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# National Highway Institute Style and General Standards Guide



U.S. Department of Transportation  
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## 1. Introduction

The National Highway Institute (NHI) is committed to developing and delivering quality transportation training to our customers and stakeholders. The value of training depends upon highly qualified instructors and well-designed course materials. NHI maintains an ongoing dialogue with developers, instructors, and participants to ensure that the stated outcomes of a course are met and successful transfer of learning occurs.

Course materials play a significant role in the learning experience. The *NHI Style and General Standards Guide* assists course developers in preparing materials that are consistent in appearance and use, helpful to the instructors and participants, and useful as reference tools to enhance job performance. Templates and sample documents are available from NHI for all developed products.

One of NHI's goals is to ensure stylistic consistency across all courseware and delivery options.

- Consistency supports NHI branding efforts, making an NHI course in any format recognizable.
- Uniformity of structure and taxonomy enables NHI to repurpose course materials for delivery in multiple formats.
- Standardization facilitates the use of materials by partner agencies.

## 2. Using This Guide

The guide is designed primarily as a reference tool.

- Use the Table of Contents (TOC) or the MS Word or Adobe Acrobat search function to locate information as needed.
- Browse the content to gain a broad understanding of the NHI style preferences.

Elements of this guide share the approach of the United States Government Printing Office (GPO) Style Guide and the FHWA Quick Reference. However, NHI's guidelines sometimes differ from other official publications. In these instances, the needs of NHI users have been considered carefully in the development of guidance specific to NHI courseware.

While NHI expects materials to conform to generally accepted grammar and style conventions, a certain degree of leeway in usage is allowable. Tricky syntax—sometimes required by technical content—should be punctuated and styled for readability and comprehension.

For general grammar and stylistic guidelines, refer to the most current edition of the *Chicago Manual of Style*.

### 2.1 Common Abbreviations in This Document

Instructor Guide .....	IG
Facilitator Guide.....	FG
Participant Workbook.....	PW
PowerPoint Presentation .....	PP
Reference Manual.....	RM

#### **Stylistic Considerations vs. Instructional Integrity**

NHI expects significant contribution from experienced and credentialed instructional systems designers (ISD) on every course development project.

We acknowledge that, occasionally, the stylistic requirements of a specific course may be in conflict with NHI's typical style and standards recommendations.

In those cases where instructional integrity or technical content would be compromised or diminished, contractors are expected to discuss instructional design concerns, and make recommendations about style and standards, with the Contracting Officer's Technical Representative (COTR) assigned to the course.

### 3. NHI Course Design and Delivery Options

NHI offers its courseware in a variety of delivery options. These options include, but are not limited to, instructor-led training (ILT), also known as classroom training; Web-based training (WBT); Web conference training (WCT); and blended learning that comprises any combination of ILT, WBT, WCT, or other formats as appropriate.

NHI Web-delivered products use two Adobe learning tools: Presenter and Connect. Adobe defines the difference between the two as follows:

Adobe® Connect™ is a suite of administrative tools that allow for secure Web conferencing, development of compelling self-paced courses, the ability to conduct interactive virtual classes, and the efficient management of training programs.

Adobe Presenter is a plug-in for Microsoft PowerPoint that allows conversion of the presentation to the Adobe Flash® format and integrates audio, narration, quizzing functions, and other interactivity.

#### **Development Approach**

The best approach to any course is an instructional design decision; that decision may have been made by NHI or may be left to the contractor's discretion.

Always consult contract documents for guidance on course delivery options.

## 4. NHI Courseware Types

### 4.1 Instructor-led Training (ILT)

Instructor-led training options include live classroom-based and video conference training.

- ILT courses may have a related online component.
- ILT courses typically provide printed materials, including a reference manual, instructor guide, and participant workbook.
- For more information on ILT standards and specifications please visit [www.nhi.fhwa.dot.gov/resources/ilt\\_developer.aspx](http://www.nhi.fhwa.dot.gov/resources/ilt_developer.aspx).

### 4.2 Web-based Training (WBT)

Web-based training involves individualized, self-paced instruction.

- WBT generally includes a variety of modules that are specific to one topic. A participant may stop the WBT after any module, and then resume the WBT later.
- WBT courses may or may not provide physical materials to participants.
- WBT courses share many style elements with Web conference training courses.
- WBT courses may be repurposed from existing ILT or WCT offerings.
- For more information on WBT standards and specifications please visit [www.nhi.fhwa.dot.gov/resources/wbt\\_developer.aspx](http://www.nhi.fhwa.dot.gov/resources/wbt_developer.aspx).

