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| **12. Sponsoring Agency Name and Address**  Illinois Department of Transportation (SPR)  Bureau of Research  126 East Ash Street  Springfield, IL 62704 | | | | **13. Type of Report and Period Covered**  ICT will provide prior to posting | | |
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*[All publications for ICT projects should include the following acknowledgment.]*

This publication is based on the results of **ICT-R27-XXX [project number]: Project Title**. ICT-R27-XXX was conducted in cooperation with the Illinois Center for Transportation; the Illinois Department of Transportation; and the U.S. Department of Transportation, Federal Highway Administration.

Members of the Technical Review Panel (TRP) were the following:

[insert list of all TRP members and their affiliations, past and present, beginning with the chair]

*[All publications giving the results of any investigation should contain the following disclaimer statement.]*

The contents of this report reflect the view of the author(s), who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Illinois Center for Transportation, the Illinois Department of Transportation, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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Executive Summary

The executive summary must be no longer than three pages. It should present the study’s primary objectives and scope or the reasons for writing the report. The techniques or approaches should be described only to the extent necessary for comprehension, and findings and conclusions should be presented concisely and informatively. The executive summary should not contain unfamiliar terms that are not defined, undefined acronyms, reference citations, or displayed equations or lists.

When writing the executive summary, please use past tense verbs.

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All ICT project reports must be written in good scientific English. Poor sentence structure and grammar lead to delays in ICT’s technical editing process, the TRP’s review, and final publication. ***Reports containing excessive errors in grammar, syntax, spelling, and punctuation will be returned to the Principal Investigator (PI) for improvement***.

The PI is responsible for ensuring that the report conforms to standards of good writing. Therefore, if someone else writes a report (such as a coauthor or student), the PI should review the report before submitting it to ICT for editing.

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ICT REPORT FORMAT AND TEMPLATE

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To see/apply the pre-set styles, access the Word style gallery under the Home tab or select Alt+Ctrl+Shift+S. **All the styles you should use are preceded by “ICT.”** Click on the text in your report that you wish to apply a style to, then click on the desired style from this list. The following pages contain sample heading styles, body text styles, and figure and table captions.

Contact ICT Project Management at ICTProjectManagement@illinois.edu if you have any questions about using Word templates and styles.

CHAPTER 1: Introduction

SECTION TITLE [ICT HEADING 1]

Lorem ipsum dolor sit amet, an ius paulo doming, eu quo simul soluta. Vel ocurreret inciderint ad, no mundi periculis assueverit mei. Ad vel vidisse iuvaret, ut nam velit ludus. His ea dicunt ancillae hendrerit. Solet nominati quo ne, dicant accusamus consulatu vel te, has alia perfecto mnesarchum.

Nam dictas habemus propriae eu, est ad mutat solet cotidieque. Nam dolore deseruisse cu. No omnium postulant nec. Debet doctus vim ne.

Errem imperdiet usu ne, ei vel error iudicabit intellegat. Mea ne wisi eirmod, insolens platonem qui ea. Persius tibique quaestio sed ei, sed summo zril partem ne. Id mea esse paulo vulputate. Ad usu rebum dolor postea.

Subsection Title [ICT HEADING 2]

Modus ludus an per, sea delectus principes ut. Pro ea duis labores veritus, ut est etiam bonorum volutpat. Populo mediocrem eu ius. Pro cu tantas eligendi, malis theophrastus duo eu. Mei id novum noluisse moderatius, usu in dolore pericula. Paulo intellegat pro ut, cu cum alia theophrastus.

In vix corpora posidonium, te pri brute salutandi disputando. Et illum percipit quo, assum utamur dissentias no cum. Pro hinc putent referrentur cu, nibh omnes contentiones sed no. Ad mea ipsum atqui singulis, vocent salutatus duo ea.

Sub-Subsection Title [ICT HEADING 3]

Ad tale gubergren vix, quo an sumo veniam fierent. Porro melius facilisi pro an, vix docendi accusam postulant et, pro ne graece postea probatus. Et vim quis ullum epicuri, inermis veritus id mel. Suas definiebas persequeris vis an. Eum corpora forensibus adolescens ea, tritani mentitum vulputate te vel.

Sub-Sub-Subsection Title [ICT HEADING 4]

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Chapter 2: Formatting Figures

Each figure should be separate and should have its own figure number and caption. The basic requirements to create Section 508 compliant figures are listed below:

* Do not include sub-numbers (1-1, 1.2, etc.) with figures.
* Number figures consecutively throughout the report and appendices, not per chapter.
* Provide [alternative text](https://www.fhwa.dot.gov/publications/research/general/15058/004.cfm?#_Toc474772831) that describes the information conveyed in the figure. To add alternative text, right click on the figure and select “Edit Alt Text.” Right click on the figures below to view their alternative text.
* Include a description of the image type (i.e., photo, graph, equation, chart, diagram, illustration) in the figure caption.
* Avoid composite figures with multiple captions. (See Figure 4).
* All images, tables, and objects must be in line with the text. To position each figure in line with text, right click on the image, select Wrap Text, and then select In Line with Text.

