Style Manual for AASHTO Publications

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</tr>
</tbody>
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Preface

The *Style Manual for AASHTO Publications* consists of project management information, AASHTO design preferences, style and editorial rules, and web and electronic publication guidelines. The manual can be used in its entirety, as a desk reference, or by individual pertinent sections.

This document was created to assist the many subcommittee volunteers, vendors, consultants, and internal staff in editing, formatting, and preparing text for AASHTO publications. It is our hope in offering this reference to the volunteers and vendors early in the creation and production process that we can continue to provide timely, accurate, and high-quality publications to our readership.

AASHTO Publications Production Staff
Part 1: Project Management

1.1 Life Cycle of an AASHTO Publication

As shown in Figure 1-1, the flowchart of the project management of AASHTO publications illustrates the life cycle of an AASHTO document. Upon receipt of a document generated by the Subcommittee or Task Force responsible for developing the guide, the Director of Publications Production fills out the Project Initiation form, enters the project into the Publications database, prepares a publications jacket, then passes the file along to the assigned Project Manager and e-mails a copy of the Project Initiation form to both the Project Manager and the Publications Marketing and Production Specialist.

The Project Manager first completes the preproduction tasks, which include organizing the components of the publication; inserting the necessary folders to the publications jacket; preparing file boxes or tracking charts, or both; and determining the layout design, color options, and printing specifications for the project.

The second step the Project Manager takes is to proofread the document and to compile queries that need to be referred to the content reviewer. The Project Manager then cleans up the electronic file and makes any corrections stemming from the copyediting of the document. Sometimes this editing process is outsourced to a vendor.

At this point, the revised document is typeset. The typesetting may be done in-house by the Project Manager or another member of the Publications staff, or outsourced to a vendor.

When the layout is complete, the Project Manager sends the revised document and any queries that have been compiled to the content reviewer(s) of the Subcommittee or Task Force. The content reviewers, who are responsible for the accuracy of the document, usually review the final draft within one to four weeks (depending upon the size of the document) and then return their revisions and comments to the Project Manager.

The Project Manager and the typesetter make the final revisions determined during the technical review. At this point in production, the Publications Marketing and Production Specialist issues print bid requests if the project is to be printed out-of-house. The Director of Publications Production reviews the bids and selects the printer.

When the project is ready for press, the Project Manager notifies the Publications Marketing and Production Specialist, who sends the final file to press. The printer returns proofs to the Project Manager for review and approval. While the document is being printed, the Publications Marketing and Production Specialist e-mails the Fulfillment Notification to the printer, the fulfillment company, and accounting.

The printer then sends a sample carton to the Publications Marketing and Production Specialist to check. Upon approval, the Publications Marketing and Production Specialist authorizes shipment of the product to the fulfillment center. The Publications Marketing and Production Specialist also issues transmittal letters so that the fulfillment center can ship the gratis copies to the member departments, instructs the Bookstore and Web Services Manager to make the publication available to the general public, and notifies the Publications Marketing and Production Specialist and the AASHTO staff that the publication is available for purchase.
When a new publication supersedes the previous edition or when SCOH or its appropriate subcommittee so determines, the Director of Publications Production archives the previous edition of the publication.

**Digital Production**

When the final files are ready for press, the Project Manager provides the Bookstore and Web Services Manager with PDF files for the online bookstore/reseller version of the document and, if necessary, for a CD-ROM version of the document.

If a CD is to be produced, the Bookstore and Web Services Manager and sometimes the Project Manager check the security features and hyperlinks provided by AASHTO’s encryption vendor. Upon approval of the AASHTO staff, the printing or replication is completed.

If a web-based version is to be produced, the final print files are exported for XML/HTML coding. Bonus features for the web-based document are provided by the AASHTO staff to the web vendor. Upon approval of the Bookstore and Web Services Manager who checks the final copy and hyperlinks, the web-based version is released.
Project Management of AASHTO Publications

Subcommittee or Task Force delivers balloted and approved original file

Director of Publications enters project into Pubs database and assigns original file to Pub Staff

Project Manager completes preproduction tasks

Proofread/copyedit original file and compile list of queries

Clean up/revise electronic files for text, graphics, and equations

Design/Layout/Check revised file and list of queries

Send copy of formatted file and queries to authors for Technical Review

Revise formatted file per Technical Review edits

Final formatted file - Fulfillment setup

Printer returns proofs for approval

CD security and replication; approve sample CD

Post to online bookstore in lieu of or along with printing

Production for web-based documents

Fulfillment and Marketing

Archived by Pub staff upon release of new edition

Figure 1-1. Project Management of AASHTO Publications
1.2 Preproduction Tasks

The Director of Publications Production

- Sets up the document in the Publications database and the publication folder(s) in the Pubs drive;
- Copies the electronic files to the appropriate publications folders, i.e., Word files in the 01 Text folder, photos and line art in the 02 Graphics folder, etc;
- Fills out the Request for ISBN Number form and sends it to the Communications and Publications Coordinator; and
- Fills out the Project Initiation form and e-mails it to the Project Manager and the Publications Marketing and Production Specialist.

The Project Manager should

- Take inventory to ensure that all components of the document have been received, then track down any missing components.
- Organize the physical components of the publication project: project initiation form, ballot, electronic files, and pertinent e-mails.
- In the Publication folder 02 Graphics, organize photos by chapter and determine that each photo is at least 300 dpi (approximately 4 or 5 MB for digital photos) at intended print size. If a photo is lower than 300 dpi, notify the AASHTO liaison or the chapter author that we will need a replacement photo that is at least 300 dpi. Make sure that all illustration files can be opened and edited.
- Set up file boxes or folders if needed for large publications. Print or photocopy chapter or section ballot revisions, print e-mails pertaining to these sections, and insert the hard copies into the appropriate folders.
- Determine who will provide the content review for each publication, chapter, or section. Create a tracking chart for the content review if needed. At a minimum, the chart should include the name of the reviewer, the date the content review was sent, the date the content review was returned, and verification that all queries were answered.
- Insert three folders into the Publications jacket, labeled Contracts/Fulfillment, Correspondence, and Production Notes. If a CD-ROM is included with the publication instead of being sold separately, include a folder for that as well. Similarly, when a publication is reprinted or if a publication has errata, add a separate folder to the Publications jacket for these items.

The Publications Marketing and Production Specialist

- Creates a fulfillment folder for the publication and
- Monitors the publications progress via the Pubs Production Database.

AASHTO sometimes outsources one or more operations of project production. Selected vendors will be invited to bid on a project based on specifications established by the Project Manager. In general, the lowest bid will be accepted.
1.3 Editorial Production

1.3.1 In-House Editorial Production

The Project Manager should proofread the document, preferably a hard copy of the document. See “Part 3: Style Rules for AASHTO Publications” for a discussion of specific style rules to be used for AASHTO publications. For items not covered in that section, refer to *The Chicago Manual of Style* or contact AASHTO.

When proofreading AASHTO’s technical documents, look for grammatical, spelling, and formatting errors and for inconsistencies. Do not make substantive revisions. If a sentence or paragraph needs to be reworded, write the revised copy as a recommendation that can be submitted to the technical reviewer for confirmation.

Prepare a “style sheet” for each publication so that all editorial decisions will be made consistently throughout the document. Use the “Copyedit Style Sheet” found in the Contractor’s Package of the Pubs Admin, Policy, & Misc Stuff folder to document your copyediting decisions.

Check all cross references in the text, including citations in the text and any reference numbers.

Verify the bibliographic information in all references, including any URL addresses. Follow the format stipulated in Section 3.14 of this manual.

Insert any corrections stemming from the copyediting of the document.

Clean up the electronic file.

Review each chapter to ensure that revisions have been made correctly.

Compile queries that need to be addressed by the chapter authors or technical section chairmen.

Obtain written permission (e-mails are acceptable) to use any material that is derived from a copyrighted source. Be sure to include source information for these passages or figures. See the permission request forms in Section 3.15.

When the revised document has been typeset, send the document and any queries pertaining to it for content review.

While the document is being reviewed, create the front matter and index for the publication.

1.3.2 Outsourced Editorial Production

If awarded a contract for editorial review, the vendor will be expected to perform the following tasks:

1. Take inventory to ensure that all components of the document have been received.

2. Proofread a hard copy of the files. See Part 3 of this manual for a discussion of specific style rules to be used for AASHTO publications. For items not covered in that section, refer to *The Chicago Manual of Style* or contact AASHTO. Also see “General Rules for Markup” below.

   When proofreading AASHTO’s technical documents, look for grammatical, spelling, and formatting errors and for inconsistencies. Do not make substantive revisions. If a sentence or paragraph needs to be reworded, write the revised copy as a recommendation in a list of queries that can be submitted to the technical reviewer for confirmation.

3. Prepare a “style sheet” for each publication so that all editorial decisions will be made consistently throughout the document. Use the “Copyedit Style Sheet” found in the Contractor’s Package to document your copyediting decisions.

   The following is a list of proofreader’s marks that AASHTO generally uses:
Proofreader's Marks

General Rules for Markup
Mark every error in both the text and the margin.
Use left and right margins, whichever margin is closer to the error.
Mark from left to right, and use slashes in the margins to separate multiple marks or to call attention to inconspicuous marks.
Refer to the following table on Proofreader’s Marks.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations (delete, insert, replace, transpose)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✗ or ✸ or ✦</td>
<td>delete</td>
<td>take ✗ out</td>
</tr>
<tr>
<td>△ or △ or △</td>
<td>caret to illustrate place of insertion</td>
<td>insert △ here something</td>
</tr>
<tr>
<td>a</td>
<td>replace character or word</td>
<td>replace “o” with “a” substitute different word</td>
</tr>
<tr>
<td>a //</td>
<td>make same correction consecutively as many times as slashes</td>
<td>make same correction</td>
</tr>
<tr>
<td>/</td>
<td>used to separate two or more marks and often as a concluding stroke at the end of an insertion</td>
<td>this example s/e</td>
</tr>
<tr>
<td>₲</td>
<td>let stand or ignore marked change</td>
<td>ignore marked correction</td>
</tr>
<tr>
<td>tr</td>
<td>transpose adjacent words or letters</td>
<td>transpose letters</td>
</tr>
<tr>
<td>₡</td>
<td>spell out</td>
<td>change 5% to five percent</td>
</tr>
<tr>
<td>✠</td>
<td>broken character</td>
<td>defective character</td>
</tr>
<tr>
<td>Q</td>
<td>query to author</td>
<td>Q Should 0.3 be changed to 0.03 or is it correct as is?</td>
</tr>
</tbody>
</table>

Spacing or Position
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>close up</td>
<td>print as one word</td>
</tr>
<tr>
<td>delete and close up</td>
<td>delete and close up</td>
</tr>
<tr>
<td>insert and close up at left</td>
<td>insert and close up at left</td>
</tr>
<tr>
<td>Symbol</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td><code>\in</code></td>
<td>insert and close up at right</td>
</tr>
<tr>
<td><code>\[</code></td>
<td>set farther to the left</td>
</tr>
<tr>
<td><code>\]</code></td>
<td>set farther to the right</td>
</tr>
<tr>
<td><code>#</code></td>
<td>insert a space</td>
</tr>
<tr>
<td><code>eq</code></td>
<td>equalize space between words</td>
</tr>
<tr>
<td><code>less</code></td>
<td>less space between words</td>
</tr>
<tr>
<td><code>ctr</code></td>
<td>center horizontally</td>
</tr>
<tr>
<td><code>\upsilon</code> or <code>\</code></td>
<td>center vertically</td>
</tr>
<tr>
<td><code>\</code></td>
<td>set as ligature (such as <code>æ</code>)</td>
</tr>
<tr>
<td><code>\</code></td>
<td>align horizontally</td>
</tr>
<tr>
<td><code>\</code></td>
<td>align vertically</td>
</tr>
<tr>
<td><code>\ll</code></td>
<td>indent or insert em quad space</td>
</tr>
<tr>
<td><code>\ll</code></td>
<td>push down or work-up</td>
</tr>
<tr>
<td><code>\#</code></td>
<td>insert line space</td>
</tr>
<tr>
<td><code>\#</code></td>
<td>delete or close up line space</td>
</tr>
<tr>
<td><code>\</code></td>
<td>begin a new paragraph</td>
</tr>
<tr>
<td><code>\</code></td>
<td>no new paragraph or new line</td>
</tr>
</tbody>
</table>

**Breaks**

- `\` begin a new paragraph
- `\` no new paragraph or new line
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breaks (continued)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>![begin new line]</td>
<td>begin new line</td>
<td>begin new line here</td>
</tr>
<tr>
<td>![run back]</td>
<td>carry back to previous line</td>
<td>carry back to previous line</td>
</tr>
<tr>
<td>PgBrk</td>
<td>insert pagebreak</td>
<td></td>
</tr>
<tr>
<td>NBS</td>
<td>set with nonbreaking space between words</td>
<td>Type Ctrl + Shift + Space bar to set nonbreaking space; e.g., 3 mm</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>![set in capitals]</td>
<td>set in capitals</td>
<td>set ben as Ben</td>
</tr>
<tr>
<td>![set in small capitals] or s.c.</td>
<td>set in small capitals</td>
<td>set section as SECTION</td>
</tr>
<tr>
<td>![set in lowercase]</td>
<td>set in lowercase</td>
<td>set text with lowercase t as text</td>
</tr>
<tr>
<td>![set in italic]</td>
<td>set in italic</td>
<td>set in situ in italic type as in situ</td>
</tr>
<tr>
<td>![set in roman]</td>
<td>set in roman</td>
<td>set text in roman type as text</td>
</tr>
<tr>
<td>![set in boldface]</td>
<td>set in boldface</td>
<td>set text in boldface type as text</td>
</tr>
<tr>
<td>![set as superscript]</td>
<td>set as superscript</td>
<td>set 2 as superscript in ft²</td>
</tr>
<tr>
<td>![set as subscript]</td>
<td>set as subscript</td>
<td>set 2 as subscript in H₂O</td>
</tr>
<tr>
<td>![turn over an inverted letter]</td>
<td>turn over an inverted letter</td>
<td>inverted</td>
</tr>
<tr>
<td>![wrong font]</td>
<td>wrong font</td>
<td>wrong size or font</td>
</tr>
<tr>
<td><strong>Punctuation Symbols</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>![hyphen]</td>
<td>hyphen</td>
<td>multi-colored</td>
</tr>
<tr>
<td>![en dash]</td>
<td>en dash</td>
<td>1965–72</td>
</tr>
<tr>
<td>![em (or long) dash]</td>
<td>em (or long) dash</td>
<td>Now—at last!—we know.</td>
</tr>
<tr>
<td>![comma]</td>
<td>comma</td>
<td></td>
</tr>
<tr>
<td>![apostrophe]</td>
<td>apostrophe</td>
<td></td>
</tr>
</tbody>
</table>
4. Depending on the contract, the vendor may also be asked to mark up a hard copy of a chapter to determine the styles/tags that will be required.

5. Prepare a list of queries. If a query will affect formatting, contact AASHTO or the technical reviewer to resolve the issue before typesetting the document. Otherwise, all queries are submitted to the authors during the technical review.

6. Prepare the electronic files.

7. Revise the original file according to the editorial changes determined during the initial proofreading.

8. Remove formatting in order to have a clean copy for layout, if necessary.

9. Complete revisions to figures as indicated.

10. Complete revisions to equations as indicated.

11. Review each chapter to ensure that revisions have been made correctly.

1.4 Design/Layout

1.4.1 In-House Design/Layout

The Designer should:

1. Mark up hard copy of a chapter or section to determine the styles that will be required.

2. Determine the layout design, color options, and printing specifications for the project.

   See Part 2 of this manual for a discussion of specific design styles to be used for AASHTO publications.

3. Using Adobe Illustrator CS5, AutoCAD Light, or Bentley Powerdraft, create or revise figures according to instructions from the chapter authors or technical section chairs.

4. Create or revise equations in MathType 6.0 or 6.5.
5. Layout the text, including table captions, tables, and equations. If the document is formatted in Microsoft Word, use the styles and formatting feature built into the Word software. Be sure to separate “character” styles (such as bold, italics, superscript, or subscript fonts) from the “paragraph” styles by basing the character style on “(no style).”

6. Insert the figures and their corresponding captions in the appropriate text section.

7. Review the typeset document for formatting errors. At this point, send the document and any queries pertaining to it for technical review.

8. While the document is being reviewed, create the front matter and index for the publication.

9. Make any revisions or adjustments as determined during the technical review. Print and review a clean copy of the final document.

10. Prepare electronic files or PDFs for printing, online distribution, or CD replication. See Section 2.2.12.

1.4.2 Outsourced Design/Layout

The vendor may be asked to perform the following tasks:

1. Typeset/layout the book.

2. Review typeset document for layout.

3. Make any revisions or adjustments as determined during the technical review. Print and review a clean copy of the final document.

4. Prepare electronic files or PDFs for printing, online distribution, or CD replication.

All files and mechanicals must be returned to AASHTO upon completion of the project.

1.5 Technical Review

Members of the Subcommittee or Task Force responsible for the publication will be the technical reviewers who are responsible for the technical accuracy of the document. The Subcommittee on Bridges and Structures and the Subcommittee on Materials (SOM) use technical sections to oversee specifications pertaining to specific subjects; for example, the technical sections for the SOM focus on different types of construction materials—asphalts, bituminous material, hydraulic cement, pipe, etc. (The LRFD books are the exception to this rule. One consultant group, Modjeski and Masters, is the sole author of this series under the auspices of the Subcommittee on Bridges and Structures.) The technical section chairmen serve as the contact persons during the technical review process. The remaining Subcommittees designate members to serve as chapter authors, who act as the contact persons for individual chapters during the technical review. On rare occasions, for small publications such as Guide Specifications for Shotcrete Repair of Highway Bridges, only one person will act as the technical reviewer. This person is usually the Chairman or Secretary of the Task Force responsible for the publication.

The schedules for the technical reviews vary depending upon the size of the project. A small publication may be reviewed from overnight to one week. Large publications may require one month to complete the review process.

The AASHTO Project Manager sends the document to the AASHTO liaison or to the designated technical section chairman or chapter author for review. Included in the package are copies of the formatted document, a cover letter that states the deadline for return of the technical review comments, a list of queries to the technical reviewers, and a checklist of items that the technical reviewers should consider during their review.
Queries should refer to the specific location of the item in question—section or page number, paragraph or line, etc. If possible, word the query in such a way that the technical reviewer can respond quickly and easily. An example from the Materials Book is as follows:

**Technical Section 4g**

M 225M/M 225 In Section 8.1.3 and in the caption for Table 4, should “welded fabric” be changed to “welded wire reinforcement”?

Yes  No

A sample checklist for technical reviewers and a template for queries follow.
Checklist for Technical Review of [Title of Publication]

Content
Check accuracy of content.
Determine that the text is complete, mathematically correct, and presented in a logical order. Make sure no portions of text were inadvertently dropped in the preparation of the document.
Check that all reference citations are exactly correct.
Be certain all queries by the AASHTO publications staff have been answered.
Check that the notes are accurate and are numbered correctly in the text.
We suggest having a second person on your staff proofread the document, particularly if you were involved in its original preparation or revision. You cannot proofread your own writing; your brain will see what is supposed to be there, not what is actually there. [Hint: Please print the document if reviewing an electronic file because proofreading paper copy is generally more accurate than proofreading online.]
Double-check accuracy of content.

Style and Format
AASHTO follows *The Chicago Manual of Style* for consistency and uniformity and the *GPO Style Manual* as a secondary source. Please follow these guides closely.
If you change the words in a document on the computer, carefully proofread all around that change because you may either leave in a word from the older version or take out too many words.
Spell out acronyms when first used.
Check the footers and headers to determine that the correct chapter heading is listed and that all pages are numbered sequentially.
Figures, Tables, and Equations
Make sure all referenced matter (tables, figures, notes) follows the first in-text callout.
Make sure all tables and figures (illustrations and photographs) have titles. If AASHTO received permission to use a figure from another source, make sure credit to the owner is noted.
Number all notes, tables, and figures consecutively throughout a chapter, including ones in appendices, annexes, and supplements.
Check that the figures (illustrations and photographs) are complete, correct, and legible, and are placed in the correct position in the text.
Cross-reference text references to figures, tables, or equations.
Check that all entries in tables are correct and located in proper rows and columns, i.e., under correct headings, and placed in the correct position in the text.
Check descriptions of tables in text against information on tables themselves.
Check that equations and formulas are complete and accurate and placed in the correct position in the text.
When the technical reviewer(s) indicates that the publication is again ready for production, the designer should make any changes resulting from responses to queries.

The designer should then print and review a clean copy of the final document. Collate all parts/chapters so that the book is in the correct order. Check that all revisions have been made correctly and that the formatting is correct.

At this point, the Project Manager ideally will want to give a copy of the files to the Bookstore and Web Services Manager to prepare the online version. If this step is completed early enough, the edits recommended by the Bookstore and Web Services Manager may be incorporated into the printed book.