### 4.3 Web Conference Training (WCT)

Web conference training is live, instructor-led training offered in an online classroom.

- Participants join the session from different locations at the same time.
- WCT courses may include a series of Web conferences held on sequential days or with a break between sessions.
- WCT courses may or may not provide physical materials to participants.
- WCT courses share many style elements with Web-based training courses.
- WCT courses may be repurposed from existing ILT offerings.
- For more information on WCT standards and specifications please visit [www.nhi.fhwa.dot.gov/resources/wct\\_developer.aspx](http://www.nhi.fhwa.dot.gov/resources/wct_developer.aspx).

## 4.4 Blended Approaches to Training

A blended course is any combination of ILT, WBT, and/or WCT. There are other creative options for blending methods, including paper-based self-study materials. A blended approach has several potential benefits.

- It provides opportunities to target a variety of learning styles.
- Blended learning may save money on travel, instructor salaries, and facilities.
- This approach allows some flexibility in the timing of course delivery. A participant may have one or two weeks to complete the WBT portion, and can more easily fit that approach into her schedule.
- It encourages self-directed learning, and puts the responsibility of learning onto the participant.
- It helps ensure that all participants attending a group course (such as WCT or ILT course) come to the class with a similar baseline of knowledge.
- It allows the participants to perform research or practice skills between sessions. For example, a WBT course may end by tasking participants to visit a lab and observe several tests; the WCT two weeks later might use those lab experiences to introduce the topic of analyzing test results.

### NHI Training Products and the Standards That Apply

Each development effort will require a unique set of training products; therefore, the standards applying to the deliverables will be unique, as well.

**Consult the contract for specific deliverables, special requirements, timelines, and delivery modes.**

This Style and Standards guide contains generic guidance for common project types. Contractual requirements supersede the guidance herein.

## 4.5 Development Notes for All Delivery Methods

All NHI courseware types share two commonalities.

- Each course is developed based on observable, measurable learning outcomes that state what participants should know or will be able to do upon completion of the training session.
- For courses that offer continuing education units (CEUs), NHI instructors administer various forms of assessments to measure mastery of the course content.

There are some differences that an ISD should consider when designing and developing various courseware types.

- ILT courses are delivered live, in a face-to-face classroom environment. ILT courses, therefore, have particular environment and logistics issues that WBT and WCT courses do not share.
  - For example, participants view ILT course material on a large screen in a shared physical space; WBT participants learn in a more individualized and self-controlled environment.
  - ILT developers also are involved in the production and delivery of printed materials; these materials may or may not be required on any given method of distance learning.
- WCT courses present unique benefits and challenges. The WC environment supports most of the types of interaction done in an ILT environment, but requires consideration for the absence of certain visual and kinesthetic cues available in a traditional classroom.
  - A WCT facilitation guide (FG) provides additional information, such as WCT checklist, training cues, poll pod question and answer sheets, and other materials unique to a WCT.
- WBT courses do not include the IG or FG, but may include a PW. The courses are self-paced. They include an attachment of the course that can be saved, printed, and reviewed at any time after course completion.
- Differences also occur in the way courses are structured, and in the structural taxonomy used. See the NHI Web site for toolkits or see the standards for each type in *NHI Style and General Standards Guide*.

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# Style

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## 5. General Guidance for All Delivery Options

This document conveys style and standard guidance for ILT, WBT, and WCT. General guidelines on expected style—grammar, use of numbers, and the voice of the document—apply to all three types. This document also addresses specific differences.

### 5.1 Language and Style

- Use the active voice and present tense when possible.
- Use the second person (you) or imperative mood (implied person), as appropriate.
- Keep language simple, concise, and consistent.
- Avoid jargon and slang.
- Choose words carefully. Precise word choice is important in technical training documents.
  - If quotation marks, italics, or other methods are required to denote a casual or infrequent use of a word, perhaps that is not the most appropriate word choice.
- Use examples that are universally understood.
  - Avoid references that learners with English as a second language would have difficulty understanding.
- Avoid the use of contractions.
  - If the course is consistently conversational in style, some contractions may be appropriate. Use sparingly.
- Abbreviate or use acronyms if possible without creating confusion.
- Avoid language and examples that will reduce the shelf life of the courseware.
- Consistently use the serial, or Oxford, comma in a list. Keep in mind that a list of lengthy phrases or technical information may be confusing without the final comma in the series.

