COMMUNICATION REFERENCE GUIDE: UPDATES

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The information in this document is applicable as of 07/01/2021.

FOREWORD

This document provides updates to the Turner-Fairbank Highway Research Center R&D Communication Reference Guide (CRG) (HRT-15-058). Authors use the CRG as a standard when preparing communication products to document and promote the Federal Highway Administration's (FHWA's) work. Since the CRG was published in 2017, there have been several updates to processes that are not reflected in the current version. The Marketing and Communications Team (HRTM-20) has also identified several areas where the guidance in the CRG is frequently misunderstood and could use further clarification. This document consolidates changes and clarifications to the CRG into a single reference. Authors can use this CRG Updates document as a supplement to the CRG when preparing their communications products.

The updates are grouped by topic, as listed in the table of contents, so that authors can easily review all updates related to each topic. For example, while references are mentioned several times throughout the CRG, all updates related to references are grouped together in this document for reader convenience. Where applicable, relevant CRG sections and page numbers are provided so that readers can review the existing CRG section along with the updated information. The updates provide an explanation of what has changed and why the changes were made.

TABLE OF CONTENTS

FOREWORD **1**

ATTRIBUTION LINES **3**

REFERENCES **6**

Update to CRG Table 9 ..... **6**

Author–Date In-Text Citations **9**

Unpublished Sources **10**

508 COMPLIANCE **10**

Symbols in Text **11**

Underlined Text **11**

Alt Text for Equations **11**

Discussing Colored Elements of Images **12**

Inserting Equations and Formulas **12**

Color Contrast and 508 Compliance **12**

Tables **13**

LIST OF FIGURES

Figure 1. Photograph. Example figure with a source attribution line. 3
Figure 2. Illustration. Example figure with a copyright attribution line. 4
Figure 3. Graphs. Example compound figure with attribution lines for each subfigure. 5
Figure 4. Equation. Example equation. 11
Figure 5. Graph. Example of text failing 508 color-contrast requirements. 13
Figure 6. Graph. Example of text passing 508 color-contrast requirements. 13

LIST OF TABLES

Table 1. Reference citations and examples. 6
Table 2. Example simple table. 14
Table 3. Example complex table. 15

ATTRIBUTION LINES

Relevant CRG sections: Copyright, pp. 21–24; Figures and Tables, pp. 37–44

The *Communication Reference Guide* (CRG) states that including attribution information for FHWA-owned images is recommended, but it does not explicitly require the information. Updated guidance on attribution lines from the Office of the Chief Counsel now requires authors to include an attribution line under every image, even if the image belongs to the Federal Highway Administration (FHWA) or was created for the subject publication. Figure 1 and figure 2 show examples of source and copyright attribution lines, respectively.

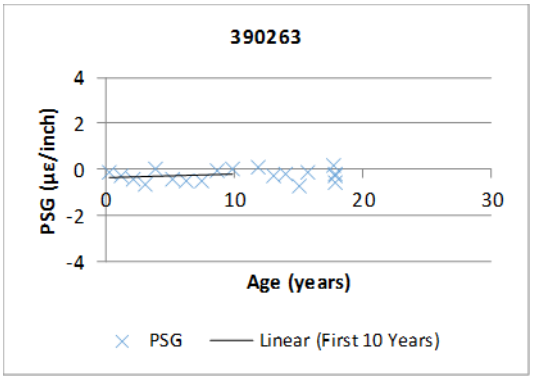
Source: FHWA.

Figure 1. Photograph. Example figure with a source attribution line.

© 2019 The State of California.

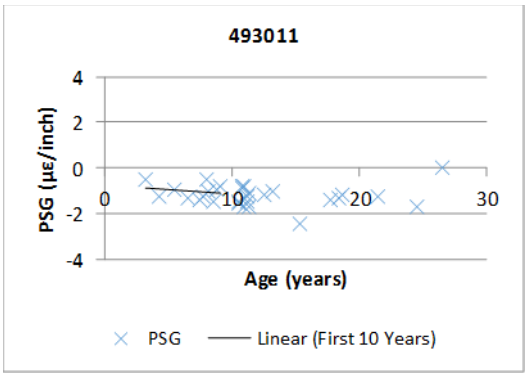
Figure 2. Illustration. Example figure with a copyright attribution line.