This photo shows the top of the concrete precast deck of beam 4F1 after grouting the specimen in place. Six shear pockets can be seen in the deck; each is filled with fresh grout, and the shear studs are not visible. The concrete deck has lifting hooks in it. The beam is in a load testing frame inside a structural testing lab. A steel column and one of the actuators used for testing are visible.

Figure 1. Photo. After grouting large-scale beam specimen 4F1.

Source: Provines et al. (2019)

This figure plots area under the curve (AUC) on the y-axis (range 0.5 to 1) versus seconds on the x-axis (range 17 to 21). The solid line is extended, the dashed line is predicted, and the dash-dot line is vector autoregression model. From 17 through 19 seconds, values for all lines are just over 0.65. From 19 through 21 seconds, the predicted and VAR lines are very similar, staying near 0.65 until increasing to just over 0.7 at 21 seconds. The extended line increases to 0.7 at 20 seconds and 0.85 at 21 seconds.

Figure 2. Graph. AUC profile of reference (original data), predicted (ARMA) method, and   
VAR method.

Source: Flannagan et al. (2019)



A. Transverse cracking in a concrete bridge



B. Transverse cracking in a steel girder bridge

Figure 3. Photo. Transverse cracking in a concrete bridge and steel girder bridge.

Source: ICT (2020)

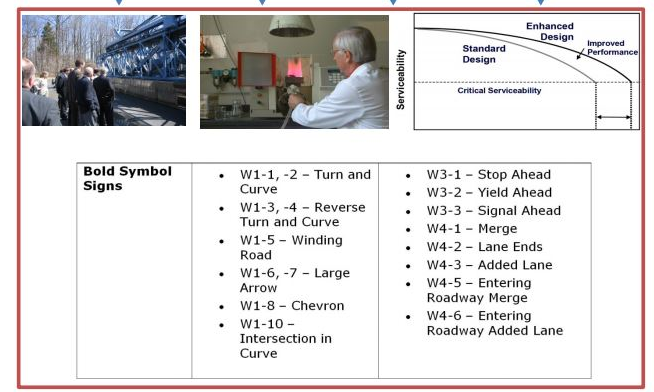


Figure 4. Multiple elements. Example of a Section 508 noncompliant composite figure.

Source: FHWA (2017)

Chapter 3: Formatting Equations

The basic requirements to create Section 508 compliant equations are listed below:

* Label equations as figures.
* Format equations as .jpg files. Note that not all computers and operating systems can interpret special math and scientific fonts.
* Provide [alternative text](https://www.fhwa.dot.gov/publications/research/general/15058/004.cfm?#_Toc474772831) with equations. For example, the alternative text for Figure 5 is as follows: Open parenthesis y minus mu subscript 2 divided by 3 sigma subscript 2 close parenthesis squared plus open parenthesis z minus mu subscript 3 divided by 3 sigma subscript 3 close parenthesis equals 1.
* Use Math ML—rather than LaTeX— to generate equations, as it is screen-reader friendly.

Open parenthesis y minus mu subscript 2 divided by 3 sigma subscript 2 close parenthesis squared plus open parenthesis z minus mu subscript 3 divided by 3 sigma subscript 3 close parenthesis equals 1.

Figure 5. Equation. Simplified equation for two-dimensional ellipsoid to represent the second and third PCs.

Source: Flannagan et al. (2019)

Chapter 4: Formatting Tables

The basic requirements to create Section 508 compliant tables are listed below:

* Create tables using the built-in feature in Microsoft Word. Do not include pictures of tables.
* Do not include sub-numbers (1-1, 1.2, etc.).
* Consecutively number tables throughout the report and appendices, not per chapter.
* Avoid using complex tables with merged and/or split cells (see Table 2).
* Only use tables to display data. Do not use tables to organize and arrange images or text on a page or to format the layout of a page in any way.

Table 1. Mix Designs

|  | **Control Mix** | **Type K Mix** |
| --- | --- | --- |
| Water\* | 267 | 286 |
| Type I Cement\* | 608 | 455 |
| Type K | — | 90 |
| Fine Aggregate\* | 1129 | 1069 |
| Coarse Aggregate\* | 1825 | 1831 |
| W/C Ratio | 0.44 | 0.52 |

\* Quantities are in lb/yd3 (1 lb/yd3 = 0.59 kg/m3)



Table 2. 508 Noncompliant Table—Complex Table Using Merged Cells

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Assigned Projects | | | | | | Future Projects | |
| Division A | | | Division B | | | Funded | Pending |
| Initiated Pending / Ongoing | | Completed | Initiated Pending / Ongoing | | Completed |
| 1 | 3 | 8 | 2 | 2 | 8 | 8 | 2 |

Chapter 5: Using Color

Information represented by color or another sensory characteristic (color, size, shape) must not be the only way to convey that meaning. For example, supplement colors in figures and tables with textures, patterns, or text to convey meaning.