The designer prepares the electronic files for delivery to the printer. Notify the Publications Marketing and Production Specialist when the project is ready for press.

### 1.6 Printing

If the printing is to be done in-house, the Project Manager completes the SSC Reproduction Work Order form and e-mails it to SSC at the time of printing.

If a project is to be printed out-of-house, the Publications Marketing and Production Specialist invites selected printers to bid on a project based on specifications established by the Project Manager. In general, the lowest bid will be accepted.

The Publications Marketing and Production Specialist provides the following information in order to enable the printer to determine an accurate proposal:

- number of copies to be printed;
- paper size;
- number of pages in publication;
- method of submission (PDF, software files, camera-ready copy) for text and covers;
- type, color, and quantity of artwork;
- type of paper for text;
- type of paper and finishes for covers;
- color of ink for text and covers;
- number of and design of covers and spine (printed one- or two-sided, bleeds, etc.);
- type of binding;
- type of proofs requested;
- delivery instructions (including the delivery of the sample carton);
- schedule required;
- request to provide estimates of shipping costs separately from printing costs; and
- any special requirements or features (insertion of CD, tipping in map, etc.).

The following is a sample bid letter that AASHTO would e-mail to the print vendors:

The American Association of State Highway and Transportation Officials (AASHTO) is requesting a price quotation for the printing, binding, packaging, and shipping of the following publication, in accordance with the specifications detailed below:

**Title:** A Policy on Geometric Design of Highways and Streets, 6th Edition (Publication Code: GDHS-6)

**Estimate:** Please submit two estimates for each quantity listed. Quotes are due to me by next Wednesday, July 13th.

The first estimate should be for the printing and production, which should include any costs to send/courier bluelines or proofs to AASHTO for review; and

The second estimate should be for delivering sample copies to our offices here in D.C., as well as shipping the remainder to our fulfillment center, which should include your method of shipping—either UPS Ground, or another less expensive shipper.

**Schedule:** The schedule for the printing this publication will require delivery 10-days after approval of proofs. Please confirm your ability to work within this schedule for the quantities listed below. If you cannot meet this schedule, please advise the schedule you will need to print this publication for the two quantities listed below.

**Summary:**

** Your quote must include the following:**
1. an estimate for printing/production;
2. an estimate for delivery and shipping;
3. the dollar total of both printing and shipping; and
4. a schedule for printing and delivery.

If your quote does not include all of this information, in this format, you may be excluded from consideration!
Please confirm receipt of this e-mail and your intention to bid on this print job, and please feel free to contact me if you have any questions or need any additional information.

Thank you.
Xxxx Xxxxxxxx  
Publications Marketing and Production Specialist, AASHTO  
Email: xxxxx@aashto.org  
Phone: 202-624-xxxx

=======================================
Following are the specifications for this request:
=======================================

Publication Title

Publication Code
GDHS-6

Print Quantity
Please provide quotes for the following two quantities:

10,000 copies
15,000 copies

Components
Single-volume book

Page Count
948 pp. + Cover

Cover Specifications
Ink: 4-color process + UV Coating; prints 4/0
Bleeds: Full
Stock: 10 Pt. C/1/S

Text Specifications
Ink: 1/1, black
Bleeds: no
Stock: 60# Regular White Offset

Final Trim Size
8.5" × 11"

Bindery
Perfect bind on 11“ side

Shipping/Delivery Information
There will be two shipments associated with this project. Delivery charges must be included with your bid.
Shipments #1

**Sample box containing 25** copies is to be delivered to AASHTO Headquarters addressed as follows:

Xxxx Xxxxxxxxx
Publications Marketing and Production Specialist
AASHTO
444 North Capitol Street, N.W., Suite 237 B
Washington, D.C. 20001

Shipments #2

**The remaining copies** are to be delivered to AASHTO’s publication fulfillment center properly labeled per their instructions and addressed as follows.

AASHTO will provide appropriate fulfillment paperwork—AASHTO Purchase Order and Box Label—for shipping.

Fulfillment Center
Attention: Receiving Department
Street Address
City, State Zip Code
XXXXX Contact: Xxx Xxxxxxx—Phone: xxx-xxx-xxxx

**Schedule**
Please include a schedule for printing and delivery with your bid.

**Negatives**
It is understood that ownership of negative or files resides with AASHTO. An electronic copy of final printer files is to be provided to AASHTO on CD-ROM upon completion of job.

Your quote must include a schedule.

### 1.7 Fulfillment

Using the Publications database, the Project Manager must provide the Publications Marketing and Production Specialist with the number of design hours of AASHTO staff or cost of services for outside designers. Time should be entered in the database on at least a weekly basis in order to provide accurate production hours.

The Publications Marketing and Production Specialist

1. Calculates the unit cost of the publication and e-mails this information to accounting;
2. Calculates the true cost of production for the publication to use in determining the sale price of the publication;
3. Calculates the pricing range of the publication and e-mails this information to the Director of Publications;
4. Fills out fulfillment documents, e.g., Inventory Management Forms (IMFs), AASHTO Purchase Order, Box Label, and UPS Shipment Request Form, and e-mails them to the printer and to the fulfillment center;
5. Prepares the transmittal letters and e-mails them to the fulfillment center; and
6. Prepares the sample box distribution instructions for the Publications and Communications Assistant.

The Director of Publications Production is responsible for determining the sale price of the publication.

1.8 Post-Production and Closeout Procedures Checklist

**Project Manager**

Remove all previous versions of the design file for both the text and the cover so that only the final version remains.

If necessary, prepare the files for resellers.

Create the low-resolution jpg of the cover for the online bookstore.

Create the high-resolution jpg of the cover for the catalog.

Save all of electronic files to CD-ROM or DVD.

In the pub jacket, place

- publication initiation form;
- copy of publication;
- CD-ROM of electronic files of the publication folder;
- official correspondence, such as permission to reprint letter;
- list of technical reviewers or chapter authors;
- notes regarding problems or unusual procedures encountered during production; and
- errata, including whether or not revisions were incorporated in electronic files.

In the box for storage at GRM, place

- technical review correspondence (especially responses to queries),
- original file,
- artwork, and
- other work papers.

For large publications, such as the Materials Book, that generate a large quantity of work papers, box up technical review correspondence (especially sign-off letters and responses to queries), the original file, artwork, and other noncontractual papers for offsite storage.

Complete the first section of this Closeout Procedure Checklist and place it in the pub jacket.

Give pub jacket, box, and this form to the Publications Marketing and Production Specialist.

(Date)
Publications Marketing and Production Specialist

Notify the fulfillment house and Support Services Center to remove previous editions of the publication from stock.

Notify both the bookstore manager and Publications/Communications Assistant regarding transmittal of project.

Review the printer invoice for accuracy and submit as okay to pay to the Director of Publications Production.

Add the following items to the pub jacket:

- print specifications report;
- print bid paperwork, including requests for estimates, submitted estimates, and print award letter;
- unit cost sheet;
- pricing sheet;
- press notification sheet;
- fulfillment information, including inventory management form, AASHTO purchase order, and box label;
- publication receiver report;
- transmittal information, including transmittal notification information, transmittal letter, and transmittal release notification;
- sample box distribution sheet;
- printer invoice;
- CD-ROM of the final printer files;
- all design, printing, replication, or consultant contracts; and
- joint development or sales agreements/contracts.

Review the pub jacket for completeness.

Complete the second section of this Closeout Procedure Checklist and place it in the pub jacket.

Give pub jacket, box, and this form to the Publications/Communications Assistant.

(Date)
Publications/Communications Assistant

Distribute books to
- appropriate AASHTO Staff, __________
- technical reviewers, __________
- reading room (display copy), and __________
- Support Services Center. __________

File for copyright of new publication. __________
Store two archive copies of new publication in Annex 3C. __________
Ship two archive copies of new publication to offsite storage. __________
Ship the work papers boxed by the Project Manager to offsite storage. __________
Add the title of any previous edition of the publication to the list of archived publications. __________
Place a copy of the printed publication in the pub jacket. __________
Complete the third section of this Closeout Procedure Checklist and place it in the pub jacket. __________
File the pub jacket under the appropriate subcommittee in the publications filing cabinets. __________

(Date)

1.9 Marketing

The Project Manager provides a high-resolution jpg of the cover to the Publications Marketing and Production Specialist for the catalog and other marketing uses and another low-resolution jpg of the cover to the Bookstore and Web Services Manager for the online bookstore, and, with the help of the AASHTO staff liaison or the authors, writes a description of the publication for the catalog.

The Publications Marketing and Production Specialist sends the blurb and jpg for the catalog to the Marketing Consultant and the Bookstore and Web Services Manager. The Publications Marketing and Production Specialist also sends similar information to the Communications staff to ensure that the availability of the new publication is announced in AASHTO newsletters and social media vehicles.

The Marketing Consultant makes sure the new publication is included in the publications catalog and may also send e-mail blasts advertising this publication.


**Part 2: Design Preferences for AASHTO Publications**

### 2.1 Organization of the Document

#### 2.1.1 Front matter

The front matter of AASHTO Publications should include the following:

<table>
<thead>
<tr>
<th>Page Number</th>
<th>Required Information</th>
<th>Wording/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title Page</td>
<td>Title of book</td>
<td>[title page may be a black-and-white version of front cover]</td>
</tr>
<tr>
<td></td>
<td>Year of Publication and number of edition if other than first Published by</td>
<td>[If necessary, insert special wording for partnership information, such as, “in cooperation (in conjunction) with FHWA” or “Prepared by Joint Task Force on Segregation of the Subcommittee on Construction and the National Asphalt Pavement Association.”]</td>
</tr>
<tr>
<td></td>
<td>AASHTO logo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AASHTO address</td>
<td>American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 249 Washington, DC 20001 (202) 624-5800 transportation.org</td>
</tr>
<tr>
<td>Copyright page</td>
<td>Copyright</td>
<td>© [year], by the American Association of State Highway and Transportation Officials. All Rights Reserved. This book, or parts thereof, may not be reproduced in any form without written permission of the publisher. Printed in the United States of America.</td>
</tr>
<tr>
<td>Page iii</td>
<td>AASHTO Executive Committee serving during the year the book is produced</td>
<td></td>
</tr>
<tr>
<td>Page iv</td>
<td>Members of Task Force that produced book</td>
<td></td>
</tr>
<tr>
<td>Page v–[viii] [number will depend on size of subcommittee]</td>
<td>Members of Subcommittee that sponsored Task Force</td>
<td></td>
</tr>
<tr>
<td>[next right-hand page]</td>
<td>Table of Contents (TOC)</td>
<td>[TOC may be followed by a List of Figures, a List of Tables, or both.]</td>
</tr>
<tr>
<td>[next right-hand page]</td>
<td>Foreword</td>
<td>[A foreword is a statement about the book that is usually written by an eminent person who is not an author or editor of the book.]</td>
</tr>
</tbody>
</table>
2.1.2 **Text**

AASHTO delivers information through a wide variety of products—weekly journals, newsletters, communication alerts, websites, policy and committee informational reports, and technical documents. Technical documents include policies, standards, manuals, guides, guide specifications, and technical reports—all of which must be approved for publication by a two-thirds majority of the members.

Technical policies and standards are accepted engineering practices, procedures, or tests that the U.S. DOT and State DOTs have agreed to use or meet; examples of these would be the AASHTO Green Book, the AASHTO Materials Book, and the *AASHTO LRFD Bridge Design Specifications*.

Manuals, guides, and guide specifications propose a series of options or information to offer direction, but do not recommend a specific course of action; examples include the *AASHTO Maintenance Manual*, the *Guide for Design of Pavement Structures*, and the *Highway Drainage Guidelines*.

The subject matter of technical reports is similar in character to a guide or manual, but there may be specific circumstances that mitigate against publication as a guide or manual; examples of AASHTO technical reports include *The Use and State-of-the-Practice of Fiber Reinforced Concrete* or *A Synthesis of Safety Implications of Oversize/Overweight Commercial Vehicles*.

**Numbering of Sections or Chapters**

In its technical publications, AASHTO adheres to the Modified Decimal Numbering System to show subordinate relationships and to simplify extensive cross-referencing. All technical documents consist of several primary divisions—these may be labeled “sections” or “articles” or “chapters.” Assign primary sections of standards in sequential order beginning with the Arabic numeral “1.” (2)
Number secondary sections with a two-part number consisting of the number used for a primary section followed by a decimal point and then another consecutive serial number (e.g., 1.1, 2.1, 2.2, 2.3 . . . 5.5, 5.6).

Ternary and quaternary sections continue with this same process. Number ternary sections as 1.1.1, 1.1.2, 2.1.1, 2.2.2 . . . 3.1.1, etc., and quaternary sections as 1.1.1.1, 1.1.2.1, 1.1.2.2, 2.1.1.1, 2.2.2.1 . . . 3.1.1.1, 3.1.1.2, etc.

Cross-references within the text to other sections should be written as “(see Section 2.1)” if the reference is within a sentence or as “(See Sections 2.1 and 3.2.)” if the reference is a separate sentence.

Using the same system in AASHTO Bridge books, articles are numbered from general to specific, i.e., 5.1, 5.1.1, 5.1.1.1, and so on. In cross-references to an article, the word “article” is capitalized, but never abbreviated, as in “Article 7.5.1.”

Some technical publications also combine typographic progression with the Modified Decimal Numbering System as a secondary formatting feature to indicate subordination. In these instances, primary (first-level headings) are set in all capital letters and boldface type. Secondary subheadings are set in initial capital letters and boldface type. Third-level headings are set in initial capital letters and either bold or roman type. Subsequent headings may be set in initial capital letters, roman or italic type, and smaller font sizes. (1)

2.1.3  End Matter

Appendixes and Other Attachments

Additional information may be included in supplementary requirements, annexes, or appendixes. If used, supplementary requirements precede annexes, annexes precede appendixes, and appendixes precede glossaries, references, or indexes.

These attachments include the following types of information:

- **Supplementary Requirements**—Requirements that apply only when specified within a contract
- **Annexes**—Mandatory information, e.g., detailed information, list of symbols that were used, instructions for operating or calibrating equipment
- **Appendixes**—Nonmandatory information that amplifies statements made in the text, e.g., calculations of equations, charts, data forms, typical applications of the material or procedure being discussed, alternate procedures, or information of physical properties not prescribed in the standard

Attachment sections are numbered separately from the text of the chapter or section. Supplementary Requirements are numbered S1, S1.1, S2, S2.1, etc. Annexes and Appendixes are numbered A1, A1.1, A2, A2.1, etc. or X1, X1.1, X2, X2.1, etc., respectively. Tables, figures, and equations in these attachments should be numbered by the designation number of the attachment followed by consecutive numbers starting with one. For example, tables in the first appendix would be numbered X1.1, X1.2, X1.3, etc. or X1-1, X1-2, X1-3, etc. Tables in the second appendix would be numbered X2.1, X2.2, X2.3, etc. or X2-1, X2-2, X2-3, etc. However, text notes in these attachments are numbered throughout the attachment by the designation letter of the attachment followed by consecutive numbers beginning with one, i.e., Note A1, Note A2, Note A3, etc. (Note: Bridge books do not have Annexes or Supplementary Requirements. General appendixes for Bridge books are numbered A1, A1.1, A2, A2.1, etc. while appendixes pertaining to and immediately following sections may be numbered relative to the section number; for
example, appendixes for Section 5 may be numbered A5, B5, B5.1, C5, etc. No one Bridge book would have both types of appendixes.)

**Glossary**

Glossary entries are arranged in alphabetical order on a letter-by-letter basis and are aligned with the left margin. (I)

Each definition begins with a lowercase letter, unless the term is a proper noun, and ends with a period.

The glossary term should be set in italic type, followed by an em dash and its definition set in roman type. Runover lines may be uniformly indented.

Nouns are presented in their singular form and verbs in their infinitive form.

If a term has multiple meanings, the subject field or part of speech should be indicated in angle brackets before the definition.

Parentheses and square brackets should be used only if they constitute part of the written form of the word, as in “poly(vinyl) chloride.”

Complete the definition in one sentence. If two or more phrases are needed to state the meaning(s), connect them with semicolons.

A glossary follows the last chapter of the book or its annexes and appendixes, but precedes an index or bibliography or reference list if that list applies to the entire book.

**References or Bibliography**

See Section 3.14 on “References.”

**Index**

An index appears as the last element of a publication. The index functions as an organizer to help the reader find a sought-after subject.

Index terms should be keywords that best represent the technical information presented in the standard. All selected keywords should be stand-alone terms, not incomplete phrases or unattached adjectives.

Index entries may be single spaced in a one- or two-column format.

Alphabetize index entries on a letter-by-letter basis.

Index entries are capitalized only for proper names.

Main entries are aligned flush left while subsequent entries are uniformly indented one em space for each level of modification.

Runover lines are indented one em space deeper than the deepest subentry of that entry.

Cross-references may be used if warranted. In cross-references, *see* is used to guide the reader to related information; *see also* is used to guide the reader to additional information. In either case, the “see” or “see also” should be italicized. The *S* should be capitalized if the phrase follows a period or is set on a separate line. If the phrase is enclosed in parentheses, the *S* is lowercase. The cross-reference is not followed by a period.

If necessary to continue a listing from one page to the next, insert the main entry term again followed by “(continued)” at the top of the next page.
2.2 Design and Layout

2.2.1 Selection of Layout Software

AASHTO works in an IBM-compatible, Windows environment. Please submit documents in Microsoft Word. Submit the text, tabular/equation, and graphic files as separate, individual components rather than integrated in one single file. Embed the graphic files in Word documents only if the Word file is the final layout of the publication (see “Formatting in Microsoft Word” in Section 2.2.2). Always include a hard copy of the document along with the electronic files.

Many of AASHTO’s technical publications are currently laid out in Microsoft Word files that are then converted to Portable Document Format files (PDFs) for printing. This method enables the Subcommittee and Task Force members to edit the files for the next edition. Printing from PDFs also sometimes allows AASHTO to use the same files for producing CD-ROMs or downloadable publications.

Smaller publications, including policy documents, or those that will be web-based documents are usually formatted in the desktop layout program InDesign CS5 (for PC only, not Mac). Photos for final design should not be embedded in the desktop file. Low-resolution photos may, however, be embedded as low-resolution graphics as placeholders only. Original photos must be clearly labeled on the back and delivered at the same time as the electronic files. (See the section on “Preparing Photographs for Production” in Section 2.2.4.)

2.2.2 Document Format

Page Setup

Basic page setup for AASHTO publications is 8½ in. by 11 in. portrait (tall). Landscape pages should be used only for tables or figures that will not fit on portrait-oriented pages.

New chapters/sections should start on the right-hand (recto) page.

Margins

Documents that are to be perfect-bound or saddle-stitched may be set up with 1-in. margins on all sides or with mirror margins. Publications that are to be 3-hole-drilled are usually set up as mirror margins with a 1.5-in. inside margin and a 0.5-in. outside margin. However, Bridge books are set up with top and bottom margins of 0.7 in. and side margins of 0.95 in. on the inside and 0.7 in. on the outside.

Typography in Design

In general, limit the use of different typefaces to two within one document.

Use a serif font for large bodies of text. Times New Roman is the preferred serif choice for AASHTO documents formatted in Microsoft Word because of its widespread use and its ease of reading.

Headings, subheads, captions, and small bodies of text may be a serif or sans serif font. Arial is the preferred sans serif choice for AASHTO documents formatted in Microsoft Word because of its widespread use.

Do not expand or condense typefaces.

Font sizes generally run between 10 and 12 points for text, 10 and 14 points for headings, and 8 to 10 points for tables. In general, the body text style for AASHTO publications is Times New Roman 11 points normal; for Bridge books, the default text style is Times New Roman 10 pt normal. Never use fonts that are smaller than 7 points. Avoid fonts that are distractingly large.
Symbols must be of an ASCII format that will not change if the graphic is converted to a PDF. The preferred typeface for AASHTO documents is Symbols.

Fractions should be presented in the same way—\( \frac{1}{2} \) or \( \frac{1}{2} \)—not in a combination of ways, i.e., some using diagonal slashes and some with the numerator directly over the denominator, some as fractions and some as decimals, etc.

Avoid using all caps except for short primary headings or for emphasis. Avoid setting text in boldface, italics, script, or a novelty face.

Use boldface or italics, however, to help emphasize headings of sections or specialized notices such as warnings, cautions, or notes. (See Section 3.10.3 on “Italic and Boldface Type.”)

Use flush left, ragged right alignment for large bodies of text. Justified text alignment may be used for smaller documents or Bridge books.

A one-column format is preferred. A scholar’s margin may be used for some publications in which the section numbering or other identifying subheads are placed to the left of the body text. Avoid two- or more column formats. Exceptions are the Bridge books, which currently have a two-column format for text and its accompanying commentary.

Use lists set off with numbers or bullets. (See Section 3.10 on “Lists.”)