### 5.2 Text and Emphasis

- Break up blocks of text to make it easier for learners to scan the content.
- Use mixed-case letters; avoid using all capital letters.
- Use bold font sparingly to emphasize a word or phrase.

- Bold font may be helpful for denoting the first use of a word that will be defined or described in a paragraph.
- Use italics only for titles of published works and words appropriated from other languages that have not become Standard English.
- Use underlining only for hyperlinks.
- Avoid text orphans (one word on a line).

### 5.3 Abbreviations and Acronyms

- Spell out the first use of any acronym or abbreviated word; follow the word with the acronym or abbreviation in parentheses.
  - However, use the abbreviation or acronym alone when that version is universally recognizable or more familiar than the full name. Examples include USA, IBM, FBI, FedEx.
- Use abbreviations in titles before and after names, e.g., Mr., Mrs., Ph.D., Col.
- Use abbreviations for mathematical measurements, e.g., lb., kg.
- Acronyms do not include spaces or periods.
- Use “email” (without a hyphen) in NHI documents.
- Use lowercase letters for file extensions, e.g., .jpg, .gif, .doc.
- Use common symbols for words, e.g., “\$” instead of dollars, “%” instead of percent.
- Include a listing of acronyms and abbreviations, and include any appropriate acronyms in the glossary.

### 5.4 Capitalization

- In headlines, capitalize all words except definite or indefinite articles and prepositions or conjunctions with fewer than four letters.
- Do not use unnecessary capitalization of common nouns.
  - Capitalize the word “State” whenever referring to one of the 50 states.
  - Capitalize the word “Federal” and “Government,” when used together or alone. However, “federally” is not capitalized.
  - Unless the text refers to specific legal or official roles, terms such as “contractor” and “agency” are not capitalized.

## 5.5 Em Dash, En Dash

An **em dash** is the same length as a small letter “m.”

- Use no space before or after a dash.
  - Most word processing programs automatically create the em dash when the user types two separate dashes side-by-side with no spacing after the preceding word or before the following word.
- Use it within or at the end of a sentence to set off a nonessential element. See example below.
  - There are three basic variables—time, wick drain spacing, and surcharge—that can be manipulated to achieve a desired result from Equation 1.

An **en dash** is the same length as the small letter “n.”

- The single dash is also called a hyphen.
- Use it to connect two related elements or to hyphenate a word. See examples below.
  - 2003-2004
  - pp. 28-72
  - twenty-four
  - all-inclusive

## 5.6 Slashes

The slash, stroke, or solidus (/) is often used in code, to separate elements of dates, to indicate division, or for fractions.

- Use with care; an incautiously placed slash in the content of an HTML document can break the page.
- Do not use a slash mark to contract a word, e.g., “w/out” in place of “without.”
- Do not insert spaces around the slash.

### **Warning!**

**Do not use the slash in any products that will be delivered electronically.**

Do not use the slash in PowerPoint or graphical elements. A screen reader used for accessibility compliance will not correctly read the slash mark.

## 5.7 Lists

- A bulleted list contains more than one element. If there is only one item in a list, do not use a bullet.
- Use a consistent, simple bullet style.
- Bullet font size should not exceed the text font size.
- Make lists parallel.
  - Each item in a single list should start with the same element, such as a verb or noun.
  - All items in a single list should be either sentences or phrases. Do not mix these types in a single list.
  - Use a period at the end of each bulleted sentence. Start each sentence with a capital letter.
  - If a bulleted list is simply a listing of items, and the items do not begin with a verb or constitute a sentence, use no punctuation at the end of each item.
- It is not necessary to use a colon at the end of every sentence that introduces a bulleted list.
  - Use a colon at the end of an introductory phrase that is followed by a series of phrases or terms that complete the sentence.
  - Do not use a colon at the end of a complete sentence that introduces a list.
- Sub-bullets are allowed in instructional materials, such as the IG, PW, and RM.
  - Use infrequently on PowerPoint slides.
- Use numbers where sequence is important; otherwise, use bullets.

## 5.8 References

- Present reference information in a uniform style, with complete identifying data, in standard bibliographic format.
  - Use current edition of the *Chicago Manual of Style* formats.
- If a reference is included in the PW, cite it below the PowerPoint slide.
- Where possible, add a list of supplemental reference material pertaining to the topics covered in the course.
- Provide a list of other related NHI courses for any topic covered in the course.

- Do not use footnotes in the IG and PW text; incorporate such notes within the text.
- Include a list of references at the end of the IG or PW, if necessary.

