**

Employee Development Specialist  
Washington Department of Transportation  
P. O. Box 47310  
310 Maple Park Avenue, SE  
Olympia, WA 98504-7310

☎ (360) 705-7068    📠 (360) 705-6847  
✉ [supensd@wsdot.wa.gov](mailto:supensd@wsdot.wa.gov)

**FHWA Division Contacts****State Highway Agency Contacts****WEST VIRGINIA****Ozell Jones**

Division Secretary  
 Federal Highway Administration  
 Geary Plaza, Suite 200  
 700 Washington Street East  
 Charleston, WV 25301-1604  
 ☎ (304) 558-3093      📠 (304) 558-5103  
 📧 [ozell.jones@fhwa.dot.gov](mailto:ozell.jones@fhwa.dot.gov)

**Gary Lanham**

Training Officer  
 West Virginia Department of Transportation  
 Room 903, Building 5, Capitol Complex  
 1900 Kanawha Boulevard East  
 Charleston, WV 25305  
 ☎ (304) 558-3111      📠 (304) 558-0340  
 📧 [glanham@dot.state.wv.us](mailto:glanham@dot.state.wv.us)

**WISCONSIN****Marlene Skuldt**

Information Manager, FHWA  
 Highpoint Office Park  
 567 D'Onofrio Drive  
 Madison, WI 53719-2814  
 ☎ (608) 829-7504      📠 (608) 829-7526  
 📧 [marlene.skuldt@fhwa.dot.gov](mailto:marlene.skuldt@fhwa.dot.gov)

**Bobbie Beson-Crone**

Technical Training Manager  
 Wisconsin Department of Transportation  
 4802 Sheboygan Avenue, Room 451  
 Madison, WI 53707-7852  
 ☎ (608) 261-0138      📠 (608) 264-6667  
 📧 [bobbie.beson-crone@dot.state.wi.us](mailto:bobbie.beson-crone@dot.state.wi.us)

**WYOMING****Jeannette Wanless**

Staff Assistant  
 Federal Highway Administration  
 2617 E. Lincoln Way  
 Cheyenne, WY 82001-3764  
 ☎ (307) 772-2004 Ext. 151      📠 (307) 772-2011  
 📧 [jeannette.wanless@fhwa.dot.gov](mailto:jeannette.wanless@fhwa.dot.gov)

**David Talley**

Training Manager  
 Wyoming Transportation Department  
 5300 Bishop Blvd.  
 Cheyenne, WY 82009  
 ☎ (307) 777-4792      📠 (307) 777-4250  
 📧 [david.talley@dot.state.wy.us](mailto:david.talley@dot.state.wy.us)

**NHI CONTACT LIST**  
**Federal Lands Highway (FLH)**

**Headquarters**

**Sharon Minnich**

HFL  
Room 6311, HFL-1  
400 7th Street, SW  
Washington, DC 20590  
Phone: (202) 366-9493  
Fax: (202) 366-7495  
[sharon.minnich@fhwa.dot.gov](mailto:sharon.minnich@fhwa.dot.gov)

**Eastern Division (EFLHD)**

**Sarah Nappier**

HFL-16  
Loudoun Tech Center  
21400 Ridgetop Circle  
Sterling, VA 20166-6511  
Phone: (703) 404-6201  
Fax: (703) 404-6217  
[sarah.nappier@fhwa.dot.gov](mailto:sarah.nappier@fhwa.dot.gov)

**Central Division (CFLHD)**

**Darlene Spreer**

HFL-17  
555 Zang St  
Lakewood, CO 80228-1010  
Phone: (303) 716-2000  
Fax: (303) 969-6499  
[darlene.spreer@fhwa.dot.gov](mailto:darlene.spreer@fhwa.dot.gov)

**Western Division (WFLHD)**

**Merry McKay**

HFL-18  
610 East Fifth St  
Vancouver, WA 98661-3893  
Phone: (360) 696-7710  
Fax: (360) 696-7846  
[merry.mckay@fhwa.dot.gov](mailto:merry.mckay@fhwa.dot.gov)