Use WebAim’s [Color Contrast Checker](https://webaim.org/resources/contrastchecker/?fcolor=0000FF&bcolor=FFFFFF) to determine the color contrast between foreground and background colors. The contrast ratio should be greater than or equal to 4.5:1.

* The following color combinations are recommended:
  + Blue and orange
  + Blue and red
* Avoid using the following color combinations:
  + Red and green
  + Red and black
  + Blue and yellow

Figures 6 through 10 demonstrate ways to supplement color in various types of graphs.

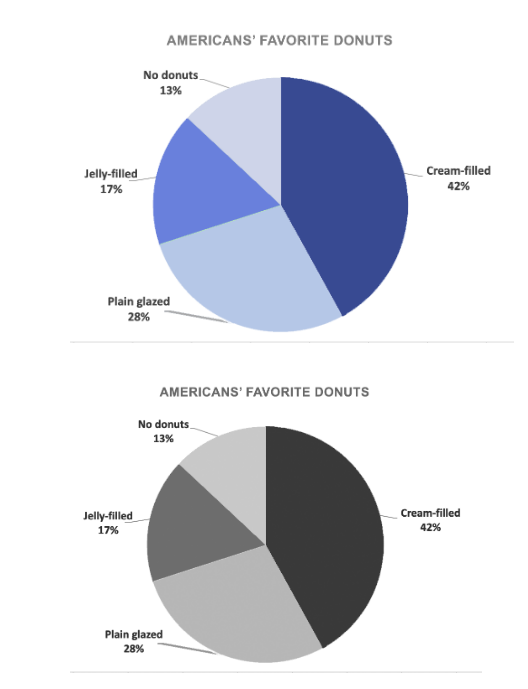


Figure 6. Chart. Accessible pie chart with adequate color contrast.

Source: Arizona State University

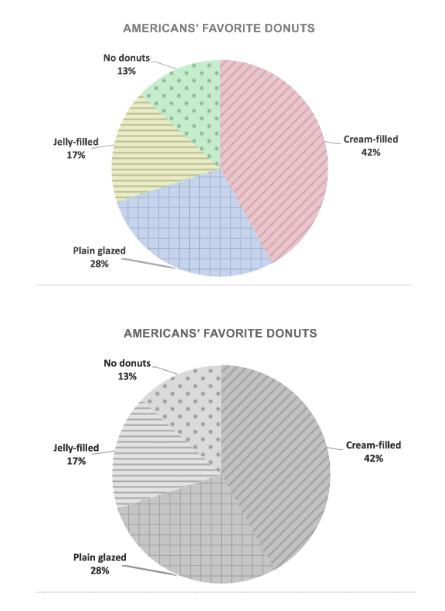


Figure 7. Chart. Accessible pie chart using patterns and color.

Source: Arizona State University

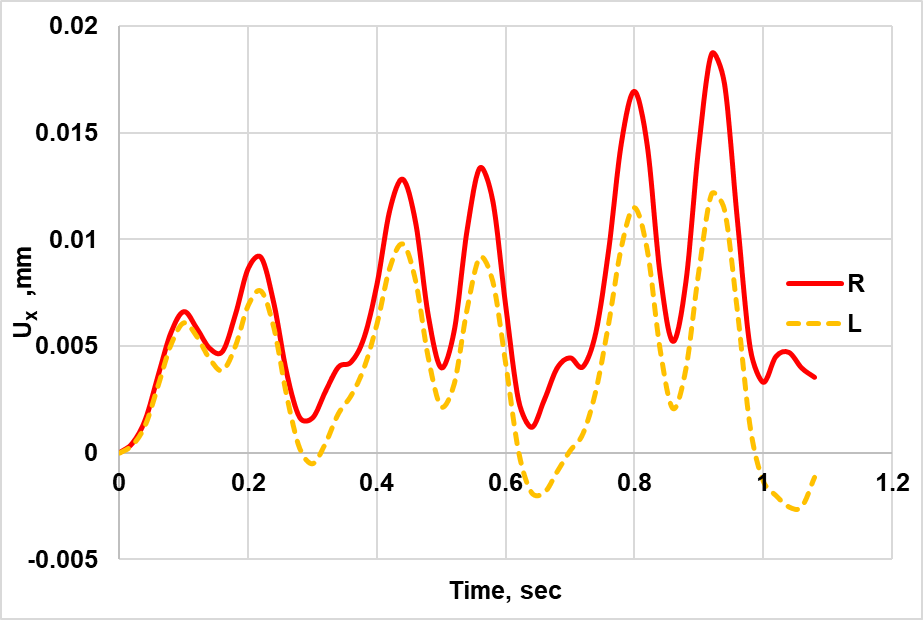


Figure 8. Graph. Displacement mode II cracking.