To ensure ease of sustained reading, average line length for large bodies of text should be approximately 50 characters. Avoid using lines for body text that are more than 65 characters or fewer than 39 characters.

Reverse type or run type over a tinted background only for accent pieces, such as fact boxes, sidebars, or pull-quote boxes.

**Headers and Footers**

Use running headers or footers to provide reference information, i.e., chapter title, document title, technical section number, and page number.

In AASHTO technical publications, the header of the recto (odd-numbered, right-hand) pages should include the title of the chapter, set flush left if the page number is to be set on the outside corner. The verso (even-numbered, left-hand) pages should include the title of the publication, set flush right if the page number is to be set on the outside corner.

Headers and footers usually appear 0.5 in. from the edge of the page. In the case of headers, the paragraph should be followed with a minimum of 12 points of white space before the body text.

Headers or footers usually do not appear on the first page of the chapter. However, if the footer contains only the page number, the footer may appear on the first page of each chapter.

Headers and footers are often set in roman or italic typeface that is equal to or one point below the typeface of the body text.

**Page Numbering**

Page numbers usually appear in the outside corner of the header or footer of AASHTO technical publications.

Occasionally, the page number may be centered in the footer of the document.

In AASHTO technical publications, the page number may include the chapter number followed by a hyphen and then the page number. For example, the page number for page 9 of Chapter 3 would be written “3-9.”
Use small Roman numerals (i, ii, iii ... v, etc.) for page numbers in front matter and Arabic numerals (1, 2, 3 ... 5, etc.) for page numbers in the main body of the publication. For Bridge books, the tables of contents for each section include the section number, e.g., 4-ii would be the second page of the front matter for Section 4. If “divider” pages are used to separate sections of a publication, set the page number of that divider page as zero so that a bookmark will be available for linking in the digital versions of the document.

Page numbers on landscape-oriented pages must be rotated so that the text is readable when that page is printed with the rest of the book. See “Landscape pages” in “Formatting in Microsoft Word” for instructions on how to insert page numbers in headers or footers of landscape-oriented pages.

**Leading and Spacing**

Use only one space between a period or colon and the text that follows it.

To ensure ease of reading for large bodies of text, use enough white space that the page is not overwhelming, intimidating, or confusing. For example, add extra space between paragraphs or bulleted lists, or before and after section headings.

Also use white space to help emphasize special notices such as warnings, cautions, and notes.

Use nonbreaking spaces (hit “Control + Shift + Space bar”) in Word documents to keep numerals with their corresponding units of measurement.

Leading (space between the lines) is generally set at type size plus 1 or 2 points. For example, leading for a 10- or 11-point typeface would be 1.2 line spacing.

For Bridge books, the default paragraph style is as follows:

- Tab 0.25 in. first line
- Full justification (no ragged right margin)
- Single line spacing
- 0 pt before and after

**Widows and Orphans**

Avoid widows (a single line of a paragraph at the top of a page).

Force an orphan (a single line of type beginning a new paragraph at the bottom of the page) onto the next page.

**Formatting in Microsoft Word**

In addition to the formatting specifications previously listed, take the following preferences into consideration when formatting a document in Microsoft Word:

*Style tags*—Use the Styles and Formatting feature in Word to create style tags instead of formatting manually. Features such as boldface, italic, superscript, subscript, superscript italic, subscript italic, etc., should be set up as character tags, not paragraph tags. Keep the number of style tags as few as possible.

*Landscape pages*—If landscape pages must be used in a Word document, create a landscape page by clicking “Insert > Break > Section break types > Next page.” Hit “Enter” and repeat the insertion of a section break. Move back to the paragraph marker on the blank page. Click “File> Page Setup > Landscape.” Discontinue the header and footer, if any, for this section. Insert text boxes on the right or left sides, or both, of the landscape page in which to place header or footer.
text. The height of the text boxes should equal the width of the text margins on portrait pages, and the width of the text boxes should be at least 0.25 in. The text boxes should be positioned so as to align with the header and footer of the portrait pages, e.g., 0.5 in. horizontal and 1 in. vertical from the page for a document with 1-in. margins all around. Place header information in the right-hand text box and footer information in the left-hand text box. Rotate the text accordingly.

**Graphics**—Figures should be inserted in Word documents as “pictures,” not as “drawing objects.” The file should be inserted in a paragraph style tag named “Figure Placeholder” that is immediately followed by a paragraph style tag named “Figure Caption.” Use the “Keep with next” style feature with the Figure Placeholder tag so that the picture does not get separated from its caption. Insert photographs as TIFF files or high-resolution jpg files (300 dpi minimum) and line art as EPS files (0.35 line weight minimum). Revisions and touch-ups to graphics should be made in a graphics program before inserting the graphic in the Word file. Graphics should be inserted as closely as possible to the place where they are cited in the text. Separate graphic files must still be submitted even if the graphics have been inserted in the Word document.

**Tables**—Similarly, tables should follow as closely as possible the place where they are cited in the text. Tables may be created directly in the Word file. See Section 2.2.5 regarding formatting tables.

**Equations and math symbols**—Create equations in MathType 6.0. Mathematical symbols should be inserted using the Symbols font. Create fractions by formatting the numerator as a superscript and the denominator as a subscript. Do not substitute commonly used fractions with those found in Word’s AutoCorrect options. (See Section 3.13 on “Mathematical Expressions.”)

### 2.2.3 Color

The majority of AASHTO publications are printed in black-and-white. Full-color printing is generally reserved for policy documents, covers, and marketing pieces. (See Section 2.2.9 on “Covers” for information regarding significance of certain colors associated with AASHTO publications.) Publications designed solely for CD-ROM, the website, or web-based documents may be full color.

**Black-and-White**

Always scan your black-and-white photos in Grayscale mode at a minimum of 300 dpi. Do not use Halftone mode. Scan with software enhancements such as sharpening and descreening turned off.

**Full Color**

Use CMYK (cyan, magenta, yellow, and black) colors instead of RGB (red, green, and blue) colors for publication designs. Color photographs should be scanned in RGB and then converted to CMYK mode.

In order to keep costs low, choose four-process colors rather than Pantone colors in design work. Specify whether you want the printer to “use” a specific color (mixing the ink according to the formula in the swatch books) or to “match” a color (to look as close as possible to the color in the swatch book).

When printing color separations, always let the printer be responsible for “trapping” the colors. If a color is critical to the publication, ask the printer for a “drawdown” (the printer applies the specified ink to the exact paper chosen for the job) or color match prints.
**Spot Color**
In order to keep printing costs low, spot color is utilized for emphasis or as a design technique only when necessary. Publications designed solely for CD-ROM or the website may use spot color.

Reverses should be used only as accents or on covers. Keep screens between 20 percent and 60 percent.

2.2.4 **Figures**
In the technical publications, line art may be of two types: graphs and charts or diagrams and drawings. Bar graphs, line graphs, and pie charts are used to show relationships among data. Diagrams show relationships among components while drawings (or illustrations) show the essential elements of an object but may omit unnecessary details.

AASHTO uses four basic graphics programs to create line art illustrations—Adobe Illustrator, Photoshop, AutoCAD Light, and Bentley Powerdraft. All line art drawings must be compatible with one of these programs. Please submit these graphics as EPS, TIFF, or DWG files. If you use MicroStation drawings, please submit them as DXF or EPS files.

Line art charts or graphs may be created in Word or Adobe Illustrator or generated from Excel files. The charts or graphs should be easily understood and the main idea visually obvious to the reader. Avoid designs using complex color schemes or codings. Make sure all symbols are easily recognizable.

Figures should be inserted in Word documents as “pictures,” not as “drawing objects.” The file should be inserted in a paragraph style tag named “Figure Placeholder” that is immediately followed by a paragraph style tag named “Figure Caption.” Use the “Keep with next” style feature with the Figure Placeholder tag so that the picture does not get separated from its caption.

All figures must be submitted as separate graphic files even if you have inserted them in a Word document.

**Captions**
The figure caption should clearly distinguish its figure from other illustrations. The caption should provide a succinct noun or noun phrase that describes the figure, but does not provide unnecessary background information nor repeat information found in the text.

Figure captions should appear below the figure. Use a period between the figure number and the caption of figure, but not at the end of the figure caption. Figure captions are set in “Title” case, i.e., all nouns and verbs are capitalized while all conjunctions, prepositions, and articles are lowercase.

Avoid using articles, such as, “A,” “The,” etc., at the beginning of captions.

Capitalize both parts of hyphenated terms within the figure caption if the elements are nouns or adjectives or if the element is the final word of the caption. Correct examples would be “State-of-the-Art Report”; “Four-Leg Intersection”; “Conditions Determined to Be Pre-Existing.”

Do not abbreviate “Figure.”

**Font**
Figure captions may be set in serif or sans serif fonts. (Times New Roman or Arial fonts are preferred because they are commonly used.) Figure captions are usually set in boldface type.
See the subsequent section on “Line Art” for a discussion of fonts used within the figures themselves.

**Numbering**

Figures should be numbered consecutively with Arabic numerals throughout the document of small publications or throughout the chapter/section of large publications. Figure captions should be numbered separately from table captions.

Figure captions of larger publications include the chapter number followed by a hyphen and then followed by the number of the figure within that chapter. For example, the figure caption for the first figure of Chapter 7 of the Green Book should be numbered as follows:

*Figure 7-1. Climbing Lane on a Two-Way Rural Arterial*

Figure captions in Word documents may be numbered automatically in the body of the text. Figure captions in Supplementary Requirements will need to be numbered manually so that the letter preceding the numbers will be correct and because Supplementary Requirements are not always numbered sequentially.

**Digital Images**

Photographs should support the information given in the text of the document. Photographs shall be considered figures in the document and will be numbered and titled accordingly.

Original art and photographs will not be returned after publication of the document unless requested by the author.

Original photographs are preferred to scanned images.

**Digital Photographs**

Send the highest resolution photographs that your digital camera can provide. Remember that we can always reduce the size of a photo, but we can never really improve the original resolution of a photo. TIFF or high-resolution jpg files are preferred.

Digital images must be at least 300 dpi in order to print properly; 600 dpi is preferred. At this resolution, an 8- by 10-in. photo would be approximately 7.2 MB and a 4- by 6-in. photo would be 2.6 MB.

Always save your digital photographs in a separate folder. Always submit these separate graphic files along with your document files.

If you wish to show the position of the photograph in the document, place a copy of the photograph in the word-processing document. Submit a hard copy of the document along with the electronic file.

**Original Photographs**

Send the original photograph. Color or black-and-white photos are acceptable.

Photographs not submitted electronically should be glossy prints that are sharp with good contrast. They should not be bent or scratched.

Photographs cut out of previous publications can not be used.

In the case of photographs of equipment, the photograph should not show a manufacturer’s name or logo on the equipment.

Photographs that are not purchased as stock photography must be accompanied by the Photo Release Form and, if people are in the picture, a Model Release Form for each person.
AASHTO Blanket Photo Release Form

Please complete a separate sheet for each photo submitted.

**Contact Information**
Submitted by ___________________________________________________________________

Company/Organization ____________________________________________________________

Street Address __________________________________________________________________

City __________________________ State/Province __________________________

Zip/Postal Code _________________________________

Phone Number ________________________________ Fax Number _____________________

E-mail Address _________________________________________________________________

**Photo Information**
Photo by (if different from above) ________________________________________________

File Name ___________________________ Format __________________________

Resolution __________________________ Medium __________________________

Date Taken __________________________ Model Release _______________________

Description (subject, location, project, etc.)

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

**Release**
I hereby submit this photo belonging to me or my company/organization to the American Association of State Highway and Transportation Officials. AASHTO may display the image any number of times, in whole or in part, in any media, now or in the future.

Date ____________________ Signature ____________________________________________
MODEL RELEASE FORM

Photographer: ________________________________________
Address: ________________________________________

Model: _____________________________________________
Address: ________________________________________

Regarding photographs taken by above-mentioned photographer on: ______________________
at: ____________________________________________

I hereby assign full copyright of these photographs to the above-mentioned photographer together with the right of reproduction either wholly or in part. I agree that the Photographer, AASHTO, or licensees or assignees can use the above-mentioned photographs either separately or together, either wholly or in part, in any way, and in any medium.

The Photographer, AASHTO, and licensees or assignees may have unrestricted use of these for whatever purpose, including advertising, with any reasonable retouching or alteration. I agree that the above-mentioned photographs and any reproductions shall be deemed to represent an imaginary person, and further agree that the Photographer, AASHTO, or any person authorized by or acting on his or her behalf may use the above-mentioned photographs or any reproductions of them for any advertising purposes or for the purpose of illustrating any wording, and agree that no such wording shall be considered to be attributed to me personally unless my name is used. I waive any right to notice or approval of any use of the above-mentioned photographs.

Provided my name is not mentioned in connection with any other statement or wording which may be attributed to me personally, I undertake not to prosecute or to institute proceedings, claims, or demands against either the Photographer, AASHTO, or his or her agents in respect of any usage of the above-mentioned photographs. I agree that the above-mentioned photographs and the right to copyright the same, shall be the sole property of AASHTO, with full right of lawful disposition in any manner. I have read this model release form carefully and fully understand its meanings and implications.

Signed: _______________________________ Date: ______________

If the Model is under 18 years of age, a parent or legal guardian must also sign:

Parent/guardian: _______________________________ Date: ______________
Preparing Photographs for Production

When submitted for production, photographs must be clearly labeled with the figure number and an indication as to which end is up.

Do not mark or tape captions or any other material on the front of photographs or write directly on the back.

For each photograph, use a label to provide the necessary identification, including author name and figure number.

Write on the label before attaching it to the reverse of each photograph, or mount the photograph on a labeled piece of heavy paper or mounting board.

Photographs should be cropped or masked to show only significant details. Crop marks should be shown on the mounting board rather than on the photograph to preserve the photo for future use.

Helpful Tips

If the photograph is of a single piece of equipment, shoot the photo indoors (if possible) using a white background (or one that will enhance contrast).

Make sure the lighting is adequate.

If the photograph is taken outdoors, make sure that the sun is behind you.

Scanning Photographs as TIFF Files

Photographs submitted electronically should be scanned with a high-resolution scanner at a minimum of 300 dpi; 600 dpi is preferred.
Scan at 100 percent of the size to be used.
Include the name of the software used to create the graphic.
A scanned image should be cropped as closely as possible to the area that is to be shown in your finished project.
Always scan your black-and-white photos in Grayscale mode. Do not use Half tone mode. Scan with software enhancements such as sharpening and descreening turned off.
Color photographs must be scanned in RGB mode (8 bit).

Scanning Photographs as PDF Files

A PDF file is acceptable but not preferred.

To create a PDF using Adobe Acrobat Distiller, follow these steps:

Choose a PostScript printer in the “Print Selection” and, instead of printing the document to the printer, print to file. This creates the source PostScript file.

1. Launch Acrobat Distiller.
2. In the window that comes up, you’ll see “Job Options” at the top and a menu bar from which to choose the type of PDF you want to create.
3. Select “Press Optimized” in order to make the file suitable for use on a printing press.
4. Go to the top menu bar and select “Settings/Job Options.” This opens up the screen that lets you dictate how the PDF is created.
5. Usually, you can just accept the default settings in the General, Compression, Color, and Advanced screens. Go to the “Fonts” screen, however, and make sure that “Embed All Fonts”
is checked. Also, at the bottom right of the “Fonts” screen, remove all fonts from the “Never Embed” section. (Adobe defaults to having several “Windows Standard Fonts” in that box—including Times New Roman and Arial.) If you leave the Adobe default setting, your PDF will contain font errors that are difficult or impossible to remedy after the fact.

6. Go back to the main screen, choose “File/Open” and select the source PostScript file that you created earlier. Rename the output file if desired, and choose your output destination.

7. Click “Save.”

**Line Art**

Figures may be categorized as two types: (1) photographs or (2) line art (illustrations and diagrams or charts and graphs). Photographs show exactly how something looks to help readers recognize an object, design, or situation. Line art diagrams use symbols labeled to represent the system components and links that show the relationship among them. Line art illustrations show specific features of an object or show how something works, is assembled, or is maintained. Pie charts, bar graphs, line graphs, or scatter charts are used to illustrate changes or trends over a period of time, to show patterns in numerical data, or to show relationships among various factors.

Examples of acceptable line art are as follows:

**Bar Graph**

![Bar Graph Image]

Figure 2-1. Port and Terminal—Forecast Capacity/Demand
Part 2: Design Preferences for AASHTO Publications

Line Graphs

Figure 2-2. Logistics as Percent of GDP

Figure 2-3. Design Controls for Sag Vertical Curves—Open Road Conditions
Figure 2-4. Crash Summary Statistics for Segment 1

Figure 2-5. Comparison of Measured and Predicted Total Rutting Resulting from Global Calibration Process
Figure 2-6. Organization of the *Highway Safety Manual*
In technical publications line art is usually presented as black-and-white figures. Color is used only if it is absolutely necessary for comprehension. Fills, such as cross-hatching and patterned lines, or screens may be used as substitutes for color.

Line art may be submitted as Adobe Illustrator or AutoCAD Light files. MicroStation files must be compatible with Bentley Powerdraft or submitted in a DWG or EPS format. Graphs and charts must be in a format editable in Microsoft Word or Adobe Illustrator. Figures should be able to fit within an 8\(\frac{1}{2}\)-in. by 11-in. page, or constructed in such a way that they may be broken apart for placement on several 8\(\frac{1}{2}\)-in. by 11-in. pages.

If original artwork must be scanned, the original drawings must have sharp, uniformly black lines. Images with fuzzy or broken lines, smudges, poor contrasts, delicate lines or fills, and stray marks or uncontained fills are not acceptable. Do not write text on the original artwork. Indicate on a photocopy of the line art what the text is and where it should be placed so that the text may be inserted after the figure is scanned and will, therefore, be consistent in size and font with other figures in the publication.

Make all fonts, symbols, abbreviations, dimension lines, text, fills, and line weights consistent for all line art of the same project, even if different software is used to produce individual graphics for the line art. For example, the same font in the same size should be used for all text or dimensions. Similarly, the dimensions should be indicated in the same manner, i.e., end lines or arrows, in all of the illustrations for the same project. Do not mix the use of decimals and fractions in U.S. Customary units. Fractions should be presented in the same way—\(\frac{1}{2}\) or \(\frac{1}{2}\)—not in a combination of ways, i.e., some using diagonal slashes and some with numerator directly over the denominator, or some as fractions and others as decimals.
Abbreviations and symbols must not only be consistent throughout the book, but must also be of an ASCII format that will not change if the graphic is converted to a PDF.

Because hairline weights will not print properly, lines must be at least 0.35 points thick. Similarly, shading and fills must be dark enough that they do not fade or disappear when printed.

As an example, instructions for the design of the Green Book figures included the following:

**Font:** Arial

**Size:**
- Headings—10 points
- Text—8 points

**Style:**
- Level 1 heading should be ALL CAPS; Level 2 heading should be Title Case.
- “Notes” should be removed from figures unless the note accompanies only a specific section of the figure.

**Dimensions:**
- Center dimension measurements within the dimension lines if the space is adequate.
- Use arrowheads instead of dots or slashes as the terminators.
- Use extension lines for clarity as necessary.

**Fractions:**
- Express fractions with diagonal slash for U.S. Customary Units and as decimals for Metric Units.

**Abbreviations:**
- Use “in.” and “ft” not ‘ or ” for U.S. Customary Units.
- Put periods after US in U.S. Customary Units.
- If “Max” or “Min” appears in metric units, then it must also appear in U.S. Customary units if they are written separately. For example, both “14.58 m Max [47.8 ft Max]” and “14.58 [47.8 ft] Max” are correct; “14.58 m Max [47.8 ft]” is incorrect.

**Symbols:**
- ASCII
- Use “Diameter” instead of Ø; also spell out “Radius.”
- Use en dash (–) as minus sign.
- Use × instead of x for multiplication symbol.

**Line weights:**
- Minimum 0.35 points

**Fills:**
- Use ISO industry standard fills.
- Fills or shading must be dark enough that they will print well.

### 2.2.5 Tables

Tables are used to present a large amount of detailed information in a minimum amount of space or to present quantitative or precise numerical values in a concise manner. (8)

In a Word document, the table itself should be inserted in a paragraph style tag named “Table Placeholder” that immediately follows a paragraph style tag named “Table Caption.” The Table Caption tag should utilize the “Keep with next” feature in order to avoid separation between the table caption and the table.
Avoid fills or shading in table cells. If gray shading is necessary to clarify the intended meaning, use a solid “Fill” of 25 percent gray.

Create tables according to the following specifications:

**Captions**
The table caption should clearly distinguish its table from other tables. The caption should provide a succinct noun or noun phrase that describes the information provided in the table but does not provide unnecessary background information nor repeat information found in the text.

Table captions should appear immediately before the table. Use a period between the table number and the caption of table but not at the end of the table caption. Table captions are set in “Title” case, i.e., all nouns and verbs are capitalized while all conjunctions, prepositions, and articles are lowercase.