## NHI CONTACT LISTS

### FHWA Resource Centers

#### FHWA Resource Center at Atlanta

**Marie Suttles**

Federal Highway Administration  
Atlanta Federal Center  
61 Forsyth Street, SW, Suite 17T26  
Atlanta, GA 30303-3104  
Phone: (404) 562-3683  
[marie.suttles@fhwa.dot.gov](mailto:marie.suttles@fhwa.dot.gov)

#### FHWA Resource Center at Baltimore

**Susie Taylor**

Personnel Office  
Federal Highway Administration  
10 South Howard Street, Suite 4000  
Baltimore, MD 21201  
Phone: (410) 962-0093  
[susie.taylor@fhwa.dot.gov](mailto:susie.taylor@fhwa.dot.gov)

#### FHWA Resource Center at Olympia Fields

**Jeffry McSpaden**

NHI Coordinator  
Federal Highway Administration  
19900 Governors Highway, Suite 301  
Olympia Fields, IL 60461-1021  
Phone: (708) 283-3516  
[jeffry.mcspaden@fhwa.dot.gov](mailto:jeffry.mcspaden@fhwa.dot.gov)

#### FHWA Resource Center at San Francisco

**Valeria Valentine**

Federal Highway Administration  
201 Mission Street, Suite 2100  
San Francisco, CA 94105  
Phone: (415) 744-3102  
[valeria.valentine@fhwa.dot.gov](mailto:valeria.valentine@fhwa.dot.gov)



# Appendix D



## Transportation Equity Act-21

TEA-21, under Section 504(a), made Federal-aid funds available to departments of transportation for the express purpose of NHI education and training programs. The legislation authorizes *“1/2 of 1 percent of the funds apportioned to a State under section 104(b)(3) for the surface transportation program...”* In addition, these funds can be used by the States to fund travel and direct expenses, as well as training fees.

The TEA-21 authorization expired on September 30, 2003. New legislation extending the TEA-21 authorization at FY 2003 funding levels to February 29, 2004 has been enacted and the “½ of 1 percent provision” continues as law. This table lists the amounts that were available, by State, for FY 2003. The 2003 funds can be used until expended.

It is not clear when the new reauthorization legislation will be enacted and at what funding levels. A new law must be in place by March 1, 2004 or Congress and the Administration will have to enact new legislation extending the TEA-21 provisions beyond February 29, 2004.

Once the new law is enacted, we will provide a summary of the training and education provisions on the NHI website at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov).

State	Available Funds
Alabama	653,229
Alaska	320,386
Arizona	616,717
Arkansas	459,097
California	3,091,361
Colorado	489,707
Connecticut	364,285
Delaware	162,218
District of Columbia	140,814
Florida	1,817,815
Georgia	1,291,785
Hawaii	164,300
Idaho	217,274
Illinois	1,103,546
Indiana	851,818
Iowa	426,110
Kansas	465,852
Kentucky	538,114
Louisiana	508,937
Maine	168,777
Maryland	508,151
Massachusetts	510,822
Michigan	1,159,749
Minnesota	616,779
Mississippi	444,697
Missouri	780,626
Montana	243,661
Nebraska	295,383
Nevada	234,127
New Hampshire	162,123
New Jersey	698,387
New Mexico	292,321
New York	1,235,857
North Carolina	962,868
North Dakota	196,856
Ohio	1,126,626
Oklahoma	579,484
Oregon	412,090
Pennsylvania	1,092,822
Rhode Island	160,083
South Carolina	618,613
South Dakota	222,853
Tennessee	720,247
Texas	2,940,106
Utah	246,733
Vermont	153,256
Virginia	879,452
Washington	585,339
West Virginia	237,112
Wisconsin	745,902
Wyoming	151,988



# Appendix E



## Registration and Coordination

This section contains information about course registration, fees, and the award of Continuing Education Units (CEUs) as well as the local coordinators' checklist.