This updated guidance also extends to compound figures. Each subfigure must include an attribution line (figure 3).



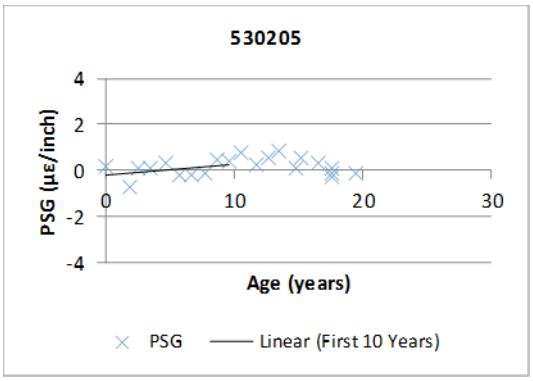
Source: FHWA.

A. Example of first subfigure.



Source: FHWA.

B. Example of second subfigure.



Source: FHWA.

C. Example of third subfigure.

Figure 3. Graphs. Example compound figure with attribution lines for each subfigure.

REFERENCES

This section aims to clarify or correct some of the reference guidance in the CRG.

Update to CRG Table 9

Relevant CRG section: Appendix P: Reference Information and Examples, pp. 125–127

Table 9 in the CRG did not fully cover the most common reference types and did not align with styles available in reference generators. When deferring to the CRG or *Government Publishing Office Style Manual* (GPO) as the main style guide(s), authors should refer to table 1 of this CRG Updates document, which aligns with the *Chicago Manual of Style* (CMOS), for guidance on preparing references.

Note that, while this recommended approach aligns with CMOS, authors still have the option to choose the style manual of their liking.

Table 1. Reference citations and examples.

Reference Type	Reference Elements	Example Reference
Blog post	Author(s) Year of publication Title of blog post Title of blog (include "(blog)" if not in title) Publisher name Date of blog post URL and last-accessed date	Chao, E. L. 2020. "SpaceX Launch on November 15, 2020." *Connections* (blog), U.S. Department of Transportation. November 16, 2020. https://www.transportation.gov/connections/spacex-launch-november-15-2020, last accessed November 28, 2020.
Book	Author(s) Year of publication Title Publisher city/province and State/country Publisher name Optional URL and last-accessed date	Huang, D., and B. Hu. 2020. *Concrete Segmental Bridges: Theory, Design, and Construction to AASHTO LRFD Specifications*. Boca Raton, FL: CRC Press. https://doi.org/10.1201/9780429485473, last accessed January 21, 2021.

Reference Type	Reference Elements	Example Reference
Journal article	Author(s) Year of publication Article title Journal title Volume Issue Optional page range Optional URL and last-accessed date	Shiffrin, R., and W. Schneider. 1977. "Controlled and Automatic Human Information Processing: II. Perceptual Learning, Automatic Attending, and a General Theory." *Psychological Review* 84, no. 2: 127–190. https://psycnet.apa.org/record/1977-24785-001, last accessed November 21, 2020. Mok, H. T., and Smith, R. 1997. "Prediction of Highway Performance Monitoring System's Present Serviceability Rating for Local Agencies Using San Francisco Bay Area Pavement Management System." *Transportation Research Record* 1592:107–115. http://dx.doi.org/10.3141/1592-13, last accessed November 18, 2020.
Report	Author(s) Year of publication Title Publication number Publisher city/province and State/country Publisher name Optional URL and last-accessed date	Ocel, J. 2021. *Historical Changes to Steel Bridge Design, Composition, and Properties*. Report No. FHWA-HRT-21-020. Washington, DC: Federal Highway Administration. https://www.fhwa.dot.gov/publications/research/infrastructure/structures/bridge/21020/index.cfm, last accessed February 3, 2021.
Social media post	Author (include handle if applicable) Year of publication Text of post (up to 160 characters) Social media platform Date and time of post URL and last-accessed date	Federal Highway Administration (@USDOTFHWA). 2021. "Agencies use crowdsourced data to improve real-time traveler information, such as dynamic message signs for motorists." Twitter, February 2, 2021, 11:01 a.m. https://twitter.com/USDOTFHWA/status/1356633850127003654, last accessed February 3, 2021.
Software	Owner(s) Year of release Title Version	International Road Dynamics Inc. 2018. *iAnalyze* (software). Version 7.7.
Specification/standard	Author(s) Year of publication Title Specification/standard number Publisher city/province and State/country Publisher name Optional URL and last-accessed date	SAE International. 2016. *On-Board System Requirements for V2V Safety Communications*. SAE J2945/1. Warrendale, PA: SAE International. https://www.sae.org/standards/content/j2945/1_201603/, last accessed June 5, 2019.