Avoid using articles, such as “A,” “The,” etc., at the beginning of captions.

Capitalize both parts of hyphenated terms within the table caption if the elements are nouns or adjectives or if the element is the final word of the caption. Correct examples would be “State-of-the-Art Report”; “Four-Leg Intersection”; “Conditions Determined to Be Pre-Existing.”

Do not abbreviate “Table.”

**Font**
Table captions may be set in serif or sans serif fonts. (Times New Roman or Arial fonts are preferred because they are commonly used.) Table captions are sometimes set in boldface type.

**Numbering**
Tables should be numbered consecutively with Arabic numerals throughout the document for small publications or throughout the chapter/section of large publications. Table captions should be numbered separately from figure captions.

Table captions of larger publications include the chapter number followed by a hyphen and then followed by the number of the table within that chapter. For example, the table caption for the second table of Chapter 9 of the *Roadside Design Guide* is numbered as follows:

Table 9-2. Temporary Longitudinal Barriers

Table captions in Word documents may be numbered automatically in the body of the text. Table captions in Supplementary Requirements, Annexes, and Appendixes need to be numbered manually in order to include the letter preceding the numeral.

**Table Orientation**
Set all tables vertically (portrait) if possible.

**Table Margins**
Make sure the tables do not exceed the limits imposed by the printed page.

**Table Rules**
Make rules at the top and bottom of the table one point wide. All other rules should be 0.5-point width. Vertical rules should not be used unless absolutely necessary.
Table Headings

Table headings, i.e., column heads, spanners, and cut-in heads, can be set in Times New Roman or Arial, 8–10 points (7 pt can be used if space must be conserved), boldface. Spanner heads and cut-ins must be centered over the columns they apply to.

When tabular matter demands two or more levels of headings, decked heads must be used. A decked head consists of a spanner head and two or more column heads to which it applies. A horizontal rule (called a spanner rule) is set between the spanner and column heads indicating the columns the spanner applies to. Decked heads should seldom exceed two levels. See “Sample Tables” for examples.

Table Stub

The table stub is the far left column of the table that lists the items about which information is provided in the columns to the right. Use Times New Roman, 8–10 pt, initial caps for the stub row text. (Headings in the table stub are set as other headings are.)

In the stub, subheads should be in italics and are aligned flush left. Stub items are usually indented one em space under the subhead. Runovers in stub items are indented one em space from where the item begins.

With two or more levels of subheads in the stub, the top level may be centered and the second level flush left. Use cut-in heads for the top-level subheads with rules above and below extending all the way across the table.

Table Columns

Vertically align a column of figures on the decimal points. Numerals of 1,000 or more should have commas for U.S. Standard units only; SI units of 10 000 or more should have a nonbreaking space inserted in place of the comma while SI units between 1000 and 9999 do not have a comma or spacing. Mathematical operation signs are aligned if they precede quantities in a column of figures. Also, in a column consisting of information expressed in words, make text flush left if the description is long. If short, center them.

Table Editing

Use em dashes to indicate breaks.

Use en dashes to indicate ranges (2–4).

Use “%” to indicate percentages.

For equations, use a minus sign (en dash) with a space on either side.

Table Footnotes

Footnotes are normally set one size smaller than the body of a table (e.g., 7 points if the table text is 8 points). The words “Source” and “Notes” are traditionally distinguished typographically from the note that follows.

In “Source:” or “Note:” do not italicize the punctuation (:). Make terms italic and initial caps followed by lowercase running text in roman style font.

Footnotes to a table are of four general kinds and should appear in this order: (1) source notes, (2) other general notes, (3) notes on specific parts of the table, and (4) notes on the level of probability. Leave extra space in between each note item.
**Tables Continued on More Than One Page**

Use continued lines as needed. Format in italics as follows:

“*Continued on next page*” should appear under the rule of the table at the bottom of the page.

“*Table 14—Continued*” should appear above the top rule of the table on the next page.

Column heads should be repeated on each page, but the title of the table does not have to be included.

**Sample Tables**

The following examples are tables taken from AASHTO’s Materials Book.

**Table 2-1. Gradation of Glass Beads**

<table>
<thead>
<tr>
<th>Sieve Designation</th>
<th>Mass Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type I</td>
</tr>
<tr>
<td>Standard, mm</td>
<td>Alternate No.</td>
</tr>
<tr>
<td>0.850</td>
<td>20</td>
</tr>
<tr>
<td>0.600</td>
<td>30</td>
</tr>
<tr>
<td>0.425</td>
<td>40</td>
</tr>
<tr>
<td>0.300</td>
<td>50</td>
</tr>
<tr>
<td>0.180</td>
<td>80</td>
</tr>
<tr>
<td>0.150</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 2-2. Weight of Metallic Coating Type I or II Fabric**

<table>
<thead>
<tr>
<th>Specified Diameter of Coated Wire</th>
<th>Weight of Coating of Uncoated Wire Surface&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type I Zinc</td>
</tr>
<tr>
<td></td>
<td>Class C, oz/ft²</td>
</tr>
<tr>
<td>in.</td>
<td>mm</td>
</tr>
<tr>
<td>0.192</td>
<td>6</td>
</tr>
<tr>
<td>1.148</td>
<td>9</td>
</tr>
<tr>
<td>0.120</td>
<td>11</td>
</tr>
</tbody>
</table>

<sup>a</sup> Based upon ASTM A 309.
Table 2-3. Selection of a Design Aggregate Structure (Example)

<table>
<thead>
<tr>
<th>Volumetric Property</th>
<th>Trial Mixture (19.0-mm Nominal Maximum Aggregate)</th>
<th>20-Year Project Design ESALs = 5 million</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At the Initial Trial Binder Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$P_b$ (trial)</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>% $G_{	ext{wet}}$ (trial)</td>
<td>88.1</td>
<td>87.8</td>
<td>87.1</td>
</tr>
<tr>
<td>% $G_{	ext{wet}}$ (trial)</td>
<td>95.9</td>
<td>95.3</td>
<td>94.7</td>
</tr>
<tr>
<td>$V_a$ at $N_{\text{design}}$</td>
<td>4.1</td>
<td>4.7</td>
<td>5.3</td>
</tr>
<tr>
<td>VMA$_{\text{trial}}$</td>
<td>12.9</td>
<td>13.4</td>
<td>13.9</td>
</tr>
<tr>
<td>Adjustments to Reach Design Binder Content ($V_a = 4.0%$ at $N_{\text{design}}$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta V_a$</td>
<td>-0.1</td>
<td>-0.7</td>
<td>-1.3</td>
</tr>
<tr>
<td>$\Delta P_b$</td>
<td>0.0</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>$\Delta$VMA</td>
<td>0.0</td>
<td>-0.1</td>
<td>-0.3</td>
</tr>
<tr>
<td></td>
<td>At the Estimated Design Binder Content ($V_a = 4.0%$ at $N_{\text{design}}$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated $P_b$</td>
<td>4.4</td>
<td>4.7</td>
<td>4.9</td>
</tr>
<tr>
<td>VMA (design)</td>
<td>12.9</td>
<td>13.3</td>
<td>13.6</td>
</tr>
<tr>
<td>% $G_{	ext{wet}}$ (design)</td>
<td>88.2</td>
<td>89.5</td>
<td>88.4</td>
</tr>
</tbody>
</table>

Notes:
1. The top portion of this table presents measured densities and volumetric properties for specimens prepared for each aggregate trial blend at the initial trial binder content.
2. None of the specimens had an air void content of exactly 4.0 percent. Therefore, the procedures described in Section 9 must be applied to: (1) estimate the design binder content at which $V_a = 4.0\%$, and (2) obtain adjusted VMA and relative density values at this estimated binder content.
3. The middle portion of this table presents the change in binder content ($\Delta P_b$) and VMA ($\Delta$VMA) that occurs when the air void content ($V_a$) is adjusted to 4.0 percent for each trial aggregate blend gradation.
4. A comparison of the VMA and densities at the estimated design binder content to the criteria in the last column shows that trial aggregate blend gradation No. 1 does not have sufficient VMA (12.9 percent versus a requirement of >13.0 percent). Trial blend No. 2 exceeds the criterion for relative density at $N_{\text{init}}$ gyrations (89.5 percent versus requirement of ≤89.0 percent). Trial blend No. 3 meets the requirement for relative density and VMA and, in this example, is selected as the design aggregate structure.

2.2.6 Equations


2.2.7 Keywords for Web

Keywords are terms that best represent the technical information presented in the standard. All selected keywords should be stand-alone terms, not incomplete phrases or unattached adjectives. Keywords may be terms that were defined, words used in titles or headings, or words determined to be significant by the technical reviewer.

2.2.8 Output

Depending on the method of printing to be used, files may be output as
- PDF for press, download, or CD-ROM
- InDesign files
- XML
2.2.9 Covers

Color
Traditionally AASHTO has used the following color-coding system associated with their publications depending upon which Subcommittee or Task Force produces the document. Covers are designed accordingly, e.g., Materials books are always a shade of red, Bridge books are a shade of blue, Design books are a shade of green, etc.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Committee(s)</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMINISTRATION AND ECONOMICS</td>
<td>Standing Committee on Administration</td>
<td>Varies</td>
</tr>
<tr>
<td>BRIDGES AND STRUCTURES</td>
<td>SCOH’s Subcommittee on Bridges and Structures</td>
<td>Blue</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>SCOH’s Subcommittee on Construction</td>
<td>Brown</td>
</tr>
<tr>
<td>MAINTENANCE</td>
<td>SCOH’s Subcommittee on Maintenance; Winter Advisory Task Force</td>
<td>Orange</td>
</tr>
<tr>
<td>DESIGN AND TRAFFIC</td>
<td>SCOH’s Subcommittee on Design, Task Force on Geometric Design; Task Force on Roadside Design</td>
<td>Green</td>
</tr>
<tr>
<td>HIGHWAY TRAFFIC SAFETY</td>
<td>Standing Committee on Highway Traffic Safety</td>
<td>Yellow</td>
</tr>
<tr>
<td>HIGHWAY TRANSPORT</td>
<td>SCOH’s Subcommittee on Highway Transport</td>
<td>Varies</td>
</tr>
<tr>
<td>JOINT TASK FORCES</td>
<td>AASHTO/ATSSA/ITE Joint Committee; joint publications with NAPA; AASHTO/AGC/ARTBA Joint Committee</td>
<td>Varies</td>
</tr>
<tr>
<td>MATERIALS</td>
<td>SCOH’s Subcommittee on Materials</td>
<td>Red</td>
</tr>
<tr>
<td>PLANNING AND ENVIRONMENT</td>
<td>SCOD’s Task Force for Environmental Design; SCOD’s Task Force on Corridor Preservation; Center for Environmental Excellence</td>
<td>SCOD’s TFs use Green; others vary</td>
</tr>
<tr>
<td>REPORTS</td>
<td></td>
<td>Varies</td>
</tr>
</tbody>
</table>

Front Cover
The front cover design should include the following:
- Title of the book and any subtitle deemed necessary—in upper half of page
- Number of edition if other than the first
- Year of publication
- “American Association of State Highway and Transportation Officials”
- AASHTO logo
- pictures of people in transportation-related activities—very important
Back Cover
The back cover design should include the following, centered and placed in the bottom $\frac{1}{3}$ of the page:

- AASHTO name and address, including web address
- Book code
- ISBN number

Please note that Bridge books bound in looseleaf binders do not include a back cover.

Spine
Spines generally include the title, “AASHTO,” year of publication, and sometimes a part or volume number.

Examples of covers include the following:

Full Spread for Saddle-Stitched Publications

Full Spread for Perfect-Bound Publications
Guide Specifications and Commentary for
Vessel Collision Design of Highway Bridges

Front Cover for Loose-Leaf Books

Spine for Loose-Leaf Books
2.2.10 Jewel Case Covers, Tray Card Inserts, and CD-ROM Labels

See “Design and Production of AASHTO CD-ROMs.”

2.2.11 Output for Bookstore

When the design of a book or CD-ROM cover is complete, create an image of the cover for the online bookstore according to the following specifications:

- Width: 150 pixels
- Format: JPEG
- Color Mode: RGB

The file should be no larger (and preferable smaller) than 20 KB. However, image quality must be set no lower than 8 (high).

2.2.12 Design and Production of AASHTO CD-ROMs

Jewel Case Covers

The dimensions will be approximately 9.5 in. wide (9.625 in. with bleeds) and 4.75 in. tall (5.25 in. with bleeds). Use CMYK colors and a minimum resolution of 300 dpi.

Tray Card Inserts

Tray card inserts are set up similarly to jewel case covers. The layout should be set up on a 7 in. × 10 in. landscape page. The design should measure 5.875 in. wide and 4.625 in. tall. The back tray should be 5.375 in. wide by 4.625 in. tall. The spines should be 0.25 in. by 4.625 in. The design should use CMYK colors and be a minimum resolution of 300 dpi.
CD-ROM Labels

If the printer has been selected, use the printer’s template to create the CD-ROM labels. If the printer is not known, use the following general specifications to design the CD-ROM labels in Adobe InDesign or Illustrator:

- Design should be a circle, 4.5669 in. or 11.6 cm in diameter.
- Type size should be no smaller than 6 points.
- Minimum resolution is 300 dpi.
- Colors should be CMYK.
- Any halftones should have a minimum line screen of 85.
Creating PDFs for CD-ROMs

Although specifications may vary depending upon the printer’s requirements and the project itself, the following job options for creating PDFs for AASHTO CD-ROMs and publications generally apply:

- Embed all fonts. If embedding fails, cancel the job.
- Resolution should be set at 600 dpi.
- Auto-rotate pages should be turned off.
- “Embed thumbnails” should be selected.
- “Optimize fast web view” should be selected.
- Bicubic downsampling should be set at 300 dpi for images above 450 dpi and 1200 dpi for images above 1800 dpi.
- Compression should be set as automatic (JPEG).
- Image quality should be set at maximum.
- Compatibility should be set to Acrobat 5.0 (PDF 1.4).

Care and Handling of CDs

1. Handle discs by the outer edge or the center hole.
2. Use a nonsolvent-based felt-tip permanent marker to mark the label side of the disc.
3. Keep dirt or other foreign matter from the disc.
4. Store discs upright (book style) in plastic cases specified for CDs and DVDs.
5. Return discs to storage cases immediately after use.
6. Leave discs in their packaging (or cases) to minimize the effects of environmental changes.
7. Open a recordable disc package only when you are ready to record data on that disc.
8. Store in a cool, dry, dark environment in which the air is clean.
9. Remove dirt, foreign material, fingerprints, smudges, and liquids by wiping with a clean cotton fabric in a straight line from the center of the disc toward the outer edge.
10. Use CD/DVD cleaning detergent, isopropyl alcohol, or methanol to remove stubborn dirt or material.
11. Check the disc surface before recording.

Do not:

1. Touch the surface of the disc.
2. Bend the disc.
3. Use adhesive labels.
4. Store discs horizontally for a long time (years).
5. Open a recordable optical disc package if you are not ready to record.
6. Expose discs to extreme heat or high humidity.
7. Expose discs to extreme rapid temperature or humidity changes.
8. Expose recordable discs to prolonged sunlight or other sources of UV light.
9. Write or mark in the data area of the disc (area where the laser “reads”).
10. Clean in a circular direction around the disc.
11. Scratch the label side of a CD.
12. Use a pen, pencil, or fine tip marker to write on the disc.
13. Write on the disc with markers that contain solvents.
14. Try to peel off or re-position a label.

General recommendations for long-term storage conditions include the following:

- For archiving recordable (R) compact discs, use discs that have a gold metal reflective layer.
- An archival storage facility for CDs should maintain a temperature of 64°F (18°C) and 40 percent relative humidity for long-term storage. The temperature should never exceed 68°F (20°C) or fall below 39°F (4°C). The relative humidity should always remain between 20 and 50 percent.

2.3 AASHTO Web Guidelines

2.3.1 Submission of Materials for Posting on Any AASHTO-Hosted Website

Submitters are strongly encouraged to attach documents to already existing pages in the appropriate subject-matter site, rather than creating new pages consisting of the content contained in the document.

Such documents will be converted to Adobe PDF (Portable Document Format) according to these publication guidelines. A PDF conversion allows the document to retain its formatting, graphic look, feel, and color, and is, in many cases, easier for the end-user to read and print.

When submitting documents for posting, the submitter must:

- Provide the document in electronic form, if at all possible. Acceptable formats include Microsoft Office (Word, PowerPoint, Excel) and Adobe Portable Document Format (PDF). Web staff will convert the document to Adobe PDF (according to Publications guidelines) if necessary.
- Provide the full title of the document to be posted. If the document does not have a formal title (e.g., meeting minutes, meeting agenda, etc.), an appropriate title should be created consisting of the subject-matter area, main content, and month/year of creation (e.g., “SCOH Meeting Minutes September 2011”).
- Provide an executive summary of the document to be posted. This summary should be no more than two sentences long (40–80 words). It will be used as an introduction to the document to be downloaded.
- Provide the exact URL (Universal Resource Locator) and title of the page where the document is to be posted. For example, Design Guidelines http://design.transportation.org/?siteid=59&pageid=742, AASHTO Home Page http://transportation.org. If additional placement instructions are needed (e.g., “Please place under the subheading titled ‘New News.’”), these should be provided.
- Provide contact information for the submitter of the document. If the document is submitted by a third party (not an AASHTO employee), full contact information (name, phone number,
When submitting graphics (photographs, illustrations, logos, etc.) for posting, the submitter must:

- Provide the graphic as a jpg (JPEG: Joint Photographic Experts Group) or gif (GIF: Graphics Interface Format) file.
- If a jpg, the graphic must be in RGB (Red Green Blue) color mode. Some illustrations are exported by applications as CYMK (Cyan Yellow Magenta black) and are unacceptable for use on web pages.
- Size does matter. Both formats of graphics should be submitted with resolution as high as possible and size as large as possible. This allows for web staff to size the graphic correctly for placement.

2.3.2 Hyperlinks

When listing a hyperlink in the references or as a cross reference, format the hyperlink according to the following rules:

- For printing purposes, the hyperlink should appear in the same color as its surrounding text and should not be underlined.
- Include the “http://” or “https://” preface in the web address.
- Do not include the slash (/) at the end of the address if you are referencing just the domain name.
- If the hyperlink flows across more than one line, do not add a hyphen or tab that is not a part of the address.

2.4 Guidelines for Preparing AASHTO Publication Videos

The procedures when AASHTO Publications produces an introductory video to accompany the release of one of its publications are as follows:

- Upon approval of the introductory publication video, AASHTO Transportation TV staff prepares the video for placement on AASHTO Transportation TV and YouTube, and provides the URL to AASHTO Publications staff.
- The publication specialist who designed the cover art for the publication shall also design the video icon that will be used to identify the video, utilizing the same design elements, artwork, and color scheme used in the design of the publication cover; and
- The video icon may be designed as Photoshop or bitmap files. The image should be 2 in. by 2 in. (600 by 600 pixels), with a minimum resolution of 300 dpi. The final file must be flattened and saved in RGB format. The design should include the following:
  - AASHTO Logo
  - Publication Title
  - Publication Edition
  - Year of Publication
  - Triangular Start Button
The design elements (or artwork) and color scheme of the start button should reflect those of the book cover. The following is an example of the video icon created for the release of AASHTO’s *A Policy on Geometric Design of Highways and Streets*, 6th Edition:

Upon completion of the video icon, the publication specialist e-mails the image and the YouTube URL to the bookstore consultant for preparation and placement on the AASHTO Bookstore homepage.

Concurrently, the AASHTO Transportation TV staff places the video onto the AASHTO Transportation TV website in the section titled Transportation 101, along with related text about the book provided by AASHTO Publications staff:

- Video Title
- Publication Code
- Publication Marketing Blurb
- Available Formats
- Information on Ordering

The following example is typical of these announcements:

AASHTO Releases the *AASHTO LRFD Bridge Design Specifications*, 6th Edition

Publication Code: LRFDUS-6

This video provides information on the release of the *AASHTO LRFD Bridge Design Specifications*, 6th Edition. Kelley Rehm, AASHTO Staff Liaison to the AASHTO Highway Subcommittee on Bridges and Structures, highlights key revisions made to this new edition since the previous edition. The *AASHTO LRFD Bridge Design Specifications*, 6th Edition contains specifications intended for use in the design, evaluation, and rehabilitation of bridges. These specifications employ the Load and Resistance Factor Design methodology using factors developed from current statistical knowledge of loads and structural performance. They are mandated by the Federal Highway Administration for all bridges using federal funding. This publication is available in print and as an online download.