Source: Al-Qadi et al. (2023)

Figure 9. Chart. Graphical representation of summarized life-cycle costs.

Source: Gombeda et al. (2023)

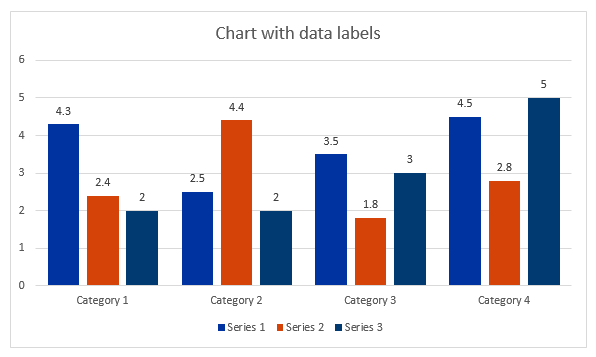


Figure 10. Chart. A chart with data labels.

Source: Boise State University

References

An example reference list is demonstrated below using the APA citation style. **You are not required to follow this exact formatting style for references, but you must use an alphabetized reference format**. Please be consistent in how you format each type of reference in terms of author names, year, date of publication, title, city of publication, etc.

Al-Qadi, I. L., Ramakrishnan, A., Zhu, Z. Said, I., Renshaw, G., Ozer, H., & Salim, R. (2023). *Optimized hot-mix asphalt lift configuration for performance* (Report No. FHWA-ICT-23-005). Illinois Center for Transportation. https://doi.org/10.36501/0197-9191/23-006

American Psychological Association. (2020). *Reference examples*. Retrieved January 30, 2020, from, https://apastyle.apa.org/style-grammar-guidelines/references/examples

Amirkhanian, S. (2020). Utilization of scrap plastics in asphalt binders. In F. S. Pacheco-Torgal, S. Amirkhanian, H. Wang, & E. Schlangen (Eds.), *Eco-efficient pavement construction materials* (pp. 13–32). Woodhead Publishing. https://doi.org/10.1016/B978-0-12-818981-8.00002-3

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/general/15058/005.cfm?#\_Toc474772847

Flannagan, C. A., Selpi, Boyraz Baykas, P., Leslie, A., Kovaceva, J., & Thomson, R. (2019). *Analysis of SHRP2 data to understand normal and abnormal driving behavior in work zones* (Report No. FHWA-HRT-20-010). FHWA. https://www.fhwa.dot.gov/publications/research/safety/20010/index.cfm

Gombeda, M. J., Lallas, Z. N., & Rivera Jr, E. (2023). *Optimal approach for addressing reinforcement corrosion for concrete bridge decks in Illinois—Phase II* (Report No. FHWA-ICT-23-004). Illinois Center for Transportation. https://doi.org/10.36501/0197-9191/23-005

Kim, R. E., Kang, S., Spencer, B. F., & Al-Qadi, I. L. (2019). Impact of pavement roughness and deflection on fuel consumption using energy dissipation. *Journal of Engineering Mechanics*, *145*(10). https://doi.org/10.1061/(ASCE)EM.1943-7889.0001653

Provines, J. T., Ocel, J. M., & Zmetra, K. (2019). *Strength and fatigue resistance of clustered shear stud connectors in composite steel girders* (FHWA-HRT-20-005). Federal Highway Administration. https://www.fhwa.dot.gov/publications/research/infrastructure/structures/bridge/20005/

Schaefer, N. K., & Shapiro, B. (2019, September 6). New middle chapter in the story of human evolution. *Science*, *365*(6457), 981–982. https://doi.org/10.1126/science.aay3550

Scholz, M. (2019). *Sustainable water treatment: Engineering solutions for a variable climate*. Elsevier. https://doi.org/10.1016/C2017-0-04643-8

Zhao, S., & Al-Qadi, I. L. (2019). Algorithm development for real-time thin asphalt concrete overlay compaction monitoring using ground-penetrating radar. *NDT & E International*, *104*, 114–123. https://doi.org/10.1016/j.ndteint.2019.04.008

Appendices

The appendix number and title should follow the same style as chapter titles.

Appendix pages should be numbered as part of the report. For example, if the last page of the report is 75, then the first page of the appendix would be 76.

If there are multiple appendices, name the appendices as Appendix A, Appendix B, and so on.