## 5.9 Figures and Tables

- Figures and tables should be placed on pages as near as practical to textual references.
  - Insert a list of tables and figures following the table of contents.
  - Include the table or figure number, title, and page number.
  - If the lists are short, lists for both tables and figures may be placed on the same page.
- For each figure and table, provide a unique title or caption and a unique figure number not duplicated by another figure or table caption in the publication.
- Be consistent with labeling. For example, all charts in a document may present the caption at the bottom left, and the title centered at the top.
- If possible, orient graphics, tables, and figures so they can be viewed without turning the page.
  - If a figure or table must be placed sideways on a page, place it so that the top is at the left side of the page.
  - Be sure that the figure or table is not obscured by the spine or binding.
- Ensure adequate white space, use a different font size, or otherwise ensure that captions are not confused with the text.

## 6. Numbers

### 6.1 Individual Numbers

Use figures (numerals) to express the numbers 10 and above, and all numbers representing mathematical functions or quantities, dates, ages, time, and money.

- Spell out the numbers nine and below unless they represent precise measurement.
- Spell out any number that begins a sentence, title, or heading in print content. (Note alternate guidance for PowerPoint and Web content in “PowerPoint and Visuals” section of this document.)
- To pluralize a number, add “s” or “es” without an apostrophe.

### 6.2 Large Numbers

Use numerals for large numbers up to one billion.

- “2,000,000” is better than “two million.”
- “Two trillion” is better than “2,000,000,000,000” because it is difficult to interpret that many zeros.
- As a compromise, use numerals for the significant digits and write out the magnitude as a word. For example, write “24 billion” (not “twenty-four billion” or “24,000,000,000”).
- Spell out numbers that do not represent specific facts.
  - For example, “We have served thousands of users” is more appropriate than “. . .1000s of users.”
  - Alternately, “We have served 20,692 users” is correct because the sentence discloses the exact number.

### 6.3 Numbers in Series

When 2 or more numbers appear in a sentence, and 1 of them is 10 or larger, figures are used for each number.

- Each of 15 major commodities (9 metal and 6 nonmetal) was in supply.
- Each of nine major commodities (five metal and four nonmetal) was in supply.
- That man has 3 suits, 2 pairs of shoes, and 12 pairs of socks.
- That man has three suits, two pairs of shoes, and four hats.

## Numbers and Readability

Readability and usability, as always, are the main concerns. Use the stylistic approach that facilitates ease of understanding for the end user.

### 6.4 Other Guidance on Number Usage

For guidance on other uses of numeric figures or words, including those items listed below, see *U.S. Government Printing Office Style Manual, 30<sup>th</sup> ed.* (2008), at [frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2008\\_style\\_manual&docid=f:chapter12.wais](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2008_style_manual&docid=f:chapter12.wais).

- Addresses
- Dates
- Decimals
- Degrees
- Fractions
- Indefinite expressions
- Mathematical expressions
- Measurements
- Money
- Numbers in Proper Names and Legal or Government Titles
- Ordinal Numbers
- Percentage
- Proportion
- Serial Numbers
- Time
- Unit modifiers

## 7. Use of Graphical Elements

Graphical representations—photographs, charts, and illustrations—can convey a message or support difficult concepts. They are important elements in the overall design of a course. However, the graphics must be appropriate and add value.

- Use graphics that match or support the text. Do not add superfluous visuals.
- Use colors that accommodate color-blind learners.
- Establish and maintain a convention for the use of shade and color to denote meaning; do not use color alone as an instructional cue.
- Be sure that photographs are clear and easily understood.
- Maintain consistent perspective in any series of visuals.
- Avoid the use of contractor or other corporate logos in the courseware.
  - Make sure there is no advertising or identifying content in the photo, such as car model name, billboard signs, or license plates. In such photographs, blur the identifying content.
- Avoid graphics that may become outdated in a short time.
- Use graphics that are royalty-free (such as those provided with PowerPoint) or public domain (such as NASA photos and charts).
  - Obtain permission to use all other art.
  - Include letters of permission with final deliverables, and cite the source in course materials.
- Do not use cartoon characters.
- All text within the graphic must be readable.
  - If a graphic is scaled down, provide the capability to expand it so that all text is readable. For example, a PowerPoint slide may contain a graphic example that is more clearly provided in the workbook or reference manual.
- Be consistent with graphic borders, effects, and quality.
  - Avoid underlines, excessive grid rulings, and unnecessary outlines or graphical borders.
- Do not use drop shadows.
- Ensure that all graphical elements include equivalent text as required. See contract documents and “Accessibility and 508 Standards” section of this guide.
  - At minimum, visual elements, such as photographs, charts, and graphics must include text that describes the visual element and provides equivalent content.