To order a copy of the *AASHTO LRFD Bridge Design Specifications*, 6th Edition, visit the AASHTO Bookstore online at https://bookstore.transportation.org, and search by the publication code LRFDUS-6.
AASHTO Publications staff also provides Transportation TV staff with the following information to place underneath the video on YouTube:

- Information on purchasing the publication (which includes a link to the publication on the AASHTO Bookstore)
- Information on downloading the latest AASHTO Publications Catalog (which includes a link to the *AASHTO Publications Catalog* on the AASHTO Bookstore)

The following example is typical of these links:


Download the latest *AASHTO Publications Catalog* at [https://bookstore.transportation.org.](https://bookstore.transportation.org)

In addition to placement of the video on the AASHTO Transportation TV website, the AASHTO Bookstore, and YouTube, AASHTO Publications staff e-mails the video icon and link to the staff liaison for the publication to place onto any related AASHTO websites, including the committee(s) or subcommittee(s) involved in the development of the publication.

### 2.5 Guidelines for Issuing Errata

Although it is preferable to avoid having an erratum, sometimes technical corrections do need to be disseminated. When AASHTO is notified of an error or omission, the technical services liaison works closely with the subcommittee or task force responsible for producing the publication to issue the erratum in a timely manner.

#### 2.5.1 Preparation

1. The Project Manager prepares the full erratum with the following information in mind:
   - Each erratum should receive a new publication code (e.g., HSM-1-E1, HSM-1-E2, etc.).
   - Each new erratum should encompass all previous years’ errata, using formatting to distinguish the previous errata’s changes (e.g., bold, italic, color, etc.). If the erratum does not use color as a distinguishing characteristic, then the entire erratum (including the cover letter) may be printed in black-and-white.
   - Each erratum should have a cover letter that includes the date (month and year only) and the publication code. Also include any instructions, such as, “Text that appeared in previous errata is printed in bold.” Use font characteristics, such as bold or italic type, font families, or color to highlight text in which special instructions apply. The title at the top of the cover letter should state “ERRATA for [Name of the Publication]” in large, boldface type. The cover letter should also include a hyperlink address to a copy of the full erratum located at AASHTO’s online bookstore.
   - For the full erratum, the cover letter is followed by a list of changes for the publication. The list is generally formatted in a 3-column table with rules only above and below the heading row. The first column lists the page number; the second column, the current text that needs to be revised; the third column, the revised text or reference to an attached page. The list may be further subdivided by chapter, volume, or in the case of Bridge
books, by section. The text in the second column should always specify the number of the section or article, table, figure, or equation where the change is to be made. The headers on these pages should include the publication code and the date of the errata. Page numbers may be placed in the header or footer.

- The general rule of thumb is that (1) if the change is small, i.e., it refers to only a few sentences or a small equation, then the revised text or equation is listed in Column 3; or (2) if the change pertains to a large amount of text or table data, a long and complex equation, or a figure, then the Project Manager will attach a revised page (in sequential order if there is more than one attached page) to the final erratum.

2. The Project Manager incorporates changes from all errata into the design file of the document. Be sure to check and adjust any text reflow during this procedure. If text reflow is unavoidable, include verso pages in the erratum if necessary.

3. Create PDFs for press of all pages with changes.

4. Create a PDF for press of the cover letter.

5. To the PDF of the cover letter, insert PDFs of replacement pages (in sequential order as they are referenced in the erratum list) to create the final erratum for press. Add blank pages where necessary to allow the users to print the erratum double-sided.

6. In the final erratum, place a header on the PDF of replacement pages to indicate the erratum code and the month and year this specific change was made, e.g., “HSM-1-E1—June 2011,” “HSM-1-E2—February 2012.”

7. Each erratum file must be approved by the technical liaison before printing or release.

8. When the final file is sent to press, the Project Manager notifies the Bookstore and Web Services Manager of the location of the PDFs of the erratum and all replacement pages.

9. The Bookstore and Web Services Manager then updates all downloadable versions for AASHTO’s online bookstore and resellers. These versions are not released until the printed errata are delivered to the fulfillment center. See Section 2.4.2.

10. If applicable, the Bookstore and Web Services Manager sends the changes for web-based documents to the contractor. If necessary, the Project Manager may have to provide EPS or jpg files of revised figures.

11. At this point, the Project Manager creates an “announcement letter” based on the full erratum’s cover letter. This letter must include the following information:
   - Title of the erratum,
   - The erratum’s publication code, and
   - The hyperlink to the full erratum.
   - This letter will be set up as a kit with the book for the fulfillment house, then packaged and shipped with each order of the book.

12. Finally, unless the book is printed from the InDesign file, the Project Manager creates “PDFs for press” for the entire book in order to keep files up-to-date for future reprints.

### 2.5.2 Distribution

Distribution of errata includes the following:

- The fulfillment house ships 10 printed copies to normal transmittal addresses.
The Bookstore and Web Services Manager uploads or releases all revised downloadable versions for AASHTO’s online bookstore and resellers at approximately the same time that printed errata are shipped to the member departments.

A printed copy of the erratum’s “announcement letter” must accompany all printed copies of the book when shipped.

The marketing contractor shall send an errata e-mail notification to all previous purchasers for each new erratum throughout the life of the edition. The text for this e-mail can be a duplicate of the erratum’s “announcement letter.”

The technical liaisons shall notify the participating subcommittee/task force of the erratum’s release.

2.5.3 Reprints with Errata Corrections

Oftentimes, reprints of an AASHTO publication may include the changes listed in errata. In these cases, the subtitle “Second Printing” should appear under the date on the title page of the book.

The following statement should appear on the copyright page: “This reprint of the [book title] incorporates errata changes through [date].”
Part 3: Style Rules for AASHTO Technical Publications

3.1 Use of “May,” “Will,” “Shall,” and “Should” in Standards

“May” indicates that a provision is optional.
“Will” expresses futurity, but never indicates any degree of requirement.
“Shall” indicates that a provision is mandatory.
“Should” indicates that a provision is not mandatory, but is recommended as good practice.

3.2 Other Words to Use with Care

From a legal standpoint, the following qualifiers should be used with care: always, never, every, all, safe/safest, insure/ensure, best, reasonable, prudent, optimal.

3.3 Use of “And/Or”

Avoid using the expression “and/or.” Instead of “A and/or B,” write “A or B, or both.” Similarly, instead of “A, B, and/or C,” write “A, B, or C, or some combination thereof.”

3.4 Spelling

Use The American Heritage College Dictionary to check the correct spelling of words. If a dictionary provides more than one spelling, use the first spelling. For technical terms, AASHTO references the ASTM Dictionary of Engineering Science and Technology, the Civil Engineering Reference Manual, and the AASHTO Transportation Glossary.

Refer to The Chicago Manual of Style for a more in-depth discussion of the items mentioned here.

Use the “U.S. Customary” spelling of “liter” and “meter” when spelling out SI units.

Do not use simplified spellings, such as “lite,” “nite,” or “thru.”

Also see Section 3.5 on “Compound Words.”

3.4.1 Plural Forms

Form the plurals of most nouns by adding s.

When the noun ends in soft ch or in s, sh, j, x, or z, the plural inflection is es, e.g., “searches, mixes, crashes.”

Plurals of nouns ending in y preceded by a consonant are formed by replacing the y with ies, as in “alkalinities.”

The plurals of some nouns are formed irregularly, e.g., “man/men,” “leaf/leaves,” “alga/algae,” “radius/radii,” “beau/beaux,” or “criterion/criteria.”

Some singular words, such as “sheep,” “deer,” or “trout” can be used as plurals.
Some words can be made plural in the usual way or can also be made plural without any change, as in the following:

- couples  couple
- dozens  dozen
- peoples  people

Some words can be either singular or plural:

- aircraft
- chassis
- series
- species

Nouns ending in \( o \) are among the most troublesome because of their variability. The majority of nouns ending in \( o \) form a plural by adding \( s \). For example,

- proper nouns as in “Eskimos” or “Filipinos,”
- numbers as in “twos,”
- nouns in which \( o \) is immediately preceded by a vowel as in “radios” or “videos,” and
- nouns in which \( o \) is immediately preceded by a consonant, such as “photos” or “pianos,”

However, some nouns ending in \( o \) immediately preceded by a consonant add \( es \) to form the plural, e.g., “dadoes,” “tomatoes,” “potatoes,” or “heroes.” Still others have two acceptable spellings for plurals, e.g., “buffaloes/buffalos,” “zeros/zeroes,” “mottoes/mottos,” or “cargoes/cargos.” When in doubt, check the dictionary.

In compound nouns, the significant word takes the plural.

- **Significant word first**: rights-of-way, notaries public
- **Significant word in the middle**: assistant chiefs of staff
- **Significant word last**: traveled ways, vice chairmen, stopping sight distances
- **Both words equally significant**: Bulletins Nos. 27 and 28, secretaries-treasurers
- **No word significant in itself**: jack-in-the-pulpits, hand-me-downs

When a noun is hyphenated with an adverb or preposition, the plural is formed on the noun, as in “passers-by.”

When neither word is a noun, the plural is formed on the last word, as in “run-ins.”

Nouns ending in *ful* form the plural by adding \( s \) at the end unless it is necessary to express the idea that more than one container was filled. For example,

- Five bucketfuls of the mixture (one bucket filled five times)
- Five buckets full of the mixture (five separate buckets)
Plural forms of letters, numbers, acronyms, or abbreviations are formed by adding \textit{s} [but not an apostrophe].

- \textit{xs and ys}
- the three Rs
- in twos and threes
- the 1990s
- State DOTs
- CODs

Use the “English” versions of plurals for such words as “appendixes,” “criteria,” “formulas,” “matrixes,” “strata,” and “vortexes.”

### 3.4.2 Possessive Forms

The possessive of singular nouns is formed by the addition of an apostrophe and an \textit{s}, as in “puppy’s tail” or “an hour’s delay.”

The possessive of plural nouns is usually formed by adding an apostrophe only, as in “puppies’ tails” or “in three days’ time.”

The possessive of nouns with irregular plurals are usually formed by adding an apostrophe and an \textit{s}, as in “the algae’s development” or “chairmen’s meeting.”

Closely linked nouns may be considered a single unit if forming the possessive when the entity possessed is the same for both, as in “my aunt and uncle’s house.” When the ownership is separate, however, both nouns take the possessive form, as in “my son’s and daughter’s friends.”

Form the possessive of compound nouns by adding the inflection at the end of the compound noun or phrase, e.g., “the mayor of Baltimore’s speech” or “the notary public’s signature.”

Possessive personal pronouns (“its,” “hers,” etc.) do not have an apostrophe, but indefinite pronouns (“one’s,” “another’s,” etc.) require an apostrophe.

### 3.4.3 Indefinite Articles

The use of the indefinite article \textit{a} or \textit{an} is always determined by the consonant or vowel sound of the word being modified. Consonant sounds require the use of \textit{a}, vowel sounds require the use of \textit{an}.

For example, \textit{a} is used before a consonant and an aspirated \textit{h}; \textit{an} is used before a silent \textit{h} and all vowels except \textit{u} when pronounced with a consonant “\textit{y}” sound and \textit{o} when pronounced with a consonant “\textit{w}” sound. Examples include

- a historic occasion \hspace{1em} an honor
- a hotel \hspace{1em} an hour
- a HUD directive \hspace{1em} an H-U-D directive
- a union \hspace{1em} an undetected problem
- a one-time application \hspace{1em} an onion
When an acronym or a group of initials begins with \( b, c, d, g, j, k, p, q, t, u, v, w, y, \) or \( z \), each having a consonant sound, use the indefinite article \( a \), as in the following:

- a U.S. DOT report
- a BLM area
- a WWW search

When an acronym or a group of initials begins with \( a, e, f, h, i, l, m, n, o, r, s, \) or \( x \), each having a vowel sound, use the indefinite article \( an \), as in

- an FHWA report
- an ASTM standard
- an NHI course

Use of the indefinite article before a numerical expression is determined by the consonant or vowel sound of the beginning syllable of the numerical expression.

- a 6-ft radius  an 11-ft diameter
- a one-time application  an 8-ft hole
3.4.4 Preferred Spellings for AASHTO Publications

A
acknowledgment
air-entraining (adj.)
air hole (n.)
alignment
alloy-steel (adj.)
ambient-temperature (adj.)
appendixes
Article (w/number)
asphaltic
assembly-marking (n.)
at-grade (adj.)

B
backfill
bankfull
bevel (n./v.)
bevelled (adj.)
bicycle-safe (adj.)
bidirectional
blockout
bollard (n.)
bolthead (n.)
bolthole (n.)
bolt-tension (adj.)
broom (v.)
built-up (adj.)
bus-based
bushhammer (n.)
bus-oriented

calcined (adj.)
cannot
carborundum
carpool (n./adj.)
centerbeam
centerbeam/support-bar (adj.)
(CS/BS)
Certificate of Compliance (contractual)
Charpy V-Notch (test)
clean-cut (adj.)
clean out (v.)
clean-out (adj.)
clean-up (adj./n.)

C continued
cofferdam (n.)
cold-draw (v.)
cold-finish (v.)
cold flow (n.)
cold-forge (v.)
cold-form (v.)
cold-roll (v.)
cold-swage (v.)
cold-weather (adj.)
complete-joint-penetration (adj.)
compressible-washer (adj.)
constant-amplitude (adj.)
continuous-beam (adj.)
contract-documents (adj.)
Constructor (contractual)
Contractor (contractual)
copper-alloy(ed) (adj.)
coplanar
countersink (v.)
crandall
cross section (n.)
cross-sectional (adj.)
crystallinity
cutoff

day (sp out)
dead-load (adj.)
debonding
decision maker (n.)
decision-maker (adj.)
decision making (n.)
decision-making (adj.)
degree(s) (sp out for angles)
deicing
delaminate
Designer (contractual)
desilverize (v.)
detensioning
Direct Tension Indicator (DTI)
disc (for CD-ROM discs)
double-ply
drier (comp. of dry)
dryer (apparatus)

D continued
DTIs (pl)
durometer

E
dgebeam
e.g., (w/comma)
elastomer
elastomeric
electrolytically
e-mail
embed
embrittlement
Engineer (contractual)
ensure
epoxy-bonded (adj.)
epoxy-bonding (adj.)
epoxy-coated (adj.)
equidistant
eyebar (n.)

F
Fabricator (contractual)
fabric-substrate (adj.)
factory-bonded
factory-treated
falsework
fatigue-critical (adj.)
fatigue-failure (adj.)
fatigue-load (adj.)
fatigue-test (adj.)
fatigue-tested
ferritic
field-connection (adj.)
field-splice (v./adj.)
field-welded (adj.)
finishable
five-sixths (etc.)
flame-cut (adj.)
floorwater
floorbeam (n.)
flow line
foreword
formwork
four-fifths (etc.)
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<thead>
<tr>
<th><strong>F continued</strong></th>
<th><strong>I continued</strong></th>
<th><strong>M continued</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>fracture-critical (adj.)</td>
<td>Interstate (highway)</td>
<td>mid-depth</td>
</tr>
<tr>
<td>ft (foot/feet)</td>
<td>judgment</td>
<td>mid-length</td>
</tr>
<tr>
<td>full-length (adj.)</td>
<td></td>
<td>mid-opening</td>
</tr>
<tr>
<td>full-penetration (adj.)</td>
<td></td>
<td>midrange</td>
</tr>
<tr>
<td>full-size (adj.)</td>
<td></td>
<td>midspan</td>
</tr>
<tr>
<td>full-width (adj.)</td>
<td></td>
<td>minute (sp. out)</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>G</strong></th>
<th><strong>J</strong></th>
<th><strong>K</strong></th>
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<td>gauge</td>
<td>judgment</td>
<td>kip</td>
</tr>
<tr>
<td>gray</td>
<td></td>
<td>ksi</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>H</strong></th>
<th><strong>L</strong></th>
<th><strong>M</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>heat-cure (v.)</td>
<td>lb (pound/pounds)</td>
<td>N (newtons)</td>
</tr>
<tr>
<td>heat-curve (v.)</td>
<td>leakproof</td>
<td>neoprene</td>
</tr>
<tr>
<td>heat-straighten (v.)</td>
<td>line-of-sight (adj.)</td>
<td>nonabsorbing</td>
</tr>
<tr>
<td>heat treat (v.)</td>
<td>liter</td>
<td>noncoated</td>
</tr>
<tr>
<td>heat-treated (adj.)</td>
<td>live-load (adj.)</td>
<td>noncommute</td>
</tr>
<tr>
<td>high-density (adj.)</td>
<td>load-carrying</td>
<td>noncritical</td>
</tr>
<tr>
<td>high-occupancy (adj.)</td>
<td>load-indicating (adj.)</td>
<td>nongelled</td>
</tr>
<tr>
<td>high-range (adj.)</td>
<td>load-indicator (adj.)</td>
<td>nonmandatory</td>
</tr>
<tr>
<td>high-performance (adj.)</td>
<td>load-test (v.)</td>
<td>nonmotorized</td>
</tr>
<tr>
<td>high-quality (adj.)</td>
<td>lock-pin (n.)</td>
<td>nonparallel</td>
</tr>
<tr>
<td>high-speed (adj.)</td>
<td>long-distance (adj.)</td>
<td>nonporous</td>
</tr>
<tr>
<td>high-strength (adj.)</td>
<td>long-duration (adj.)</td>
<td>nonprestressed</td>
</tr>
<tr>
<td>high-temperature</td>
<td>long-lasting (adj.)</td>
<td>nonreactive</td>
</tr>
<tr>
<td>high-yield-strength (adj.)</td>
<td>long-term (adj.)</td>
<td>nonredundant</td>
</tr>
<tr>
<td>highwater</td>
<td>low-alloy (adj.)</td>
<td>non-sag</td>
</tr>
<tr>
<td>horsepower</td>
<td>low-carbon (adj.)</td>
<td>nonshrink</td>
</tr>
<tr>
<td>hot-bend (v.)</td>
<td>low-flow period</td>
<td>nonstop</td>
</tr>
<tr>
<td>hot-bond (v.)</td>
<td>low-flow channel</td>
<td>nontransit</td>
</tr>
<tr>
<td>hot mix asphalt</td>
<td>low-friction (adj.)</td>
<td>nonyielding</td>
</tr>
<tr>
<td>hot-weather (adj.)</td>
<td>low-occupancy (adj.)</td>
<td>nonuser</td>
</tr>
<tr>
<td>hour (sp. out)</td>
<td>low-stress (adj.)</td>
<td>numerically-controlled (adj.)</td>
</tr>
<tr>
<td>Hz (hertz)</td>
<td>low-temperature (adj.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low-pressure (adj.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low-water (adj.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lubricant-adhesive (n.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lubricant-sealant (n.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lump-sum (adj.)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>N</strong></th>
<th><strong>O</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>N (newtons)</td>
<td>off-peak (adj.)</td>
</tr>
<tr>
<td>neoprene</td>
<td>off-site (adj.)</td>
</tr>
<tr>
<td>nonabsorbing</td>
<td>one-half (etc.)</td>
</tr>
<tr>
<td>noncoated</td>
<td>on-ramp (n./adj.)</td>
</tr>
<tr>
<td>noncommute</td>
<td>on-site (adj.)</td>
</tr>
<tr>
<td>noncritical</td>
<td>on-street (adj.)</td>
</tr>
<tr>
<td>nongelled</td>
<td>open-channel (adj.)</td>
</tr>
<tr>
<td>nonmandatory</td>
<td>opening-movement-vibration</td>
</tr>
<tr>
<td>nonmotorized</td>
<td>(adj.) (OMV)</td>
</tr>
</tbody>
</table>
Part 3: Style Rules for AASHTO Publications

O continued
orthotropic-deck (adj.)
out-of-round
overall (adj./adv.)
overhang (n./v.)
overlay (n.)
oversize (v.)
overtap (v.)
overturn (v.)
overtension (v.)
Owner (contractual)
oxygen-cut (adj.)

P
park-and-ride (adj.)
percent (sp. out in text)
pickup
pipet
plane (v.)
plaster of paris
plate-cut (adj.)
polychloroprene
polyethylene
polyisoprene
polymer
polymerization
polystyrene
polytetrafluoroethylene
polyvinyl
poly(vinyl) chloride
pond (v.)
popout
portland cement
post-tensioning
pourable
pozzolan
pozzolanic
pphm (parts per hundred million)
ppm (parts per million)
preassembly
precasting
preemption
preinstall (v.)
preamolded
prepositioned
prequalify

Q
quality-assurance (adj.)
quality-control (adj.)
quenched-and-tempered (adj.)

R
rad. (radians)
radiant-heat (adj.)
rail-based
rail-oriented
ream (v.)
reinspect (v.)
relubricated (v.)
requench (v.)
resistivity
retemper (v.)
retest (v.)
retorque (v.)
rideability
rip-rap
rotational-capacity (adj.)
rotobroach cutters
runoff
run-out

S
sandblasting
saw-cut (adj.)
scupper (n.)
seal-retaining
seal-weld (v.)
second (time; sp out)
Section (in book; contractual)
semilog (adj.)
service-limit (adj.)