Reference Type	Reference Elements	Example Reference
Thesis/dissertation	Author(s) Year of publication Title Type of document (e.g., Master's thesis) Name of school/university Optional URL and last-accessed date	Khattak, Z. 2016. "Evaluating the Operational and Safety Aspects of Adaptive Traffic Control Systems in Pennsylvania." Master's thesis. University of Pittsburgh. http://d-scholarship.pitt.edu/26899/1/ZulqarnainKhattak_etdPitt2016_%28final%29.pdf, last accessed July 29, 2020.
Website or web page	Author(s) Year of publication (use "n.d." if not available) Title of website/web page Type of reference (e.g., website, web page) URL and last-accessed date	Federal Highway Administration. n.d. "What's New" (web page). https://www.fhwa.dot.gov/publications/lists/whatsnew/index.cfm, last accessed August 13, 2016.
Workshop or meeting presentation/proceeding	Author(s) Year of presentation/proceeding Title of presentation/proceeding Workshop/meeting title Workshop/meeting city/province and State/country Workshop/meeting sponsor Optional URL and last-accessed date	Gibbons, R., C. Andersen, and J. Hankey. 2005. "The Wet Night Visibility of Pavement Markings: A Static Experiment." Presented at the *84th Annual Meeting of the Transportation Research Board*. Washington, DC: Transportation Research Board.

Note: Any URL included in a reference must have a last-accessed date.

Author–Date In-Text Citations

Relevant CRG section: References and Bibliography, pp. 34–35

The CRG showed author–date references with punctuation before the reference citation; this was inconsistent with CMOS and other commonly used reference manuals. With this update, recommended formatting for author–date in-text citations has been standardized to align with CMOS. When using the author–date reference style, place in-text citations before the ending punctuation of a sentence. The following example demonstrates where the in-text citation should appear in relation to the ending punctuation:

> This approach contrasts with the *Manual for Bridge Evaluation*, which suggests reducing capacity by a factor that accounts for general condition (AASHTO 2018).

Note that, while this recommended approach aligns with CMOS, authors still have the option to choose the style manual of their liking.

When citing works with four or more authors, abbreviate the in-text citation by naming the first author and then including "et al.," as in the following example:

> Facility types were identified as paved or unpaved roads (Calvert et al. 1999).

When citing two or more references by the same author(s) or with identical in-text citations, name the author(s) once and then separate the years of publication with commas, as in the following example:

> A few resources identified the facility types as paved or unpaved roads (Calvert et al. 1999, 2001, 2005; Knapp 2014).

When citing two or more references, separate each reference with a semicolon, as in the following example:

> Two resources identified the facility types as paved or unpaved roads (Calvert et al. 1999; Knapp 2014).

When naming a reference in a sentence, add the year of publication in parenthesis directly following the name, as in the following example:

> Calvert et al. (1999) identified facility types as paved or unpaved roads.

When there are two or more references with identical in-text citations, add a lowercase letter after the year of publication to differentiate them. The following examples demonstrate using lowercase letters to differentiate references with identical in-text citations:

Reference Examples

Randolph, D., H. Patterson, A. Baunee, and K. Dietz. 2021a. *Exploring Why Bridge Surfaces Freeze Before the Road*. Report No. AC-1. Hometown, AK, Americana Company Inc.

Randolph, D., H. Patterson, A. Baunee, and K. Dietz. 2021b. *How AI is Watching for Pedestrians*. Report No. AC-2. Hometown, AK: Americana Company Inc.

Randolph, D., A. Baunee, K. Dietz, K. Patterson, and J. Seacrist. 2021c. *Evaluating the Effectiveness of Low Bridge Ahead Warnings*. Report No. AC-3. Hometown, AK: Americana Company Inc.

In-Text Citation Example

Past research on various focus areas confirms this finding (Randolph et al. 2021a, b, c).