## **8. Audio, Video, and Animation Techniques**

### **8.1 Audio**

- Use audio as appropriate to add instructional value.
- Use sound effects only when they help to convey the content.
- Provide text that matches verbatim any audio script; this is required to make materials accessible to hearing-impaired users and must be included in all instructor or facilitator guides and support materials.

### **8.2 Video**

- Use video to reinforce, clarify, or emphasize a specific behavior or performance objective that cannot be taught effectively using graphics, photographs, or animation.
- All video must be captioned in compliance with accessibility requirements.

### **8.3 Animation**

- Use special effects only when required for emphasis or transition.
  - Do not use any special effects that detract from learning.
- Use animation to display concepts that are difficult to describe in text.
- Do not use blinking graphics or text.
- Ensure that assistive technology for the blind can effectively manage animations.

## Accessibility

NHI materials conform to Sections 504 and 508 of the Rehabilitation Act Amendments of 1998. To ensure compliance with Section 508, materials must be accessible to users regardless of physical ability.

Items of note in this guide are examples only; each course and all submitted materials should be reviewed carefully to ensure that Section 508 requirements are met.

Any changes to requirements for a specific course will be noted in the contract documents. Review those documents carefully.

**Contractual obligations supersede recommendations in *NHI Style and Standards Guide*.**

Please refer to Section 13 of this guide, “Standards Applied to Section 504 and Section 508 Compliance” for additional information.

## 9. Formatting the Page (Written Documents)

The following guidelines refer to submissions of hard copy documents, such as the instructor guide, participant workbook, or reference manual.

### Remember the Reader

Legibility is critical for all training materials.

Slides must be readable from the back of a room (at least 35' from the projector screen).

The PW, RM, and IG often will be used in a low light environment.

### 9.1 Header

- Insert title of course on top left side of the page.
- Insert type of document on top right side of the page.
- Insert a single (1/2 point) separator line underneath the course title and document name.

### 9.2 Footer

- Add only the page number at the bottom of the page.
- Use no separator line above page number.

### 9.3 Page Numbering

- Center page numbers.
- Use two series of numbers in a single volume.
  - Use a series of lowercase Roman numbers (i, ii, iii) for the front material.
    - Front material includes title page, preface, table of contents, and lists of references or tables.
    - Any front material preceding the table of contents should not be listed in the table of contents.

- Use a series of Arabic numbers that captures module or lesson number and page number in the document body.
  - Begin Arabic numbering at the introduction or first lesson or module.
  - An example of page numbering would be as follows: 5-3 (lesson 5, page 3).
- List every section or subsection title.
  - Make each heading level consistent.
  - Titles may be formatted in all capitals or initial capital letters.
  - Subheadings may be indented to emphasize a relationship with the main heading.

### 9.4 Spacing

Consistency is one of the key elements in a document that is easy to read and understand. Therefore, NHI offers the following guidance on page formatting.

Deviations from these guidelines may be requested by developers to the COTR. Changes to NHI style preference may be requested for reasons of readability or usefulness of content presented in an alternate method.

- Use a single space between sentences.
- Use a single space after a colon that begins a list in sentence format.
- Use two single lines between sections separated by a heading.
- Use a single line between paragraphs.
- Use 6 pt. spacing before and after bulleted items.

### 9.5 Fonts

Remain consistent with font size and type throughout the course. NHI requires use of a sans serif font, such as Arial or Verdana. Below are the preferred font sizes for NHI products.

<b>Content Type</b>	<b>Font Size</b>
Printed material: first-level headings	16 pt. bold
Printed material: second-level headings	14 pt. bold
Printed material: content	12 pt.

## 10. Formatting PowerPoint Presentations and Visuals

When crafting PowerPoint slides or other visuals, use the style guidance provided throughout this manual. Exceptions or additions to standard style protocol are included in the following list.