### 1. Course Requests/Scheduling

To host NHI courses, the "On-Site Course Request" form (FHWA 1530) should be submitted to NHI via <http://www.nhi.fhwa.dot.gov/registration.asp>. A copy of this form is also included in the back of this catalog. Photocopies are accepted and should be faxed to the NHI Training Program Coordinator at (703) 235-0577. **Desired dates may be shown on the form, but courses are not officially confirmed until the hosting organization receives confirmation from NHI.** After the FHWA 1530 is received, an instructor will contact the Local Coordinator to discuss scheduling. After the course is confirmed by NHI, the host will receive confirmation, the local FHWA division office coordinator will be notified and the course will be advertised on the NHI Website at [www.nhi.fhwa.dot.gov/schedule.asp](http://www.nhi.fhwa.dot.gov/schedule.asp).

In addition, NHI provides assistance to international organizations wishing to purchase standard NHI training courses on a variety of technical subjects. These courses can be tailored to specific needs of the organization at an additional cost. For more information about training courses for international participants, please contact Roger Dean at (703) 235-0550 or by e-mail: [roger.dean@fhwa.dot.gov](mailto:roger.dean@fhwa.dot.gov).

### 2. Course Registration

To register for a distance learning course use the URL [www.nhi.fhwa.dot.gov/registerdl.asp](http://www.nhi.fhwa.dot.gov/registerdl.asp) and follow the instructions provided on the screen. On-line registration for distance learning courses requires a configuration of MS Internet Explorer (IE) 5.0 or higher with 128-encryption. You cannot use Netscape. The version 6.0 of IE has been tested with FHWA applications and has been approved by the FHWA Information Systems Security Office. For FHWA employees, it can be downloaded from <http://staffnet.fhwa.dot.gov/software.htm#iexplore>. For others, it can be downloaded from [www.microsoft.com/windows/ie/downloads/ie6/download.asp](http://www.microsoft.com/windows/ie/downloads/ie6/download.asp).

To register for a instructor-led course:

#### a. Domestic Customers

Individuals located within the United States who wish to attend a NHI training course should contact the Local Coordinator listed in the Scheduled Course section of the NHI Web page, [www.nhi.fhwa.dot.gov/schedule.asp](http://www.nhi.fhwa.dot.gov/schedule.asp). The Local Coordinator determines whether the course is open to outside participants and can provide specific information, such as available space, course location and cost.

#### b. FHWA Employees

As NHI training is provided to hosting agencies at a subsidized rate, space for up to 15 percent of the maximum number of participants specified for a given course is reserved for FHWA employees. NHI courses are considered internal training for FHWA and consequently there is no charge for FHWA employees. FHWA employees should use the following procedure to attend NHI courses:

- i. Registration of FHWA employees to attend NHI courses is controlled by the FHWA Course Coordinator in the State/Division Office. The names of the coordinators are listed in the Learning and Development System (LADS) and NHI Website at [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov). Registration in LADS for NHI courses will enable the FHWA Division Office training coordinator to forward the names of registered employees to the appropriate State Coordinator. **FHWA employees should enroll in NHI courses using LADS. Do NOT contact the Hosting State Coordinator directly.** Registration in LADS keeps the information current by showing the availability of training slots. Also, in those circumstances where slots are not available, LADS has the capability to maintain a waiting list and notify individuals when sessions are scheduled or slots are available.
- ii. Not later than three weeks prior to the starting date of the NHI course, the FHWA Course Coordinator in the State/Division Office in which the training is being presented, should inform the hosting organization of the final number of FHWA employees who will be attending. If the FHWA spaces are not filled within three weeks of the course starting date, the hosting organization may fill these spaces with other participants.

#### c. International Customers

NHI will arrange the participation of international customers in training courses in the United States.

### 3. Course Fees

NHI charges on the basis of the number of individual participants. Generally our course fees are based on \$200 per participant per day and include course materials for each participant. To assure that courses are not under-subscribed, a minimum number of paid participants (20) are required. Please note that no charges will be assessed to the hosting organizations for FHWA personnel attending NHI classes. We will continue to recover the full cost of delivery for international presentations. These will be handled on a case-by-case basis.

After a careful assessment of the projected delivery costs as compared to our current fee structure, we have no plans to increase fees in 2004.

Fees for distance learning courses vary from course to course. Please refer to the course information found in the NHI training course description.