S continued
service-load (adj.)
setback (n.)
set-up (n./adj.)
sheet flow
shop-splice (adj.)
shop-weld (adj.)
short-term (adj.)
silica (n.)
single-support-bar (adj.)
single-ply
sinter (v.)
Skidmore-Wilhelm Calibrator
slip-critical
S-N curve
snug (v.)
soffit (n.)
solid-shank (adj.)
solid-steel (adj.)
spalling (n.)
Specifications (contractual)
State DOTs
still water (n.)
still-water (adj.)
stormwater
straightedge (n.)
straightedging
strain-gauge (adj.)
strain-measuring
strength-failure (adj.)
strength-limit (adj.)
St. Venant’s
subarticles
subassembly (n.)
subbase
subdrill (v.)
subgrade
subpunch (v.)
subsize (v.)
substrate (n.)
sulfate
sulfur
supersede (v.)
support-bar (adj.)
swedge (v.)
swivel-joint (adj.)
swivel-joist (adj.)
T
Teflon® (w/registered trademark symbol)
temperature-dependent
temperature-sensing
tensile-strength (adj.)
tension-indicating	
tension-indicator
tension-measuring
thermal-cut
thought-out
three-fourths (etc.)
time-consuming
time-dependent
tine (v.)
torque (v.)
torsional
traffic-calming
traffic-loading (n.)
transferable
transit-friendly
transit-supportive

T continued
tremie (n.)
troweled
troweling
Turner-Fairbank
turn-of-nut (adj.)
two-thirds (etc.)

U
unground (adj.)
usable
usage

V
vee (v.)
very-high-slump (adj.)

W
waterproof
waterstop (n.)
watertight
web/website

W continued
weldable
weld-repaired
weld-toe (adj.)
wheel-load (n.)
wheel path
width-to-thickness (adj.)
wire-brushed

X
X-ray (n.)
x-ray (adj. or v.)

Y
[No entries so far.]

Z
[No entries so far.]

Other
μm
3.5 **Compound Words (8, 10, 11)**

A compound word is a group of two or more words or elements treated grammatically as a single term. The phrase may be used as a noun, adjective, adverb, or verb. Examples include

- **Nouns**: crosswalk, cross section, governor-elect
- **Adjectives**: up-to-date, self-sustaining, cross-referenced
- **Adverbs**: overzealously, all-inclusively, somewhat diffidently
- **Verbs**: crash-test, butt-joint, cross-check

Compound words may be either permanent compound words or temporary compounds.

- Permanent compound words have been generally accepted in the English language and, as such, are listed in the dictionary. Examples include “tradeoff” and “cost-effective.”
- Temporary compounds are a joining of words for a specific purpose. Examples include “cross-sectional” and “time-consuming.”

3.5.1 **Types of Compounds**

An open compound is a combination of separate words that are so closely related as to constitute a single concept. Examples include

- lowest common denominator,
- portland cement concrete, and
- traveled way.

A hyphenated compound is a combination of words joined by one or more hyphens. Examples include

- right-of-way,
- state-of-the-art, and
- candela-hour.

A closed (or solid) compound is a combination of two or more elements, originally separate words, now spelled as one word. Examples include

- groundwater,
- recordkeeping, and
- runoff.

3.5.2 **General Rules for Using Compound Words**

Because spelling and hyphenation vary greatly among compound words, the first step to establish the correct spelling is to check the dictionary.

If the compound word is not listed in the dictionary, follow these general rules:
For Compound Nouns

When the elements of a compound word are of equal importance to the meaning, appear in regular order, and have no ambiguous meaning, then print the compound word open, as in “cross section,” “decision maker,” “cost of living,” “carbon monoxide poisoning,” “attorney general,” and “New Yorker.”

If the elements of a compound word express a unit idea that would not be clearly expressed in unconnected succession, the compound word should be hyphenated. Examples include “right-of-way,” “Afro-American,” “self-knowledge,” and “author-critic.”

Fractions used as nouns are open, as in “one third of the shipment.” Fractions used as adjectives or adverbs are hyphenated, as in “a one-third share” or “one-half empty,” respectively.

Use a nonbreaking hyphen between a capital letter and a noun or participle, as in “I-beam” or “S-shaped.”

A compound word formed from two nouns, the first of which consists of only one syllable or one of which loses its original accent, should be written as a closed compound, e.g., “footnote” or “crosswalk.”

If it does not interfere with comprehension, set as a closed compound nouns that consist of a short verb as the first element followed by an adverb as the second element, as in “pickup” or “cooldown” (but hyphenate “run-in” or “cut-in”).

Refer to Sections 6.8–6.14 of the GPO Style Manual for a list of terms that are usually presented as closed compounds.

For Compound Adjectives

Hyphenate compound adjectives that precede the noun being modified, as in

- user-friendly product,
- decision-making policies,
- a three-foot-high wall,
- high-speed train,
- 3-week vacation,
- 3-to-1 ratio, or
- cost-of-living increase.

These hyphens help readers determine the relationship between the elements modifying the noun. Exceptions to this rule include

- compound adjectives comprised of chemical terms, such as “sodium chloride solution”;
- modifier consisting of a numeral followed by a possessive noun, as in “3 weeks’ vacation”;
- two-word modifiers in which the first element is a comparative or superlative, as in “better drained soil” or “highest level decision”; and
- color-term compounds in which the first element modifies the second element, as in “bluish green paint.”
If the compound adjective follows the noun being modified, do not use a hyphen, e.g., “a wall three feet high” or “The product is user friendly.”

Foreign adjectival phrases, such as “*in situ* soil,” and compounds consisting of a number followed by “percent,” as in “12 percent interest,” are written as open compounds.

Fractions that modify nouns are hyphenated, as in “one-half gallon.” Fractions performing as nouns, however, are written as open compounds, as in, “One half of the inventory disappeared.”

Insert a hyphen between a number and unit of measure if the term is an adjective directly preceding the noun being modified. (2, G14), (8, 3.88), (11, 6.15)

- Correct: 12-ft board, a board 12 ft long, a 12-ft-long board
- Correct: 2-in. diameter, a diameter of 2 in., 2-in.-diameter pipe
- Incorrect: a board 12-ft long, 2-in. diameter pipe

When two or more hyphenated compounds have a common element and this element appears only after the last term, use a hyphen after each modifier, as in “10-, 20-, or 30-mm diameter” and “long- or short-term plans.”

**For Compound Adverbs**

Adverbial compounds beginning with “over” or “under” are closed, as in “underhandedly.”

Compound adverbs consisting of spelled-out fractions are always hyphenated, as in “one-half empty.”

Do not hyphenate compound adverbs that contain an adverb that ends in *ly*, as in “previously known” or “highly developed.”

**For Compound Verbs**

Do not hyphenate compound verbs in which a preposition acts as an adverb, as in “burn off” or “blow up.”

### 3.6 Prefixes and Suffixes (8, 10, 11)

Though not strictly compounds, words bearing prefixes or suffixes are treated similarly to compound words—some of these are closed and some are hyphenated.

Consult a dictionary to determine whether or not to use a hyphen with a word containing a prefix or suffix.

If the word is not listed in the dictionary, follow these general rules:

#### 3.6.1 Prefixes

In general, do not use a hyphen with a word containing a prefix. However, use a hyphen

- after prefixes added to proper names or numbers, as in “un-American” or “mid-1990s”;
- if adding the prefix would repeat a letter or similar term, as in “non-native” or “sub-subcommittee”;
- if the omission of the hyphen would make the meaning unclear, as in “recreate” and “re-create”;


with prefixes that stand alone, as in “pre- and postwar relations”;  
with prefixes ex- and self-, as in “ex-president” or “self-restraint”; and  
in compounds in which the second element consists of more than one word, as in “non-load-bearing beam.”

### 3.6.2 Suffixes

Words ending in a silent e usually drop the e before adding a suffix that begins with a vowel, e.g., “creating” or “forcible.” Exceptions to this rule include “dyeing,” “enforceable,” “knowledgeable,” “mileage,” and “singeing.”

If the silent e precedes a consonant, the e is usually retained, as in “movement” or “wholesome.” Exceptions to this rule include “judgment,” “wholly,” and “truly.”

Words with soft endings—ce or ge—retain the e before suffixes beginning with vowels, such as “advantageous” or “changeable.”

Most words ending in a vowel + y keep the y. However, when a consonant precedes the y, substitute an i for the y before adding the suffix, as in “drier” or “messiness.”

Many words that end in a single consonant preceded by a vowel double the final consonant, as in “controlled,” “occurring,” or “preferred.” Exceptions to this rule include “totaled,” “transferable,” and “traveled.”

Words ending in c often add a k to ensure proper pronunciation, e.g., “shellacked.”

“Supersede” is the only word in the English language that ends in “sede.”

Only three words—“exceed,” “proceed,” and “succeed”—end in “ceed.”

Other words with the same pronunciation end in “cede,” e.g., “precede.”

The GPO Style Manual lists words ending in the “ible” and “ise” suffixes in Sections 5.11 and 5.12, respectively. For further information, check the dictionary.

### 3.7 Capitalization

As a general rule, use initial caps for the following:

- proper nouns (such as John Doe, Park Avenue, or Massachusetts),
- formal titles or names (such as Senator Glad Hander),
- names of structures and public places (such as Statue of Liberty or the White House),
- names of organizations or government agencies (such as American Society of Civil Engineers or Federal Highway Administration),
- names of institutions or companies (such as Library of Congress or Transportation Research Board),
- trade names (such as Pyrex or Quickchange® Barrier System) (see Note),
- first word in a sentence, and
- titles of works.

**Note:** Exceptions to the rule of trade names include words that have become accepted as generic. These terms include such words as babbitt, cellophane, diesel, kraft, neoprene, nylon, portland cement, and saran.
In capitalizing hyphenated compounds in titles of works, headings for sections, or table headings, adhere to the following rules:

- First elements are always capitalized (Twentieth-Century Transit Developments).
- Subsequent elements are capitalized unless they are articles, prepositions, or conjunctions (Non-Compact Section, State-of-the-Art Report 3).
- If a compound comes at the end of the title, capitalize the final element regardless of the part of speech it is (Successful Safety Features in Vehicles Crashed Head-On, but Fatalities in Head-on Crashes).

In scientific terminology, the genus name is capitalized, but the species name is lowercased. Names of chemical elements and compounds are lowercased when written out, but the chemical symbols are capitalized and set without periods (as in sulfuric acid, H₂SO₄). Capitalize only the proper name associated with the names of laws, theorems, or principles, such as Newton’s law or Manning’s n.

Use initial caps in direct references to figures, tables, etc., such as Figure 2, Table 6, Section 3.3.4, Type 1, or Class B. Use lowercase in less direct references, such as .” . . is shown in the same table” or “This chapter discusses . . .”

### 3.8 Abbreviations and Acronyms

#### 3.8.1 General

**Acronyms**

An acronym is a shortened form of a compound term that uses the initial letters of the term to make a pronounceable word, e.g., AASHTO. Acronyms are usually written in full caps.

At its first appearance in the text, an acronym must be enclosed in parentheses and follow the spelled out terms, as in “American Association of State Highway and Transportation Officials (AASHTO).”

For Federal government agencies, use the acronyms listed in “Abbreviations and Acronyms of the U.S. Government” at http://www-lib.iupui.edu/subjectareas/gov/docs_abbrev.html.

**Abbreviations**

An abbreviation is a shortened form of a compound word or phrase, such as “%” for percent or “assn.” for association.

Use the symbol “%” in equations, figures, and tables. Spell out “percent” in the text.

Spell out United States when the term stands alone. Always use periods in the abbreviation “U.S.” when used as an adjective, as in “U.S. highways.”

When following a city or other geographical term, use the two-letter abbreviation without periods for states, e.g., “AK” for Alaska or “DC” for District of Columbia. Spell out the name of the state if it stands alone.

Spell out days of the week and months of the year.

Capitalize the abbreviation for “not applicable,” i.e., “NA.” Do not include punctuation.

The abbreviation “etc.” is acceptable at the end of a series of three or more elements, but should be set off by commas. Do not use a conjunction in the series when “etc.” is used.
See Section 3.13 on “Mathematical Expressions,” which lists abbreviations for units of measure.

### 3.9 Punctuation

Punctuation marks are used to clarify the meaning of the text and to make reading the text easier. In general, AASHTO prefers “closed” punctuation in order to avoid any misinterpretations of the technical documents. In closed punctuation, a comma or semi-colon is used after each element of a series (see “comma” and “semi-colon” in the table below).

The following table provides a brief description of the most common uses for punctuation marks. Since most punctuation rules have qualifications, however, refer to Chapter 5 of *The Chicago Manual of Style* or Chapter 8 of the *GPO Style Manual* for an in-depth discussion of the appropriate use of punctuation marks.

<table>
<thead>
<tr>
<th>Punctuation Mark</th>
<th>Reason for Use</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apostrophe</td>
<td>to replace letters omitted in contractions (Do not use contractions in technical writing.)</td>
<td>can’t, don’t, isn’t</td>
</tr>
<tr>
<td></td>
<td>to indicate possessive case (See the discussion regarding “Possessives Forms” in Section 3.4.2.)</td>
<td>ship’s bow, Tom’s planning, citizens’ interest, Virginia and Maryland’s border, Wisconsin’s and Alabama’s programs, someone’s design, someone else’s design, two hours’ delay</td>
</tr>
<tr>
<td></td>
<td>to indicate plural forms of letters or abbreviations where the absence of an apostrophe would create confusion</td>
<td>a’s and b’s, Btu’s</td>
</tr>
<tr>
<td>Colon</td>
<td>to introduce words, phrases, or clauses in a series if the clause preceding the series is grammatically complete (Also see Section 3.10 on “Lists.”)</td>
<td>The procedures included three crash tests: front end crashes, side crashes, and off-center front end crashes.</td>
</tr>
<tr>
<td></td>
<td>to separate two statements, the second of which amplifies the first</td>
<td>Serving in Congress is not a career: it is a responsibility and an honor.</td>
</tr>
<tr>
<td></td>
<td>after introductory phrases such as “the following” or “as follows”</td>
<td>“. . . the following equation: ( a + b = c ).”</td>
</tr>
<tr>
<td></td>
<td>to introduce long quotations</td>
<td>As Hamlet said: “To be or not to be . . .”</td>
</tr>
<tr>
<td></td>
<td>between the parts of ratios</td>
<td>H1:V2, 1:15</td>
</tr>
<tr>
<td></td>
<td>in expressions of the time of day</td>
<td>6:30 p.m.</td>
</tr>
<tr>
<td></td>
<td>after salutations in business letters</td>
<td>Dear Mr. Smith:</td>
</tr>
<tr>
<td>Comma</td>
<td>to separate items in a series or lists (Note: Use a comma before the conjunction in order to avoid confusion about the meaning of the text.) (Also see “semi-colon” and Section 3.10 on “Lists.”)</td>
<td>the devastation of hurricanes, tornados, and earthquakes</td>
</tr>
<tr>
<td></td>
<td>to separate two or more adjectives in a series</td>
<td>a clean, dry, lint-free cloth</td>
</tr>
<tr>
<td>Punctuation Mark</td>
<td>Reason for Use</td>
<td>Example</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>---------</td>
</tr>
<tr>
<td>Comma (cont’d)</td>
<td>to separate compound sentences (Do not use a comma to separate compound predicates, e.g., “He drove to town but walked back.”)</td>
<td>He walked to town, but he rode the bus back home.</td>
</tr>
<tr>
<td></td>
<td>to separate dependent phrases or clauses from the main body of the sentence</td>
<td>In the late 1980s, the project . . . If the temperature exceeds 20°C, remove . . . Judging from the data, the project . . . When the program began, the staff . . .</td>
</tr>
<tr>
<td></td>
<td>– introductory clauses</td>
<td>Let the mixture dry for at least two hours, or, if time allows, for seven hours.</td>
</tr>
<tr>
<td></td>
<td>– dependent clauses after a conjunction between two coordinate clauses</td>
<td>The plotted data is shown in Figure 4, a typical representation of test data in these cases.</td>
</tr>
<tr>
<td></td>
<td>– a nonrestrictive phrase or clause that cannot be omitted without changing the meaning of the sentence (Do not separate a restrictive clause, as in, “You will be more productive if you organize your work space.”)</td>
<td>The Engineer, after reviewing the plans, decided to . . .</td>
</tr>
<tr>
<td></td>
<td>– adverbial phrases between the subject and verb</td>
<td>The distance, D, equaled . . . This light, but surprisingly effective, pressure . . .</td>
</tr>
<tr>
<td></td>
<td>– appositions, complementary phrases, and contrasting phrases</td>
<td>Furthermore, the data . . . The results were, generally speaking, not successful. The movements, if any, were recorded.</td>
</tr>
<tr>
<td></td>
<td>– transitional words, parenthetical expressions, and transposed terms that signify a break in the continuity of thought</td>
<td>Sandstone, for instance, erodes quickly.</td>
</tr>
<tr>
<td></td>
<td>to separate elements such as etc., e.g., i.e., for example, that is, namely, and similar expressions</td>
<td>The chairman said, “We plan . . .”</td>
</tr>
<tr>
<td></td>
<td>to separate direct quotes from the main body of the sentence</td>
<td>A report printed on July 19, 1999, indicated that . . .</td>
</tr>
<tr>
<td></td>
<td>in dates</td>
<td>312,684 miles</td>
</tr>
<tr>
<td></td>
<td>in numbers [but not in SI unit numerals]</td>
<td>Senator, what is your position on . . .</td>
</tr>
<tr>
<td></td>
<td>after a noun or phrase in direct address</td>
<td>Hank Williams, Jr., sang . . . Tom Jones, Ph.D., will be . . . Publisher, Inc., offices . . .</td>
</tr>
<tr>
<td></td>
<td>before and after indicative titles in a sentence</td>
<td>Executive Director, AASHTO Chairman, Subcommittee on Materials</td>
</tr>
<tr>
<td></td>
<td>between the title of a person and the name of an organization</td>
<td></td>
</tr>
<tr>
<td>Ellipses</td>
<td>to indicate an omission</td>
<td>The boys . . . thought they were safe.</td>
</tr>
<tr>
<td></td>
<td>used in mathematical expressions</td>
<td>[x^1 + x^2 + \ldots + x^n]</td>
</tr>
<tr>
<td>Punctuation Mark</td>
<td>Reason for Use</td>
<td>Example</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>En dash</td>
<td>to separate inclusive numbers, such as a range of pages, dates, or measurements</td>
<td>pages 4-14–18, 1982–2003, 1.0–1.2 in.</td>
</tr>
<tr>
<td></td>
<td>in place of a hyphen in compound adjectives in which one of the elements is an open compound</td>
<td>New York–Paris flight post–World War II boundaries</td>
</tr>
<tr>
<td>Em dash</td>
<td>to indicate an element added to give emphasis or explanation to the main clause</td>
<td>Division II—Construction</td>
</tr>
<tr>
<td></td>
<td>to introduce and, when necessary, to follow an enumeration or amplification</td>
<td>Measuring tools—rulers, yard sticks, and tape measures—must be accurate.</td>
</tr>
<tr>
<td></td>
<td>to precede a credit line</td>
<td>An investment in knowledge pays the best interest. —Benjamin Franklin</td>
</tr>
<tr>
<td></td>
<td>to mark a sudden or abrupt change of thought</td>
<td>Neither rain, snow, nor sleet—unless it snows in Florida—will keep the postman from delivering the mail.</td>
</tr>
<tr>
<td></td>
<td>to indicate “no data” breaks in tables</td>
<td></td>
</tr>
<tr>
<td>Exclamation point</td>
<td>to signify a vehement or ironic statement (Avoid using exclamation points in technical documents.)</td>
<td>The bomb is going to explode!</td>
</tr>
<tr>
<td>Hyphen</td>
<td>in non-inclusive numbers that have two or more elements</td>
<td>page 4-2</td>
</tr>
<tr>
<td></td>
<td>in unit modifiers preceding nouns and consisting of a number followed by a unit of measure (See Section 3.13.5 on “Units of Measure.”)</td>
<td>5-cm depth, 1/4-gallon container</td>
</tr>
<tr>
<td></td>
<td>(See Section 3.13.5 on “Units of Measure.”)</td>
<td>8-ft-long board, 1/2-in.-diameter pipe</td>
</tr>
<tr>
<td></td>
<td>(See Section 3.13.5 on “Units of Measure.”)</td>
<td>9- and 10-ft sections</td>
</tr>
<tr>
<td></td>
<td>(See Section 3.13.5 on “Units of Measure.”)</td>
<td>9-by-10-ft sections</td>
</tr>
<tr>
<td></td>
<td>(See Section 3.13.5 on “Units of Measure.”)</td>
<td>9- × 10-ft sections</td>
</tr>
<tr>
<td></td>
<td>(See Section 3.13.5 on “Units of Measure.”)</td>
<td>one-third share of the profits (but one third of the profits)</td>
</tr>
<tr>
<td></td>
<td>in some compound words (See Section 3.5 on “Compound Words.”)</td>
<td>Compound words are more often written as separate words, e.g., “closed box girder,” but there are exceptions, e.g., “right-of-way” or “self-knowledge.”</td>
</tr>
<tr>
<td></td>
<td>—in compound nouns</td>
<td>I-beam, T-shaped</td>
</tr>
<tr>
<td></td>
<td>—between letter of alphabet and a noun or participle</td>
<td>high-speed train</td>
</tr>
<tr>
<td></td>
<td>—in compound adjectives or unit modifiers that precede the noun being modified</td>
<td>up-to-date files</td>
</tr>
<tr>
<td></td>
<td></td>
<td>well-maintained equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>decision-making role</td>
</tr>
<tr>
<td></td>
<td></td>
<td>long- and short-term plans</td>
</tr>
<tr>
<td></td>
<td>in some words with prefixes or suffixes and with prefixes that stand alone</td>
<td>re-create, 10-fold, non-load-bearing, pre- and postoperative examinations</td>
</tr>
<tr>
<td>Parentheses and Brackets</td>
<td>use parentheses to enclose an explanatory or other secondary comment not intended to be part of the main sentence, but important enough to be included</td>
<td>Chocolate and peanut butter (the two main ingredients of this recipe) make a delicious combination.</td>
</tr>
<tr>
<td>Punctuation Mark</td>
<td>Reason for Use</td>
<td>Example</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Parentheses and Brackets (cont’d)</td>
<td>use parentheses to enclose acronyms or abbreviations that immediately follow the first use of the spelled-out term</td>
<td>The Transportation Research Board (TRB) publishes the <em>Transportation Research Record.</em></td>
</tr>
<tr>
<td></td>
<td>to enclose bylines in Congressional documents</td>
<td>(By Harry Jones, research assistant)</td>
</tr>
<tr>
<td></td>
<td>use parentheses to enclose numerals or letters in enumerated lists</td>
<td>The three factors that weather reports usually include are (1) temperature,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) precipitation, and (3) barometric pressure.</td>
</tr>
<tr>
<td></td>
<td>use parentheses to enclose numbered references cited in the text</td>
<td>The common needs of all people include (a) food, (b) shelter, and (c) clothing.</td>
</tr>
<tr>
<td></td>
<td>use parentheses to enclose U.S. Customary units for hard conversions (rounded metric units) in dual unit publications</td>
<td>1 m (3.2 ft)</td>
</tr>
<tr>
<td></td>
<td>use brackets to enclose U.S. Customary units for soft conversions (exact re-stating of metric measurements in conversions) in dual unit publications</td>
<td>1 m [3.281 ft]</td>
</tr>
<tr>
<td></td>
<td>use brackets to enclose editorial comments within the text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>use brackets to enclose parenthetical remarks within parentheses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>use brackets in equations or other mathematical expressions to indicate that the enclosed matter should be treated as a unit</td>
<td>$x = [(a \times b) + c] – d^2$</td>
</tr>
<tr>
<td>Period</td>
<td>at the end of a complete declarative or imperative sentence</td>
<td>I came, I saw, I conquered. See if you can do better.</td>
</tr>
<tr>
<td></td>
<td>after numerals or letters in numbered or outline lists</td>
<td>1. chromium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. chromium</td>
</tr>
<tr>
<td></td>
<td>in abbreviations (but not for names of states or units of measurement abbreviations except for “in.”)</td>
<td>e.g., U.S., Mr., Mt. Everest, E. A. Poe, etc.</td>
</tr>
<tr>
<td></td>
<td>as decimal points in mathematical expressions</td>
<td>1.65 cm, $1.25, 65.5$ percent</td>
</tr>
<tr>
<td>Question mark</td>
<td>to indicate a question</td>
<td>Is dinner ready yet?</td>
</tr>
<tr>
<td>Quotation marks</td>
<td>use double quotation marks to enclose direct quotations and single quotation marks to enclose quoted or emphasized material with a direct quotation</td>
<td>The student asked, “What do you mean by ‘outline numbering’?”</td>
</tr>
<tr>
<td></td>
<td>put quotation marks around words or phrases to indicate a new or special meaning at the first use of the term in the document</td>
<td>In this case, “gauge length” means the distance over which the deformation measurement is made.</td>
</tr>
<tr>
<td></td>
<td>use quotation marks to enclose instructions or commands</td>
<td>Type “Control + Shift + Space Bar” to insert a nonbreaking space.</td>
</tr>
<tr>
<td>Punctuation Mark</td>
<td>Reason for Use</td>
<td>Example</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Quotation marks (cont’d)</td>
<td>use quotation marks to enclose title of chapters/sections in text citations</td>
<td>See the section on “Text Citations.”</td>
</tr>
<tr>
<td>Semi-colon</td>
<td>between clauses of a compound sentence if they are not joined by a conjunction</td>
<td>The rain ended in the afternoon; the sun shone brightly.</td>
</tr>
<tr>
<td></td>
<td>to separate clauses of a compound sentence joined by a conjunction and containing commas within the clause</td>
<td>The cold, steady rain ended; but the clouds lingered on.</td>
</tr>
<tr>
<td></td>
<td>to precede transitional phrases that link clauses of a compound sentence</td>
<td>The rain ended; consequently, the rainbow disappeared.</td>
</tr>
<tr>
<td></td>
<td>to precede transitional terms that introduce an independent clause</td>
<td>Precipitation composed of liquid H₂O ceased to fall from the clouds to the earth; that is, the rain ended.</td>
</tr>
<tr>
<td></td>
<td>to separate elements in a series if the elements contain internal punctuation</td>
<td>The precipitation of water from the atmosphere can appear in the form of mist, including fog; rain; cold, icy sleet; hail, i.e., pellets of ice; and snow.</td>
</tr>
<tr>
<td>Slash (also called solidus, slant, or virgule)</td>
<td>to signify division in fractions, mathematical expressions, and units of measure</td>
<td>(\frac{4}{5}) (a/b) 10 m/s</td>
</tr>
<tr>
<td></td>
<td>to indicate alternatives or alternative spellings</td>
<td>upstairs/downstairs, tradeoff/trade-off</td>
</tr>
<tr>
<td></td>
<td>to link two terms when a hyphen or en dash would be confusing</td>
<td>electrode/electrolyte interface</td>
</tr>
</tbody>
</table>