Unpublished Sources

Relevant CRG section: References and Bibliography, pp. 34–35; Appendix P: Reference Information and Examples, pp. 125–127

The CRG makes brief mention of how to handle unpublished data sources but does not go into detail. Unpublished sources should not be included in the References list. Instead, an unpublished source should be cited as a footnote in the text. In the footnote, include the type of information obtained, from whom the information was obtained, and when the information was obtained. The following examples demonstrate how unpublished sources should appear as footnotes:

[1]FHWA staff member; interview conducted by evaluation team members Margaret Petrella, Sarah Plotnick, and Matthew Keen on August 20, 2019.

[2]Project partner; phone interview conducted by FHWA staff member on October 8, 2019.

[3]These data are unpublished and are only included as a reference to evaluate the effectiveness of the treatment. Data were obtained by the research team via personal communication with VDOT staff.

508 COMPLIANCE

Relevant CRG section: Section 508 of the Rehabilitation Act, pp. 12–13

The CRG makes clear that all public-facing and internal electronic content, as well as electronic content communicating agency official business developed, procured, maintained, or used by the Government, needs to conform to Section 508 of the Rehabilitation Act. However, it does not go into detail on some of the things that authors need to do to ensure 508 compliance. This section aims to clarify approaches and items that make a research document 508 conformant, reflecting

the latest direction from FHWA's 508 compliance officer. *Please note that this is not an exhaustive list of all things authors should do and check for when producing a document that can be made accessible.* Please visit FHWA's Section 508 website, https://www.fhwa.dot.gov/508/, the agency's comprehensive, one-stop location for information on Section 508.

Symbols in Text

Authors should use Unicode characters (found in the Symbols dropdown on the Insert tab in Word) when inserting symbols throughout the text. Symbols include Roman numerals (e.g., Ⅰ, Ⅱ, Ⅲ), Greek letters (e.g., α, β, γ), mathematical operators (e.g., −, ×, ≥), and other general symbols (e.g., ℉, ™, ✓). A Unicode character is encoded with a specific meaning. Unicode is particularly important and helpful for those using assistive technologies to read FHWA research products because they ensure information is properly communicated to such users. For example, if the capital letter I is used three times instead of the Unicode Roman numeral Ⅲ, text-reading assistive technologies will read that (phonetically) as "eye eye eye" rather than "3" or "Roman numeral 3." To maintain 508 conformance, it is necessary to use Unicode characters when inserting symbols whenever possible to maintain meanings for all users.

Underlined Text

In FHWA research products, underlined text indicates an active hyperlink (e.g., URLs, email addresses). To maintain this meaning, no other text in the document should be underlined. Reserving underlined text for hyperlinks aids document usability for all users.

Alt Text for Equations

Relevant CRG section: Examples of 508 Captions for Nontext Elements, p. 19

Per new FHWA guidance, authors must write alt text for equations as the equation would be read aloud. For example, acknowledging this new guidance, the alt text for the equation in figure 4 would be written as follows:

> AREA subscript 7 equals 4 plus 6 open parenthesis d subscript 8 divided by d subscript 0 close parenthesis plus 5 open parenthesis d subscript 12 divided by d subscript 0 close parenthesis plus 6 open parenthesis d subscript 18 divided by d subscript 0 close parenthesis plus 9 open parenthesis d subscript 24 divided by d subscript 0 close parenthesis plus 18 open parenthesis d subscript 36 divided by d subscript 0 close parenthesis plus 12 open parenthesis d subscript 60 divided by d subscript 0 close parenthesis.

$$AREA_7 = 4 + 6\left(\frac{d_8}{d_0}\right) + 5\left(\frac{d_{12}}{d_0}\right) + 6\left(\frac{d_{18}}{d_0}\right) + 9\left(\frac{d_{24}}{d_0}\right) + 18\left(\frac{d_{36}}{d_0}\right) + 12\left(\frac{d_{60}}{d_0}\right)$$

Figure 4. Equation. Example equation.

When using Greek letters in alt text, use capital or lowercase letters that correspond to whether the Greek letter is capitalized or lowercase in the equation (e.g., λ = "lambda"; Λ = "Lambda").