Course Length	Per Person Fee
1 Day	\$ 200.00
1.5 Days	\$ 235.00
2 Days	\$ 270.00
2.5 Days	\$ 335.00
3 Days	\$ 400.00
3.5 Days	\$ 460.00
4 Days	\$ 530.00
4.5 Days	\$ 600.00
5 Days	\$ 650.00
10 Days	\$1,400.00

### 4. Payment

#### a. Domestic Customers

NHI will send an invoice to the hosting organization upon completion of the course. NHI accepts checks, money orders, and credit cards. Checks and money orders should be made payable to the *Federal Highway Administration/NHI*.

#### b. International Customers

NHI will fax an invoice to the individual or organization upon completion of the course. Cashiers' checks, international money orders, and credit cards are accepted forms of payment. Special arrangements will have to be made for wire transfers, and customers must ensure that they pay all related bank fees. All cashiers' checks and international money orders should be payable in U.S. dollars to the *Federal Highway Administration/NHI*.

#### c. Distance Learning Courses

NHI accepts checks, purchase orders and credit cards as payment for distance learning courses. If a purchase order is used, names must be submitted to Danielle Mathis-Lee before individual registration begins. FHWA employees may take distance learning courses free of charge. Follow the on-line screen instructions when registering via the URL [www.nhi.fhwa.dot.gov/registerdl.asp](http://www.nhi.fhwa.dot.gov/registerdl.asp). For additional information, please contact Danielle Mathis-Lee at (703) 235-0528, (703) 235-0577 (fax), or [danielle.mathis-lee@fhwa.dot.gov](mailto:danielle.mathis-lee@fhwa.dot.gov)

### 5. Course Cancellation Policy

A host of the NHI course must contact the NHI Training Coordinator to cancel a course. Cancellation is requested no later than seven days prior to the course start date to avoid incurring any fees, so NHI can assist with rescheduling the course. If the course materials have been sent, the host must return the materials to the FHWA Report Center.

### 6. Refunds

A refund may be obtained for a distance-learning course within 48 hours after a user has received a User-id and Password. Please submit an e-mail request for refund to Danielle Mathis-Lee at [danielle.mathis-lee@fhwa.dot.gov](mailto:danielle.mathis-lee@fhwa.dot.gov). Your reimbursement will be processed as quickly as possible. Credit card reimbursements should appear within two billing cycles. A credit to attend another NHI course will be issued if payment was made by check.

### 7. Participation

Potential hosts of NHI courses are encouraged to survey the training needs of entities outside their own organization while they determine their internal training needs. In some cases, the combined needs may be sufficient to warrant hosting a course for which there otherwise would not be enough interest to justify the expense. In cases where contractors are working for State agencies or on state projects, the inclusion of contractor and consultant participants in the course ensures these groups have access to the unique, state-of-the-practice training offered by NHI. By attending training together, both parties receive

the same training, benefit from the breadth of experience added to classroom discussions, and participants increase their understanding of each other's perspectives by working together on class exercises.

Course hosts may charge participants from outside their organizations a fee in order to recover all or part of the NHI course fee, plus other costs associated with hosting the course. Checks, money orders or other generally accepted forms of payment from individual course participants will be accepted as part of the course fee, so long as they are made payable to the *Federal Highway Administration/NHI*. Such payments may be forwarded to NHI as soon as they are received with the amount of the invoice reduced accordingly; or they can be held and submitted as part of the total payment upon invoice to the hosting organization.

As a course host, please be aware of the responsibility you have in accommodating individuals with disabilities. For specific information and requirements, please refer to the accessibility guidelines and standards provided by The Access Board. A summary of these guidelines can be found at [www.access-board.gov](http://www.access-board.gov).

## 8. CEUs and PDHs

The course descriptions include Continuing Education Units (CEUs) that will be awarded to course participants who successfully complete NHI courses. According to the International Association for Continuing Education and Training (IACET):

*One Continuing Education Unit (CEU) is ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction.*

The CEUs shown for the courses in our catalog have been established based on a typical course presentation with 6 hours of actual instruction time, i.e., 0.6 CEUs, per day. Adjustments to the course length to match local work hours or to accommodate increased/decreased emphasis on certain topics or for travel on field trips may affect the actual number of CEUs awarded. CEUs will be awarded only to those participants who are present for the full course. Each agency is encouraged to maintain its own records for CEUs awarded to their course participants.