- Use the Slide Master feature in PowerPoint for background color and page numbering.
  - Number slides in the lower right corner.
  - Use the same numbering convention as used in the PW, i.e., 5-1, 5-2, 5-3.
  - Do not add embedded graphics; if NHI requires slides with embedded graphics, those templates will be provided or authorization for embedding will come from the COTR.
- If deviating from a provided template, use a color scheme with high contrast.
- Use larger font sizes or emphasis fonts sparingly for specific emphasis only on slides with minimal text.
- Use bullets only. Include explanatory information in IG and PW.
  - Exclude articles and superfluous wording.
  - Use consistent bullet style throughout slides.
  - Make bullets no larger than the text size being used.
  - Use sub-bullets sparingly.
- Round off numbers and decimals to whole numbers except where exact numbers are critical.
- Use numerals even when the number is the first word in a sentence or bullet point in online or PowerPoint content.
- Use a scale along either the horizontal or vertical axis of a graph, bar chart, or column chart instead of numbers at the ends of the bars or columns.
  - If information must be presented on the graphic itself, use a font size that is readable, and encapsulate that text in a white background.
- Generally omit sources from the slides.
  - Cite sources under the slide in the PW where appropriate.
- When pulling slides into the IG or PW, ensure legibility and quality of graphics by converting the slides to black and white before insertion.
- Do not rely on color alone to convey information.
  - Use dotted or dashed lines or different shapes in addition to color.

- Note that PWs are printed in black and white only.
- Be cautious when using shading.
  - Black and white slides in the PW could display as a very dark background, which makes reading the material a challenge.
  - When material is printed in black and white, color can be distorted or lose its meaning.

## 10.1 Fonts

Set font size as appropriate for the amount of content on the slides; however, slides should not contain excessive text. Remain consistent with font size and type throughout the presentation. NHI prefers use of a sans serif font, such as Arial or Verdana.

Below are the preferred font sizes for NHI products.

Content Type	Font Size
Headings on PowerPoint slides (course title, lesson title, screen title)	40-44 pt. bold
Text on PowerPoint slides	24-32 pt.
Headings on WCT Screens	24-28 pt. bold
Text on WCT Screens	24-32 pt.
Headings on WBT screens	24 pt
Text on WBT screens	18-24 pt

### Special Note for Course Revisions

When updating an older course, be sure to make the necessary style changes to bring the course into conformity.

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# General Standards

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## Intentionally Blank

### 11. Philosophy

In order for NHI's training programs to have maximum effectiveness, they must be designed and developed based on adult learning principles. The development process must involve creating materials that map to the overall course goal and course outcomes. The process should also articulate learning outcomes for each lesson or module that supports the course outcomes, and incorporate the principles of instructional system design.

NHI courses adhere to an approach that comprises the following standards.

- All courses should be designed as learner-centered and experiential.
- Value participants' experience and encourage contributions before, during, and after class.
- Acknowledge that individuals have one or more preferred learning styles. A well-designed course will use varied instructional methods and allow participants to process new information from the visual, auditory, and tactile or kinesthetic perspectives.
- Tie content and evaluation methods to the stated learning outcomes. Do not include superfluous information; deliver the required information, and provide references or resources for those wishing to know more. Give participants ownership in mastering the desired outcomes, and provide numerous opportunities for the instructor to assess progress and for participants to gain confidence.
- NHI is authorized by the International Association of Continuing Education and Training (IACET) to provide continuing education units (CEUs) for our courses. By instituting IACET standards, we ensure quality in continuing education and training programs and increase the consumer's confidence in our organization to deliver top quality, superior training materials and instruction that achieve a recognized standard.

To learn more about NHI's philosophy on learning, visit our website at [http://www.nhi.fhwa.dot.gov/about/nhi\\_philosophy.aspx](http://www.nhi.fhwa.dot.gov/about/nhi_philosophy.aspx).

## 12. Learning Outcomes

Learning outcomes (LO) state what the participants should be able to do as a result of training. Outcomes allow instructor and participant to verify comprehension. Therefore, LOs must be written as observable and measurable performance.

Learning outcomes must make a connection with the tasks people will be able to do on the job. Participants attend training to improve some aspect of job performance; course outcomes need to capture this goal in language that is clear and understandable to the potential participant.

Lesson plans and assessment tools are based on the learning outcomes; therefore, an ill-defined—or fuzzy—learning outcome is of little value and will not identify the desired performance.

NHI follows Bloom's Taxonomy of learning levels including associated outcome and assessment development. The most effective learning outcomes include condition, behavior/verb, and criteria.

### 12.1 Condition

Whenever possible, state the condition under which the performance occurs. Examples include:

- Given a set of data...
- Using the plan sheets for Silver Street Bridge...
- In small groups...
- Find in the reference manual...
- After researching the assigned model...
- ...from a concrete sample.
- In the laboratory...using the following equipment...
- Based on the case study...
- ...in the Excel spreadsheet.
- Using a calculator...