### 3.9.1 Placement of Punctuation Marks

**Colon**

A colon should **not** be used to introduce a list that is the object of an element in the introductory clause, e.g., “Care should be taken to (1) weigh the sample carefully, (2) determine that the sample is dry, and (3) ensure that the scale is accurate.”

**Comma**

Use a comma to separate compound predicates (two or more verbs having the same subject) only if three or more compound predicates constitute a series or enumerated list within the sentence. If a sentence includes only two compound predicates, do not use a comma to separate them.

- Butch walked the dog around the park, fed him, and then brushed him.
- Butch walked the dog around the park and fed him.

A comma should **not** separate an introductory adverbial phrase that immediately precedes the verb it modifies, e.g., “Out of the storm ran the five children.”

A comma should **not** separate an adverbial phrase, transitional word, parenthetical expression, or transposed term if the element creates no significant break in the continuity of thought, as in, “The test samples were therefore reexamined.” Use a comma (not a semi-colon), however, before the transitional adverbs “yet” and “so.”
Ellipses
Ellipses are periods set with nonbreaking spaces or em spaces between them and are used to indicate omission within quoted text.

If the omission occurs within a quoted sentence or fragment, add a space before and after the three ellipsis points.

If the omission occurs at the beginning of a quoted sentence, ellipsis points are not necessary. If, however, more than one paragraph is being quoted in block text, use ellipsis points at the end of the first paragraph and at the beginning of the second paragraph.

If the omission occurs at the end of a quoted text and what remains is a grammatically complete sentence, include punctuation for that sentence. If the omission occurs at the end of a quoted text and what remains is only a fragment, do not include punctuation in addition to the ellipsis points.

Correct examples of the use of ellipses include the following:

Original Paragraphs
Fourscore and seven years ago, our fathers brought forth upon this continent a new nation: conceived in liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war testing whether that nation or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war.

Within Sentence
Fourscore and seven years ago, our fathers brought forth upon this continent a new nation . . . dedicated to the proposition that all men are created equal.

End of Sentence
Fourscore and seven years ago, our fathers brought forth upon this continent a new nation . . .

End of Fragment
Fourscore and seven years ago . . .

Between Paragraphs
Fourscore and seven years ago, our fathers brought forth upon this continent a new nation. . . .

. . . testing whether that nation or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war.

Question Marks
When the question consists of a single word within a sentence, do not use a question mark nor capitalize the interrogative word, e.g., “He asked himself why.”

A question mark should not be used at the end of a request courteously disguised as a question, e.g., “Will you please pass the butter.”

A question mark should not be used at the end of a question that is stated indirectly, as in, “How to reduce stress is the question on everyone’s mind today.”
Quotation Marks
Place quotation marks after commas and periods but before colons, semicolons, and footnote reference numbers.

Place quotation marks after question marks and exclamation points if these punctuation marks are part of the quotation. If they are not part of the quoted text, place the question mark or exclamation point outside the quotation marks.

Quotation marks always appear within a closing quote when they are part of the quoted text, as in

Mary said, “Tom was right when he said, ‘We’ll never make the deadline!’”

Use a thin space or expanded kerning of the font to separate adjacent double and single quotation marks and between adjacent superscripts (including fractions) and quotation marks.

Parentheses
When the text enclosed within parentheses or brackets stands alone as a separate sentence, set the terminal punctuation inside the parentheses or brackets, e.g., “The statistical data can be found in Table 6 of this report. (Also see Figure 5.)”

Do not place a period inside the closing parenthesis if the sentence within parentheses is located within another sentence, as in, “The statistical data can be found in Table 6 (also see Figure 5) of this report.”

If all of the material enclosed in parentheses or brackets is in italic style font, then the parentheses or brackets in running text (but not equations) should be italic. If part of the enclosed material is in roman text, then the parentheses or brackets should be in roman text.

Terminal Punctuation
If a colon, question mark, or exclamation point immediately follows italicized text but is not part of the italicized text, then the punctuation mark should be set in roman type. For example,

Has anyone seen my copy of the Roadside Design Guide?
Have you read Who Moved My Cheese?

3.10 Lists
Lists may be used to organize and present material in a concise manner that makes the information easily understood. The information may be run into the text of a sentence or displayed as a vertical list.

3.10.1 Lists as Running Text
Listings run into the text of a sentence are usually lowercased, such as, “... consist of (1) food, (2) water, and (3) shelter.”

For a long, complex list within a sentence or if preferred for a simple list within a sentence, number the list with numerals or lowercase italic letters in parentheses.

Simple items listed within the sentences should merely be separated by commas.

If the phrases or clauses comprising the list contain commas or other punctuation, then the items of the list should be separated by semi-colons; for example, “The precipitation of water from the atmosphere can appear in the form of mist, including fog; rain; cold, icy sleet; hail, i.e., pellets of ice; and snow.”
3.10.2 Vertical Lists

Capitalization in Vertical Lists

If items in a vertical list complete a sentence begun in the introductory clause and are separated by commas or semi-colons, then the items in the list begin with lowercase letters (10, Sections 5.10 and 8.76). For example,

Requirements consist of
- food,
- water, and
- shelter.

If the preceding introductory clause is grammatically complete, the items in vertical lists are usually capitalized. For example,

Requirements consist of three items:
- Food
- Water
- Shelter

If the preceding introductory clause is grammatically complete and one of the list items is a complete sentence, then all items should begin with a capital letter and end in a period. For example,

Requirements consist of
- Food (provided by the campers).
- Water (provided in large coolers) at the camp sites.
- Shelter will be four-person tents.

Punctuation of Vertical Lists

If the items complete the preceding introductory clause, punctuate the vertical lists as if the items were running text.

Use commas to separate the list items and a period after the final item.

If the items are long and complex or contain their own punctuation, separate the items by semicolons instead of commas.

If the list items are complete sentences themselves, use a period at the end of each item.

If one of the items is a complete sentence, then all sentence fragments should end in periods as well.

Use a colon to introduce vertical lists if
- The introductory clause preceding the vertical list is grammatically complete on its own;
- The introductory clause contains an introductory phrase, such as “as follows” or “the following.”
If the introductory clause preceding the vertical list is not grammatically complete, do not use a colon.

Use numbers or letters with vertical lists in which the items indicate order of importance or sequence. Use bullets for all other vertical lists.

If numerals or letters used to enumerate items in a vertical list are not enclosed in parentheses, place a period after the numeral or letter.

**Format of Vertical Lists**

Items in vertical lists may be aligned either flush left or indented in an outline style.

If items in the vertical lists are enumerated or bulleted, the paragraph should be set with a hanging indent so that all lines of the paragraph align.

If enumerated lists are subdivided, the numerals or letters for the top three levels are set off by periods, and those for the lower levels are enclosed in parentheses.

*For Bridge Books:*

- Primary bullets are round and bullet points are flush left.
- Secondary bullet points are discouraged in light of the two-column format but, when used, should be the round, open type, and indented 0.25 in.

### 3.10.3 **Italic and Boldface Type**

Highlighting techniques help readers find important or special text.

Use italic type to indicate

- Titles of books—*Roadside Design Guide,*
- Foreign phrases—*in situ,*
- Legal cases—*Roe v. Wade,*
- Scientific names—*Streptococci,*
- Reference citations—Reference (10),
- Variables (except for Greek symbols) in mathematical expressions—\(a + b = c,\)
- New terms at first use, and
- Minor headings.

Use boldface type to indicate

- Major headings,
- Captions, and
- Cautions or warnings.

If all of the material enclosed in parentheses or brackets is in italic font, then the parentheses or brackets in running text (but not equations) should be italic. If part of the enclosed material is in roman text, then the parentheses or brackets should be in roman text.

If a question mark or exclamation point immediately follows italicized text but is not part of the italicized text, then the punctuation mark should be set in roman type. For example,
Has anyone seen my copy of the *Roadside Design Guide*?
Have you read *Who Moved My Cheese*?

### 3.11 Numerals in Text

Use Arabic numerals.

Spell out any numeral that is the first word of a sentence. If a unit of measurement begins a sentence, spell out both the numeral and the unit of measurement.

Spell out numerals one through nine except when they
- are followed by a unit of measure or percentage, such as “3 ft” or “5 percent”;
- are part of a mixed number, such as “1.5” or “3 1/2”;
- specify a mathematical expression, such as “square root of 4” or “divide by 6”;
- are part of inclusive numbers expressed with en dashes, such as “2–4 days”;
- express ratios, as in “1 to 4” or “1:15”;
- appear in a statement containing two or more numbers, one of which is greater than nine, such as “2 to 10 hours”; or
- follow an abbreviation, such as Vol. 2.

It is also recommended to spell out numerals in expressions such as “twenty 30-mm rods” in order to avoid confusion.

A spelled-out number should not be repeated with a numeral in parentheses.

For clarity in large numbers, spell out “million” or “billion” as in “$12 billion.”

Place a zero before the decimal point if the unit is less than one, as in “0.03 in.”

Omit zeros after the decimal point unless they report a significant digit, such as “10.5 ft.”

### 3.12 Signs and Symbols in Text

Symbols must be of an ASCII format that will not change if the graphic is converted to a PDF. The preferred typeface for AASHTO documents is Symbols.

### 3.13 Mathematical Expressions

Above all, be consistent. Do not mix symbols and names of units. Do not express fractions in a mixture of styles.

Express ratios as “1 to 4” or “1:4” but not as “1-4.”

### 3.13.1 Numerals in Mathematical Expressions

Use Arabic numerals.

Place a zero before the decimal point if the unit is less than one, as in “0.03 in.”

Omit zeros after the decimal point unless they report a significant digit, such as “10.0 ft.”
3.13.2 Signs and Symbols

Symbols must be of an ASCII format that will not change if the graphic is converted to a PDF. The preferred typeface for AASHTO documents is Symbols.

Do not substitute the letter “O” for zero, a hyphen for a minus sign or a negative number symbol, or the letter “x” for a multiplication sign.

Use the symbol “%” in equations, figures, and tables. Spell out “percent” in text.

Set mathematical expressions with a space on each side of a mathematical symbol between two quantities, such as “\(a + b = c\),” “15 ÷ 5 = 3,” or “32° ± 2°” (8).

Set a one-space separation on each side of the abbreviations “\(\sin, \cos, \tan, \sinh, \cosh, \tan, \log, \ln\),” etc., such as “2 \(\cos \theta\)” or “\(\log p\).” However, if the functions are enclosed in fences, then the expression is closed up, as in “\(\exp(a + b \times \ln(AADT_{maj}) + c \times \ln(AADT_{min}))\)” or in “\(\sigma_i' = A_{ni} + A_{ni} \cos(\omega_i t_i) + B_{ni} \sin(\omega_i t_i)\).”

If the symbol expresses a degree of the number, set the symbol close to the numeral, as in “–4°C” or “\(\leq 25\)” or “\(\pm 6\) mm.”

Use closed spacing between a symbol or numeral and its associated subscript or superscript.

Any symbol set close to a numeral should be repeated after each numeral in a series or group, such as 32° ± 2° or 15% to 30%. The exception to this rule is specified temperatures, which should be set as “45 to 50°F” instead of “45° to 50°F.”

When presented in a list, symbols, abbreviations, and acronyms should appear in the following descending order:

- Roman (English) alphabet capital letters,
- Roman (English) alphabet lowercase letters,
- Greek alphabet capital letters,
- Greek alphabet lowercase letters,
- Subscripts,
- Superscripts,
- Special notes.

If a symbol, abbreviation, or acronym has more than one definition, the explanations are separated by a semicolon, and each definition is explained at its first use in the report.

3.13.3 Decimals and Fractions

Do not mix the use of decimals and fractions in expressing U.S. Customary units.

Be consistent! Fractions should be presented in the same way—\(\frac{1}{2}\) or \(\frac{1}{2}\)—not in a combination of ways, i.e., some using diagonal slashes and some with numerator stacked directly over the denominator, etc.

Mixed numbers, i.e., whole number plus a fraction, are always expressed in numerals.

Fractions that are followed by “of a” or “of an” are generally spelled out.

Place zeros before decimal points if there is no whole unit, as in 0.03 in.
3.13.4 Equations

Numbering
Just as figures and tables, equations are numbered relative to the chapter/section number, i.e., “Eq. (2-3)” would be the third equation in the Chapter/Section 2.

Equation numbers are enclosed in parentheses at the right-hand margin. There should be a minimum of one quarter of an inch between the equation number and the last term in the equation.

The equation number appears on the same line of a single-line equation and on the last line of a multiline equation.

Formatting
All Roman variables are italicized throughout the text. Variables represented by Greek symbols are not italicized.

Original MathType equations may be inserted in Word documents as an object. For InDesign documents, the equation is created in MathType as an EPS file, then saved as a copy. Open the copy file, convert the text to outlines, and then place the equation as a graphic file. (Keep a copy of the original MathType EPS file in case you need to make changes to the equation.)

Variables within the text are set in Word using a TrueType font and italicizing to be consistent with those set in MathType.

Except for special symbols, the font is 11 pt. Times New Roman Regular (10 pt. Times New Roman for Bridge books). Subscripts or superscripts should be 7 or 8 pt. Times New Roman.

Standard mathematical notation is used throughout, including italicizing variables, except as noted below.

Fences/enclosures are used in the preferred order listed in *The Chicago Manual of Style*, working from parentheses outward: { [ ( ) ] }.

The negative-value symbol and the subtraction operator are both represented by an en dash (–).

Individual equations are centered. Formulas with multiple lines are aligned at the equal sign.

Be careful to use the correct symbol for “prime” and not an apostrophe or single-quote:

- Correct: ’
- Incorrect: ‘
- Incorrect: ’

If used when working through formulas, the “therefore” symbol, ∴, appears at the start of a new line.

In equations, the degree symbol (°) can be used to represent both temperature and angle. Usage will be clear from the context. There should be no spaces within the temperature, as in “30°C” or “67°F.”

A short equation in the text should not be broken. If the text before the equation is short, simply set the equation on a separate line.

If an equation is too long for one line, the order of preference for splitting the equation is

- before a “verb” sign (=, ≠, <, >, ≤, ≥, ≈, ≅, etc.)
- before an operator sign (+, −, ×, ÷, etc.)
- after a group of parentheses, brackets, or braces
- before an integral sign (∫)

Do **not** break equations within bracketed items.

In split equations, the first line of the equation should be set flush left. Subsequent lines should be indented in such a way that the last line ends at the right margin.

Extra line space may be used between the lines of a split equation in order to make the equation more legible.

Two or more equations in a series are aligned on the equal signs, centered on the longest equation in the group.