Some states and organizations use Professional Development Hours (PDHs) to track training. The conversion of CEUs to PDH units is one CEU equals ten PDHs. As NHI does not award PDHs, each agency is encouraged to maintain its own records.

## 9. Local Coordinators' Checklist

Everyone has attended training sessions where the instructor could not find the chalk, or the eraser, or the light switch when it came time to show the slides; or the room was too hot or too cold; or there was not enough room for the number of participants scheduled for the course. Since there are many details to remember when preparing for and presenting a successful training course, we have compiled a few suggestions and reminders that will hopefully prevent last minute glitches. The following checklist provides a suggested step-by-step process for those who are setting up the training site. The checklist offers suggestions that will stimulate thinking about the physical facilities and what is needed to create an effective learning environment. The person assigned Local Coordinator responsibilities should review this checklist, and add to it as additional requirements arise.

## Checklist

### 1. Request for Training

Following the instructions on the form, send a Completed **On-Site Course Request Form** (FHWA 1530) to the NHI. Please furnish a copy to the local FHWA Division Office. Make sure that NHI has provided at least verbal approval of the requested dates.

### 2. Training Site

- Selection of a training room is critical to the success of the course. Great care should be taken to select a room that will not be overcrowded, too hot or too cold, or subject to outside distractions. The instructor should provide you with any unique requirements for the training facilities.
- Ensure that the training location you have selected can accommodate individuals with disabilities. For specific information and requirements, please refer to the accessibility guidelines and standards provided by The Access Board that can be found at [www.access-board.gov](http://www.access-board.gov).
- Reserve a training room for the duration of the course.
- Check to see if anyone else will be using the room for nighttime functions.
- Determine if books and equipment can be left in the room. Training courses, requiring special equipment or computers, must have after-hours security.
- Visit the classroom to make certain it meets all of the instructor's requirements.
- Other considerations for a training room:
  - Heat or air conditioning - find out if the instructor can control these.
  - Adequate size and shape. No poles or obstructions.
  - Special arrangements for demonstrations, labs, and experiments.
  - Seating arrangements.
  - Away from kitchen, construction area or other noise distractions.
  - Electrical outlets.
  - Lighting controls - Almost every training course uses visual aids that require a projection screen. It is important to have a room where lighting can be controlled to prevent glare on the screen while not placing the room in total darkness.
  - Adequate Ventilation
- Consider the following points for using visual aids:
  - Will shades completely darken all windows?
  - Can the lights be selectively dimmed when showing slides or viewgraphs?
  - Will overhead lights shine directly on the screen?
  - Can a bulb be removed above the screen or will the blackboard be too dark?

### 3. Participants and Instructors

- If needed, reserve a block of hotel/motel rooms for the course participants and instructors. Some hotels will provide a free meeting room if a minimum number of participants stay at the hotel.
- Participants and instructors should be:
  - Informed of course starting and ending times.
  - Advised on hotel accommodations and room rates, check-out times.
  - Furnished with maps.
  - Advised on parking arrangements.

### 4. Equipment Needs

- Nothing is more frustrating to the instructor and annoying to the participants than a slide projector that will not advance, a VCR that will not play, a computer that is not connected properly or other such disasters.
- The instructor should provide guidance on what equipment is needed, such as:
 

<ul style="list-style-type: none"> <li><input type="checkbox"/> Slide/Overhead projector with spare bulb and remote control extension</li> <li><input type="checkbox"/> Blank transparencies</li> <li><input type="checkbox"/> Marking pens/markers in various colors</li> <li><input type="checkbox"/> Computers</li> <li><input type="checkbox"/> LCD projection equipment with cables</li> <li><input type="checkbox"/> Screen -- 6' x 6' or larger</li> <li><input type="checkbox"/> Videotape player</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Blackboard with chalk and eraser</li> <li><input type="checkbox"/> Whiteboard with drimark pens and eraser</li> <li><input type="checkbox"/> Easel with flip chart paper</li> <li><input type="checkbox"/> Pointer</li> <li><input type="checkbox"/> Lectern</li> <li><input type="checkbox"/> Public address system</li> <li><input type="checkbox"/> Extension cords</li> <li><input type="checkbox"/> Masking tape</li> </ul>
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- Check all equipment to ensure that it is working satisfactorily.