## 12.2 Behavioral Verbs

NHI recommends Bloom's Taxonomy of performance levels when crafting learning outcomes. The six major levels of Bloom's Taxonomy of the Cognitive Domain, with associated behavioral verbs and sample learning outcomes, are shown below.

- **Knowledge** (remembering information)
  - Define, identify, label, state, list, match
    - Identify the six components of a quality assurance program.
    - Define precision, accuracy, and bias.
    - On the given diagram, label the parts of a bridge.
  
- **Comprehension** (explaining the meaning of information)
  - Describe, generalize, paraphrase, summarize, estimate
    - Explain normal distribution.
    - Describe the meaning of data on a given control chart.
    - Explain how transportation processes can affect the plastic properties of concrete.
    - Describe viscoelastic response of asphalt binders to traffic loads and service climate.
  
- **Application** (applying concepts to actual situations)
  - Determine, chart, implement, prepare, solve, use, develop
    - Using given data, calculate the area under the curve.
    - Determine the appropriate HMA mixture type for a variety of given highway applications.
    - Establish threshold values based on local or regional parameters.
  
- **Analysis** (breaking down a whole into component parts)
  - Point out, differentiate, distinguish, discriminate, compare
    - Compare and contrast the processes for project-based and system-based IA programs.
    - Differentiate between structural and functional pavement performance.
    - Compare and contrast the investigation process of a mineral deposit vs. that of a processed aggregate.

- Relate given mix design properties to the selection of reinforcement types.
  
- **Synthesis** (putting component parts together to form a greater whole)
  - Design, organize, generate, construct, and create
    - Using the guidelines defined in class and a given position with associated job responsibilities, develop an effective personnel qualification program.
    - Based on best implementation practices from the U.S., generate a quality assurance program recommendation document for your State.
  
- **Evaluation** (judging the merits of ideas or materials)
  - Weigh, evaluate, select, critique, assess, recommend
    - Recommend an appropriate corrosion mitigation technique for a given scenario.
    - Using a case study document, assess the feasibility of three pavement rehabilitation activities in terms of potential success and economics.
    - Select appropriate surface treatment types based upon existing pavement conditions.

### 12.3 Criteria

NHI courses that provide CEUs have established criteria for the assessment; therefore, it is not always necessary to provide criteria.

- The instructional designer can make a decision on whether another criterion is more appropriate for any learning outcomes.
- For example, a task that needs to be completed within a specified time limit, or a task that requires exacting measurements or mastery should have the associated criteria for completion described in the learning outcome.
- Situations in which one wrong answer is unacceptable (even in a list where other correct answers are given) require specified criteria.

## 12.4 Example Learning Outcomes

Escalating through the levels can ensure that a topic and its application are fully understood, and that the expected outcomes can be mastered. For example, the following lesson has expected outcomes aligned with a variety of taxonomical levels.

### **Lesson: Performance Tests for HMA Mixtures**

1. Match given examples to field or laboratory tests.
2. Using laboratory data, describe potential adjustments to correct deficiencies identified by performance testing.
3. Establish threshold values based on local or regional parameters.
4. Differentiate between fundamental and empirical tests.
5. Based upon criteria provided, determine the type of testing needed to evaluate future pavement distress and possible modes of failure.
6. Analyze test results to determine potential future pavement distress and possible modes of failure.

### **13. Assessment Tools (Evaluation Instruments)**

Assessments, or tests, are used to measure and document a student's knowledge, cognitive ability, and performance. The assessment measures mastery of overall course learning outcomes, but not necessarily each lesson outcome. NHI administers course evaluations based on Kirkpatrick's Level Two, defined as the participant acquiring added skill and knowledge as a result of the training; learning must be demonstrated by the participant and confirmed by the instructor (Kirkpatrick and Kirkpatrick, 2006). Selection of the learning evaluation tool(s) is an ISD decision.

- Acceptable tools include case studies, skills demonstrations, and objective tests.
- Participants should complete a typical assessment within one hour.
- The number of test items should sufficiently test for mastery of the material.
- A score of 70% is considered passing for purposes of awarding CEUs.

For specific direction on acceptable methods, reference the guidance for end-of-course assessment tools outlined in the standards guide for your course delivery type.

## 14. Standards applied to Sections 504 and 508

NHI adheres to the requirements of Section 504 and 508 compliance in all of its training development and delivery efforts. NHI and its contractors must, to the greatest degree possible, meet all accessibility needs of its participants. While it is not feasible to anticipate every situation and every learner's needs, putting forth a best effort is mandatory.