Discussing Colored Elements of Images

Relevant CRG section: Section 508 and Publication Content, pp. 16–17

The CRG briefly touches on not using color as the only differentiator of information. This applies not only to the in-line text of a document but also to the alt text that accompanies a document's images. When discussing an image, avoid using color to describe objects (e.g., "the gray line in figure 6…"); instead, describe the object and what it signifies (e.g., "the HRI line…"). Color that imparts a specific meaning beyond the figure itself, such as double yellow lines on a road, is an exception.

Inserting Equations and Formulas

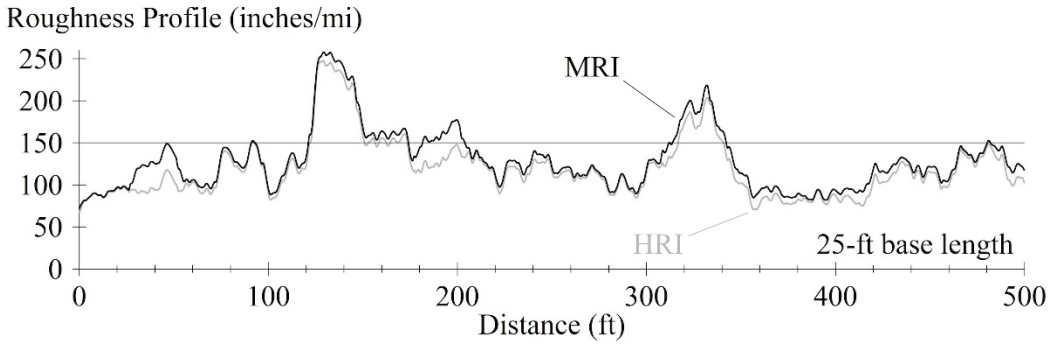
Relevant CRG section: Equations and Formulas, p. 45

The CRG states that authors need to insert static images (.jpg files) of any equations or formulas. Updated FHWA guidance now allows authors to submit equations in an equation-editor tool (e.g., Word's Equation Tool or MathType) instead. This both facilitates corrections and improves the quality of the final published document. These equation-editor objects will be converted to images at a later point during the editorial process. Equation editor tools currently do not support the addition of alt text. Authors must provide alt text for all equations separately, and it will be added to the images during the editorial process.

Color Contrast and 508 Compliance

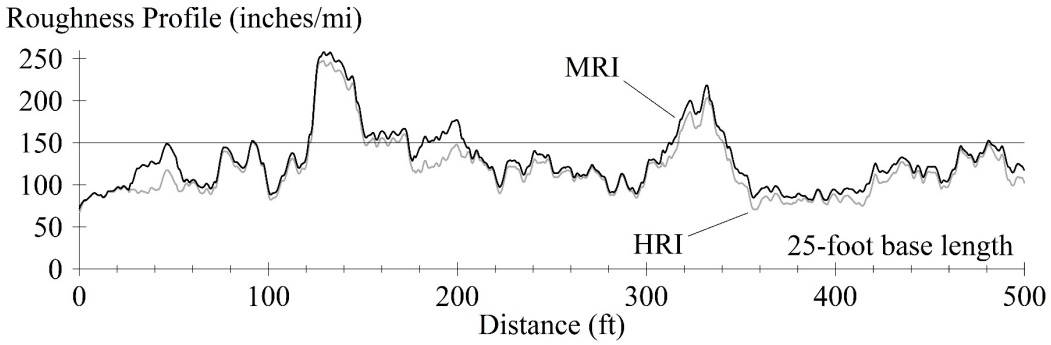
Relevant CRG section: Section 508 and Publication Content, p. 16

The CRG briefly states that authors should select colors and graphics that have high contrast. New FHWA guidance provides further direction on color contrast. Meaningful text color must meet minimum contrast against its background. The Section 508 color contrast is defined by WCAG 2.0, level AA, Success Criterion 1.4.3. This criterion applies to images of text where allowed. The contrast requirement does not apply to incidental text or to logos. Authors can use the TPGi color contrast analyzer (https://www.tpgi.com/color-contrast-checker/) to test for conformance. For example, in figure 5, "HRI" is too light and fails to conform with color-contrast requirements. The same text in figure 6 has been corrected to a darker color that passes the color-contrast conformance test.



Source: FHWA.