If two equations on the same line are separated by a conjunction, use an em space on each side of the conjunction, as in the following (9):

\[ a + b = c - 1 \quad \text{and} \quad c - 1 = a + b \]

Between two equations displayed on the same line or between an equation and a condition, use two em spaces, as in the following (9):

\[ x^2 + y^n = z^{n-1} \quad (n = 0, 1, \ldots, 9) \]

**Definition List**

A “where” list may be used to define the symbols or variables used in an equation.

Insert a lowercase “where” flush left on the line immediately following the equation.

On the next line, insert flush left the symbols or variables followed by an equal sign and then the definition of that symbol or variable. They should be listed in the order of their appearance in the equation.

The equal signs in the list should align.

Units of measure, if any, should be included at the end of the definition.

The end of each line is punctuated with commas or semi-colons as warranted, and the final line is punctuated with a period. (8)

An example of an equation and its definitions is

\[ r = \frac{Sbd^2}{L} \]  \hspace{1cm} (1)

where

\[ r = \text{loading rate, MN/min (lb/min)}, \]
\[ S = \text{rate of increase in extreme fiber stress, MPa/min (psi/min)}, \]
\[ b = \text{average width of specimen mm (in.)}, \]
\[ d = \text{average depth of specimen mm (in.)}, \]
\[ L = \text{span length, mm (in.)}. \]
Part 3: Style Rules for AASHTO Publications

3.13.5 Units of Measure

Do not mix symbols and names of units. For example, write “km/h” instead of “km per hour.”

Combine numerical values written in figures with unit symbols, e.g., “5 m.” Use a nonbreaking space (hit “Control + Shift + Space bar”) between the numerical value and the unit abbreviation.

If a unit of measurement begins a sentence, spell out both the numeral and the unit of measurement.

Do not use the symbols ′ and ″ for feet and inches in the text. Use “ft” and “in.” instead.

Units of measure are abbreviated identically in the singular and the plural, i.e., write “5 lb” not “5 lbs.” The exception is “kip,” which is treated as a word, i.e., no period and the plural form “kips.”

Except for expressions of percent, place a hyphen between numbers and measurement units if the term is a modifier that precedes a noun, such as, “6-ft board” or “3-in. diameter” (but “diameter of 3 in.”)

Do not hyphenate a modifier consisting of a number followed by a possessive noun (“two months’ work,” not “two-months’ work”).

Units derived from proper names are abbreviated in initial caps (Hz or N) but are lowercase when spelled out (hertz or newtons).

3.13.6 SI and U.S. Units

In AASHTO publications with dual units, metric units appear first and are followed by U.S. Customary units in parentheses.

Use “liter” and “meter” when spelling out SI units.

Use only numbers between 0.1 and 1000 to express the quantity of SI units. For example, 12 000 meters is preferably written as 12 km, not 12 000 m. Similarly, it would be preferable to write 0.003 cubic centimeters as 3 mm³ rather than 0.003 cm³.

Abbreviate “inches” as “in.” to avoid confusion with the word “in”.

Unit of measure abbreviations follow the primary recommendations from The Chicago Manual of Style for U.S. Customary Units and IEEE/ASTM SI 10-2002 for SI Units.

In dual unit publications, use parentheses to enclose U.S. Customary units for hard conversions (rounded metric units, such as “1 m (3.2 ft)”) and brackets to enclose U.S. Customary units for soft conversions (exact re-stating of metric measurements in conversions, such as “1 m [3.281 ft]”).
Except for Bridge books, acceptable abbreviations of commonly used terms are as follows:

<table>
<thead>
<tr>
<th></th>
<th>U.S. Customary Units</th>
<th>SI Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in.</td>
<td>inch</td>
<td>mm</td>
</tr>
<tr>
<td>ft</td>
<td>foot</td>
<td>cm</td>
</tr>
<tr>
<td>yd</td>
<td>yard</td>
<td>m</td>
</tr>
<tr>
<td>mi</td>
<td>mile</td>
<td>km</td>
</tr>
<tr>
<td>rd</td>
<td>rod</td>
<td></td>
</tr>
<tr>
<td><strong>Area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in.(^2)</td>
<td>square inch</td>
<td>mm(^2)</td>
</tr>
<tr>
<td>ft(^2)</td>
<td>square foot</td>
<td>cm(^2)</td>
</tr>
<tr>
<td>yd(^2)</td>
<td>square yard</td>
<td>m(^2)</td>
</tr>
<tr>
<td>mi(^2)</td>
<td>square mile</td>
<td>km(^2)</td>
</tr>
<tr>
<td>rd(^2)</td>
<td>square rod</td>
<td></td>
</tr>
<tr>
<td>acre</td>
<td>acre</td>
<td></td>
</tr>
<tr>
<td>ha</td>
<td>hectare</td>
<td></td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in.(^3)</td>
<td>cubic inch</td>
<td>mm(^3)</td>
</tr>
<tr>
<td>ft(^3)</td>
<td>cubic foot</td>
<td>cm(^3)</td>
</tr>
<tr>
<td>yd(^3)</td>
<td>cubic yard</td>
<td>m(^3)</td>
</tr>
<tr>
<td><strong>Weight/Mass</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oz</td>
<td>ounce</td>
<td>g</td>
</tr>
<tr>
<td>lb</td>
<td>pound</td>
<td>kg</td>
</tr>
<tr>
<td>ton</td>
<td>ton</td>
<td>t</td>
</tr>
<tr>
<td>kip</td>
<td>kip</td>
<td></td>
</tr>
<tr>
<td><strong>Liquid Measure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>cup</td>
<td>mL</td>
</tr>
<tr>
<td>pt</td>
<td>pint</td>
<td>L</td>
</tr>
<tr>
<td>qt</td>
<td>quart</td>
<td></td>
</tr>
<tr>
<td>gal</td>
<td>gallon</td>
<td></td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s</td>
<td>second</td>
<td>s</td>
</tr>
<tr>
<td>min</td>
<td>minute</td>
<td>min</td>
</tr>
<tr>
<td>h</td>
<td>hour</td>
<td>h</td>
</tr>
<tr>
<td>yr</td>
<td>year</td>
<td>yr</td>
</tr>
<tr>
<td><strong>Velocity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ft/s</td>
<td>foot per second</td>
<td>m/s</td>
</tr>
<tr>
<td>ft/min</td>
<td>foot per minute</td>
<td>m/min</td>
</tr>
<tr>
<td>ft/h</td>
<td>foot per hour</td>
<td>m/h</td>
</tr>
<tr>
<td>mph</td>
<td>miles per hour</td>
<td>km/h</td>
</tr>
<tr>
<td>rpm</td>
<td>revolutions per minute</td>
<td></td>
</tr>
<tr>
<td><strong>Acceleration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ft/s(^2)</td>
<td>foot per second squared</td>
<td>m/s(^2)</td>
</tr>
<tr>
<td><strong>Force</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kip (lbf)</td>
<td>pound force</td>
<td>N</td>
</tr>
<tr>
<td>kip-in.</td>
<td>pound force per inch</td>
<td>kN</td>
</tr>
<tr>
<td>kip-ft</td>
<td>pound force per foot</td>
<td>N/m</td>
</tr>
<tr>
<td>kip/ft</td>
<td></td>
<td>N/kg</td>
</tr>
</tbody>
</table>
### U.S. Customary Units and SI Units

<table>
<thead>
<tr>
<th>Pressure or Stress</th>
<th>U.S. Customary Units</th>
<th>SI Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>bar</td>
<td>Pa</td>
</tr>
<tr>
<td>ksi</td>
<td>kip per square inch</td>
<td>kPa</td>
</tr>
<tr>
<td>psi</td>
<td>pound-force per square inch</td>
<td>kPa</td>
</tr>
<tr>
<td>lb-ft²</td>
<td>pound-force per square foot</td>
<td>kPa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Torque</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>in.-lbf</td>
<td>inch pound-force</td>
<td>N·m</td>
</tr>
<tr>
<td>ft-lbf</td>
<td>foot pound-force</td>
<td>N·m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy, Heat, or Power</th>
<th>U.S. Customary Units</th>
<th>SI Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ampere</td>
<td>A</td>
</tr>
<tr>
<td>Ω</td>
<td>ohm</td>
<td>Ω</td>
</tr>
<tr>
<td>V</td>
<td>volt</td>
<td>V</td>
</tr>
<tr>
<td>W</td>
<td>watt</td>
<td>W</td>
</tr>
<tr>
<td>kW</td>
<td>kilowatt</td>
<td>kW</td>
</tr>
<tr>
<td>cal</td>
<td>calorie</td>
<td>J</td>
</tr>
<tr>
<td>◦</td>
<td>degree</td>
<td>◦</td>
</tr>
<tr>
<td>Btu</td>
<td>British thermal unit</td>
<td>K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Light</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cp</td>
<td>candlepower</td>
<td>cd</td>
</tr>
<tr>
<td>cd/in.²</td>
<td>candela per square inch</td>
<td>cd/m²</td>
</tr>
<tr>
<td>fc</td>
<td>footcandle</td>
<td>lx</td>
</tr>
<tr>
<td>lm</td>
<td>lumen</td>
<td>lm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td>hertz</td>
<td>Hz</td>
</tr>
<tr>
<td>mHz</td>
<td>megahertz</td>
<td>mHz</td>
</tr>
</tbody>
</table>

### SI Prefixes

- G: giga
- M: mega
- k: kilo
- h: hecto
- da: deca
- d: deci
- c: centi
- m: milli
- micro
- n: nano
3.14 References

3.14.1 General

AASHTO technical publications usually include a bibliography or reference list at the end of each chapter or section. If, however, the bibliography or reference list applies to the entire book, the bibliography or reference list should be placed after the Glossary but before the Index.

A single bibliography at the end of the chapter or book must include all references—sources with and without in-text citations.

All bibliographic or reference lists must be organized alphabetically by the last name of the author.

If an author has more than one entry, list the items in chronological order with the earliest copyright first.

However, list a single-author entry before a multi-author entry beginning with the same name.

In the case of multiple types of entries by the same author, list the single-author works in chronological order, then the multi-author works in chronological order.

For example:


If the author is not known, use the name of the sponsoring organization as the author. If the sponsoring organization is not known, begin the entry with the title of the work.

Always list the name of the author(s). Do not use “Ibid” or dashes to replace the author’s name.

When specific page numbers are cited, follow the date with “p. x” or “pp. x–xx.” If the volume is specified, follow the volume number with a colon and then the page numbers.

Number the bibliography or reference entries in sequential order.

Citations in the text appear as the reference’s number enclosed in parentheses at the end of the sentence or clause in which the work is referenced. Italicize the reference’s number, but not the enclosing parentheses or the closing punctuation. For example, the following text references entry 2 above, *Discharge Ratings at Gaging Station*:

Discharge measurements at various stages at a site or gaging station provide data for developing a rating curve (2).

3.14.2 Elements to Be Included

The following information should be included in all bibliography or reference lists:

- Author, last name first (for the first author of multi-author works);
Part 3: Style Rules for AASHTO Publications

- Title, including subtitle if necessary;
- Editor, compiler, or translator, if any;
- Edition, if not the first;
- Volume, total number of volumes if entire series is referenced or number of volume if individual volume is being referenced;
- Title of individual volume, if applicable;
- Title of series, if applicable;
- Facts of publication—publisher, city, and date; and
- Page number(s), if applicable.

Samples of types of entries with the information written in the correct sequence and with the correct punctuation follow.

### 3.14.3 Books

#### Single Author

(Set author’s last name, first name or initials (use a space between initials). *Title of book.* Volume or series number or edition (if not the first edition). Publisher, city, state, date.)


#### Two Authors


#### Three or More Authors


#### Books within a Series

(Set title of book in italics; set title of series in italics only if the complete series is grouped under a specific title.)


#### Editor, Compiler, or Translator


Parts of a Book


Group such as Organization, Association, or Corporation as Author

Government Agency as Author

3.14.4 FHWA Publications

**FHWA Reports**
(Set report title in italics.)

**FHWA Circulars**

**FHWA Series**

3.14.5 TRB Publications

**Special Report**
(No quotes around paper title; set series and report title in italics.)

**Record**
(No quotes around paper title; set series in italics. Do not include Record title.)
State-of-the-Art Report
(No quotes around paper title; set series in italics.)

Circular
(Set series and title in italics.)

NCHRP Report
(Spell out NCHRP Report, follow by the report number and a colon, then follow with the title of the report.)

3.14.6 Periodicals
(Include the author’s name (last name first), title of article in roman type, title of periodical in italic type, issue information (volume, issue number, date), and page reference.)

3.14.7 Technical Reports

### 3.14.8 Government Documents

(See also the sections on FHWA and TRB publications.)

**Executive Orders**


**Congressional Record**


**Hearings**

1. U.S. House Science Committee, 108th Congress. *Hearing on H.R. 2551, Surface Transportation Research and Development Act of 2004*. [Follow with the citation to the Congressional Record if possible.]

**Bills and Resolutions**


**Federal Register**


2. 21 F.R. 623.

**Code of Federal Regulations**

1. 43 CFR 192.1.

**U.S.C.**


### 3.14.9 Court Cases


### 3.14.10 Theses and Dissertations

(No quotes or italics.)

3.14.11  Others

**Proceedings**

(Indicate where the conference was held, the publisher (association), location, and date; no quotes for the paper title; set proceedings title in italics.)


**Conference Presentation**

(Indicate where the conference was held, the publisher (association), location, and date; no quotes or italics for paper title.)


3.14.12  Nonprint Materials

**Slides and Films**


**Computer Programs**


**Websites**

(Referencing only the year the document was cited is acceptable if the year of publication is not provided.)


2. FHWA. Computer software and related publications are available from McTrans, 512 Weil Hall, University of Florida, Gainesville, Florida 32611-2083. www.mctrans.ce.ufl.edu Telephone (904) 392-0378 or PC-TRANS, 2011 Learned Hall, University of Kansas, Lawrence, Kansas, 66045. Telephone (913) 864-3199.

3.15 Request to Cite from Other Sources

Citing other sources of information is the responsibility of the author, i.e., whichever task force or subcommittee member, technical reviewer, or consultant is writing the text for a particular chapter, section, or book. By citing other sources, the author is able to relate his work to supporting information and to provide a valuable resource for the reader. Properly citing sources maintains the intellectual integrity of the document and satisfies legal requirements pertaining to copyright issues. Most organizations will grant permission if they get referenced as the source (for example, a note placed under the table or figure stating where it came from). Keep in mind that AASHTO does not typically pay for copyright permissions.

Some examples of things you will need copyright permission for include:

- direct quotes (or sections of text that are substantially unchanged. (Do not just change a word or two and think you can get out of obtaining copyright permission!));
- figures, photos, charts, or graphs that were taken directly from another publication;
- an equation or procedure developed by someone that is unique to a certain publication (if it is not widely used);
- any text, tables, photos, or charts taken directly from publications that are not in the public domain (i.e., not from a government source like FHWA or a state DOT);
- any information from an organization such as ITE, ASTM, IESNA, etc.;
- private sector publications.

Samples of items that generally do NOT need copyright permission include:

- summaries or descriptions that the task force wrote of research studies or procedures as long as they don’t use a direct quote or contain a chart or graph;
- Federal agency documents, such as those of FHWA, EPA, DOE, etc.;
- State agency documents, such as those of State DOTs;
- Local government publications, such as those of the City of Los Angeles.

Permission to use copyrighted material is usually limited to one edition of a publication. Therefore, if you plan to re-use an item that was previously cited in an earlier edition of an AASHTO publication, you will need to obtain an updated copyright permission.

To obtain copyright permission from the source, fill out the Permissions Request form. Send both this form and the Transfer of Copyright Agreement to the appropriate author or publisher. Ask them to fill out and sign the Transfer of Copyright Agreement form and return it to you. Provide copies of all forms and related correspondence to AASHTO at the time that you submit the document.
Permission Request

Date:

To: [Name]
[Address]

I am preparing a document to be published by AASHTO.

Document Title:

Estimated publication date:

Approximate number of pages:

Distribution:

I request your permission to include the following material in this and all subsequent editions of the book.

Author/Publisher:

Title of document:

Text:

Figure(s):

Table(s):

Photo(s):

Equation(s):

(Please see attached photocopies of the referenced material.)

Please indicate agreement by signing and returning the enclosed copy of this letter. In signing, you warrant that you are the sole owner of the rights granted and that your material does not infringe upon the copyright or other rights of anyone. If you do not control these rights, I would appreciate your letting me know to whom I should apply.

AGREED AND ACCEPTED BY:

Authorized Signature

Date __________________

Name (please print)

[Title]

[Agency or Firm]

Credit and/or copyright notice to appear:

Thank you for your expediency in addressing this matter.

Please return to:

Sincerely,
TRANSFER OF COPYRIGHT AGREEMENT

To: ___________________________________________ Date: _________________________________

Contact Author Name and Full Address:

_________________________________________________________________________________

__________________________________

_______________________________________________

Copyright to: ______________________________________________________________________

_________________________________________________________________________________

By: ______________________________________________________________________________

To be published by the American Association of State Highway and Transportation Officials in:
[Name of Publication]

The owner of the copyright hereby assigns and forever transfers all right, title and interest, including copyright to the
American Association of State Highway and Transportation Officials [for U.S. Government employees: to the extent
transferable], including all rights of reproduction, distribution, display, and the right to create derivative works. However,
the author(s) reserves the following:

All proprietary rights other than copyright, such as patent rights.
The right to use all or part of this article in future works of his or her own, such as lectures, press releases, reviews, textbooks,
or reprint books.
Has this article been published elsewhere? No _____ Yes _____ If yes, when and in what publication?

__________________________________________________________________________________

Did the prior publication request and receive a transfer of copyright? No _____ Yes _____ If yes, please attach any document
executed as a condition to prior publication and give name of publication and date of issue.

__________________________________________________________________________________

As author(s) of this work, I (we) warrant that I am (we are) the sole owner(s) of all rights in the work; that the work is original
with me; that any material not original with me (us) and appearing in the work appears with the written permission of the
copyright owner of such work and such permission is hereby attached. I (we) also warrant that the work does not violate or
infringe any existing copyright and that I (we) have full power to enter into this agreement. I (we) agree to indemnify AASHTO
for any damages and legal fees incurred by AASHTO for copyright infringement claims that arise due to publication of this
work.

____________________________________________________________

Signature (of author or employer) 

____________________________________________________________

Agency or Firm 

____________________________________________________________

Title 

____________________________________________________________

Date

All authors, or in the case of a “work made for hire” the employer, must sign this agreement prior to publication of the work by
AASHTO. (Use additional sheets as necessary.)

Please return by fax to +1 202-508-3835. 

(Rev. 3/16/2005)
3.15.1 Trade Names
Avoid proprietary trade names (i.e., trademarks) for a particular product.

If use of a trade name cannot be avoided, the product name should be immediately followed by a registered trademark symbol, superscripted, as in “Brakemaster℠”.

Note: Exceptions to the rule of trade names include words that have become accepted as generic. These terms include such words as babbitt, cellophane, diesel, kraft, neoprene, nylon, portland cement, and saran. If in doubt, check the dictionary.

3.15.2 Endnotes and Footnotes
AASHTO prefers endnotes placed at the end of each chapter or article. Footnotes will be accepted, however.

Notes shall be numbered consecutively within each chapter or article. (Notes to tables or figures are numbered separately.)

Superscript reference note numbers should be placed at the end of the sentence outside all punctuation marks except a dash.

3.15.3 Text Citations
AASHTO employs the reference number system for citations of references within the text. In this system, the reference items are listed alphabetically by authors’ last names and numbered sequentially. The reference number cited within the text is placed at the end of the sentence but before the period. Italicize the reference number, but not the enclosing parentheses. For example,

- Two-lane arterials generally have all-weather surfaces and are marked and signed in accordance with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) (9).

If the full title of the work is cited, italicize the title. If a chapter or section of that work is cited, enclose the title of that section in quotation marks. For example,

- Recommendations can be found in AASHTO’s Roadside Design Guide.
- See the section on “Mathematical Expressions” under “Style Rules” in Style Manual for AASHTO Publications.

AASHTO Bridge books prefer to use author/date citations. Examples would be

- The conference proceedings contain a collection of papers dealing with vessel collision, scour, and earthquake design for highway bridges (FHWA 1996).
- Figure C3.9-1—Elevation View of Set-Up for Woisin’s Ship Model Collision Tests at Howldtswerke-Deutsche Werft, Hamburg (Woisin 1971)

Cross-references for author/date citations should be formatted as follows:

- Single author, single publication—without punctuation, i.e., “(FHWA 2009)”
- Single author, multiple publications—use a comma to separate dates of publication, i.e., “(FHWA 2003, 2010)”
- *Multiple authors, single publication*—use a comma to separate authors and dates of publication, i.e., “(Jones and Smith, 2010)” or “(Jones, Brown, and Smith, 2007)”

- *Multiple authors, multiple publications*—enclose each publication within separate parentheses, i.e., “(Jones and Smith, 2010) (Jones, Brown, and Hammond, 2007) (FHWA 2009)”
Bibliography for Style Manual for AASHTO Publications