The accessibility requirements that apply to each Task Order are described herein. Unless otherwise indicated, the contractor represents by submission of its Task Order proposal and acceptance of the Task Order award that all required 504 and 508 compliance requirements will be met.

- Section 504 applies to accessibility for all participants in training classes.
  - These requirements specifically address classroom settings, course materials, and accommodations for special needs.
- Section 508 of the Rehabilitation Act requires that Federal agencies provide access to electronic information and data to people with disabilities that is comparable to people without disabilities.
  - These requirements apply to electronic media, such as Web postings, Web sites, computer simulations, and videos.

*The Final Rule, Electronic and Information Technology Accessibility Standards*, published in the Federal Register on December 21, 2000, provides guidance on how a contractor can meet these requirements (see, 36 CFR Part 1194 [Docket no. 2000-01] RIN 3014-AA25).

There are also other available resources on the Rehabilitation Act, including several Web sites. See, for example, [www.section508.gov](http://www.section508.gov) and [www.access-board.gov](http://www.access-board.gov).

Additionally, a number of organizations provide technical information on making Web sites accessible for the disabled. Such organizations include, but are certainly not limited to, the following:

- The Web Consortium ([www.w3.org](http://www.w3.org)).
- The HTML Writers Guild ([www.hwg.org](http://www.hwg.org)).
- The Rochester Institute of Technology's Equal Access to Software and Information website (<http://people.rit.edu/easi/>).
- The University of Wisconsin-Madison's Trace Research and Development Center ([www.trace.wisc.edu](http://www.trace.wisc.edu))

See also:

- Janet L. Balas, "Online Resources for Adaptive Information Technologies," *Computers in Libraries* (June 1, 1999).

- Cohodas, Marilyn J. Does barrier-free compute? *Governing Magazine*. April, 2000.

The requirements for Web-based applications as described in §1194.22 the December 21, 2000 Final Rule can be found in *NHI Style and Standards Guide*, “Web-based Training Standards,” and “Web conference Training Standards” sections.

## 14.1 Electronic Information Technology

Section 508 required the Architectural and Transportation Barriers Compliance Board (Access Board) to create Electronic and Information Technology (EIT) Accessibility Standards that all Federal agencies are required to follow to determine if they are Section 508 compliant.

Access Board standards apply to EIT, defined as:

“Any equipment or interconnected system or subsystem of equipment that is used in the creation, conversion, or duplication of data or information, or used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information.

The term electronic and information technology (EIT) includes, but is not limited to, telecommunications products (such as telephones), information kiosks and transaction machines, World Wide Web sites, multimedia, office equipment such as copiers and fax machines. It includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.”

Use of video media, including PowerPoint presentations that include video clips, is subject to Section 1194.24 of the Access Board Standards.

- The standards require captioning and audio descriptions for training and informational multimedia production developed or procured by Federal agencies.
- The standards require that viewers be provided a means to turn captioning or video description on or off.
- Color-coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

The Act requires that all electronic products prepared for the Federal Government be accessible to persons with disabilities, including those with vision, hearing, cognitive, and mobility impairments.

- See [www.access-board.gov/508.htm](http://www.access-board.gov/508.htm), and the Federal IT Accessibility Initiative home page at [section508.gov](http://section508.gov) for detailed information.

## **14.2 Electronic documents with complex charts or data tables**

When preparing documents with complex charts or data tables, provide enough alternate information so that assistive technologies can read them aloud.

- Identify row and column headers for data tables.
- Provide the information in a non-linear form.
- Associate data cells and header cells for data tables that have two or more logical levels of row or column headers.

## **14.3 Electronic documents with images**

Provide a text equivalent for every non-text element in all publications prepared in electronic format. (For every non-text element, include an Alt Text description of the element.)

- An image that is merely decorative may require only a brief text-equivalent description.
- If the image conveys information that is important to the content of the report, then text sufficient to reasonably describe that image and its purpose within the context of the report must be provided.
- Text ascribed to photographs should provide as much descriptive information as possible as to meet Section 508 compliance requirements, e.g., date, location, description, and other necessary information.
- Video with narration or instructive voice must be closed-captioned.
- All HTML deliverables must conform to "Minimum Requirements for FHWA Web Pages." See [www.fhwa.dot.gov/wpcz/minimum.htm](http://www.fhwa.dot.gov/wpcz/minimum.htm).

For specific standards pertaining to your delivery type, see the appropriate appendices referenced in this guide.