Figure 5. Graph. Example of text failing 508 color-contrast requirements.



Source: FHWA.

Figure 6. Graph. Example of text passing 508 color-contrast requirements.

Tables

Relevant CRG sections: Expediting the Editing Process, pp. 7–8; Section 508 and Publication Content, pp. 16–17

The CRG encourages authors to use a simple table format for all tables. However, authors are no longer limited to the simple table format. Tables with merged cells are acceptable as long as all data cells clearly correlate to unique column and row headers. This approach means that all columns must have a unique header that reads down. That unique header may span a few heading levels if the author uses multiple headings and merged cells (for example, the third column in table 3 has two headers that create a unique header for that column of data: first "95% Confidence Level" and second "NV").

The following example presents the same contents in both simple (table 2) and complex (table 3) table formats. Both formats are acceptable.

Table 2. Example simple table.

Crash Type	Expected Reduction in Crashes (%)	95% CL NV	95% CL NC	95% CL OK	95% CL OR	90% CL NV	90% CL NC	90% CL OK	90% CL OR
All	10	*143	*158	*224	*545	*101	*111	*158	*385
All	20	30	33	46	113	21	23	33	80
All	30	11	12	17	40	8	8	12	29
All	40	5	5	7	18	3	4	5	13
KABC	10	346	438	636	1,189	245	309	449	840
KABC	20	*71	*90	*131	*245	*51	*64	*93	*175
KABC	30	26	32	47	88	18	23	33	62
KABC	40	11	14	21	39	8	10	15	27
RE	10	393	414	488	1,115	277	293	345	788
RE	20	*81	*86	*101	*230	*58	*61	*72	*164
RE	30	29	31	36	82	21	22	26	58
RE	40	13	13	16	36	9	10	11	26
ANG	10	307	773	2,681	9,692	217	546	1,894	6,846
ANG	20	*63	*160	*553	*2,000	*45	*113	*394	*1,423
ANG	30	23	57	198	715	16	40	140	508
ANG	40	10	25	87	315	7	18	62	223
LT	10	475	840	818	4,065	336	593	578	2,871
LT	20	*98	*173	*169	*839	*70	*123	*120	*597
LT	30	35	62	60	300	25	44	43	213
LT	40	15	27	27	132	11	19	19	94
LTOT	10	N/A	1,145	857	6,632	N/A	809	605	4,684
LTOT	20	N/A	236	177	1,368	N/A	168	126	974
LTOT	30	N/A	*85	*63	*489	N/A	*60	*45	*347
LTOT	40	N/A	37	28	216	N/A	26	20	153

*Recommended sample-size values.
N/A = not available.

Table 3. Example complex table.

Crash Type	Expected Reduction in Crashes (%)	95% Confidence Level				90% Confidence Level			
		NV	NC	OK	OR	NV	NC	OK	OR
All	10	*143	*158	*224	*545	*101	*111	*158	*385
	20	30	33	46	113	21	23	33	80
	30	11	12	17	40	8	8	12	29
	40	5	5	7	18	3	4	5	13
KABC	10	346	438	636	1,189	245	309	449	840
	20	*71	*90	*131	*245	*51	*64	*93	*175
	30	26	32	47	88	18	23	33	62
	40	11	14	21	39	8	10	15	27
RE	10	393	414	488	1,115	277	293	345	788
	20	*81	*86	*101	*230	*58	*61	*72	*164
	30	29	31	36	82	21	22	26	58
	40	13	13	16	36	9	10	11	26
ANG	10	307	773	2,681	9,692	217	546	1,894	6,846
	20	*63	*160	*553	*2,000	*45	*113	*394	*1,423
	30	23	57	198	715	16	40	140	508
	40	10	25	87	315	7	18	62	223
LT	10	475	840	818	4,065	336	593	578	2,871
	20	*98	*173	*169	*839	*70	*123	*120	*597
	30	35	62	60	300	25	44	43	213
	40	15	27	27	132	11	19	19	94
LTOT	10	N/A	1,145	857	6,632	N/A	809	605	4,684
	20	N/A	236	177	1,368	N/A	168	126	974
	30	N/A	*85	*63	*489	N/A	*60	*45	*347
	40	N/A	37	28	216	N/A	26	20	153

*Recommended sample-size values.
N/A = not available.