## Final Arrangements

### 1. Two Weeks Before The Course

- Make sure an approved copy of COURSE REQUEST AND CONFIRMATION (Form FHWA 1530) has been received. If not, call Danielle Mathis-Lee at (703) 235-0528.
- Check that all training materials have arrived.
  - Participant notebooks
  - Tent cards (large felt tip markers will be needed)
  - Evaluation forms
  - Class roster form
  - Certificates
- Other Checks:
  - Reconfirm the training facilities
  - Discuss the seating arrangements and who will set up the room
  - Discuss what time the room is unlocked/locked
  - Determine whether a technician is available in case of problems setting up the room or if something goes wrong during the course

### 2. One Week Before The Course

- Prepare directional signs to classroom
- Check the smoking policy
- No smoking in the classroom. Signs should be posted or written on the blackboard
- Find out where smoking areas are located
- Determine if snacks are available
- Identify where telephones are--both for participants to make outgoing calls and to receive incoming messages
- Pass out a list of eating places for lunch, along with a map
- Decide who will welcome the participants and introduce the instructors
- Special check out arrangements may be made to coincide with the course completion time
- Determine who will prepare the certificates of training and who will pass them out at the end of the course

### 3. One Day Before The Course

- Set up the classroom
- Organize the participant material
- Post directional signs
- Test all equipment

### 4. During The Course

- Let the instructor know who to contact if he/she needs assistance.
- Provide an accurate copy of the class participant roster to the instructor.
- Prepare certificates of training. The time needed to prepare them may be reduced and the appearance improved by using a computer with a graphics program and a laser printer.
- Check with the instructor at least once a day to resolve any problems.

### 5. After The Course

Make certain the instructor has the class roster, course evaluation forms, and participant evaluation forms (if applicable). The instructor is responsible for sending these items to NHI.

We hope these suggestions make the job of coordinating NHI courses easier and maximize training benefits.



## NATIONAL HIGHWAY INSTITUTE ON-SITE COURSE REQUEST



Fax this Form to Danielle Mathis-Lee at (703) 235-0577

### Section A - COURSE REQUEST

**1. Course Information**

Course Number  Course Title   
 Length  (days) Fee \$   Per Participant  Per Course Number of seats for public:

**2. Training Location**

City  State

**3. Requested Date**

**Alternate Dates**

**4. Hosting Agency**

**5. Local Coordinator**

Name   
 Street   
 City  State  Zip   
 Phone  Fax   
 Email

**6. Shipping Address for Materials**

*(Please list Street Addresses only)*

Name   
 Street   
 City  State  Zip   
 Phone

**7. Billing Address**

Name   
 Street   
 City  State  Zip   
 Phone  Fax   
 Email

**8. Requesting Official** *(if different from Local Coordinator)*

Name   
 Title   
 Phone  Fax   
 Email   
 Signature \_\_\_\_\_ Date \_\_\_\_\_

**X**

### Section B - CONFIRMATION

**1. Confirmed Course Date**

**2. Contractor**

**3. Instructor**

Name   
 Email

Phone  Fax

**4. NHI Training Program Manager**

Name   
 Email   
 Phone  Fax

**5. Authorizing Official**

Name   
 Email   
 Phone  Fax

Signature \_\_\_\_\_

Date \_\_\_\_\_

**X**

SPECIAL NOTE: The course material will be shipped directly to the local coordinator unless we are requested to do otherwise. The local coordinator should use the packing list enclosed with each shipment to inventory the material immediately upon receipt. If the course material has not arrived 2 weeks prior to the scheduled presentation or if there are any questions on the arrangements, the local coordinator should contact the NHI Training Program Manager listed in Section B.