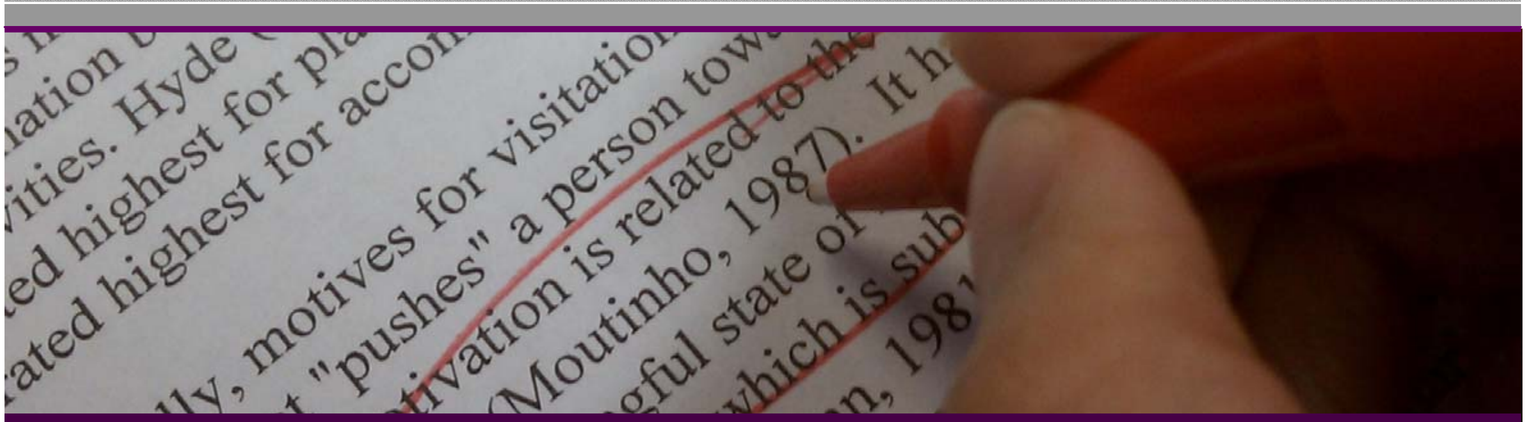
Instructions and Specifications for Preparing ADOT Research Reports

May 2011



Arizona Department of Transportation
Research Center

Table of Contents

Acronyms, Abbreviations, and Terms

ADOT ....Arizona Department of Transportation

Chicago ....*The Chicago Manual of Style*; a manual providing rules on language style and usage; required by ADOT

DOT ....Department of transportation; ADOT's counterpart in another state

FHWA ....Federal Highway Administration; joint sponsor with ADOT on many research projects

LOF ....List of figures

LOT ....List of tables

NTIS ....National Technical Information Service; federal depository for U.S. research findings

PI..........................Principal investigator; the researcher in charge of the project

PM ....Project manager; the ADOT contact who oversees a research project

RC........................ADOT Research Center

Recto ....A right-hand, front, or odd-numbered page in a report; opposite of verso

TAC ....Technical Advisory Committee assists Project Manager in overseeing a research project

TOC ....Table of Contents

TRB ....Transportation Research Board

TRDP ....Technical report documentation page; the first page in an ADOT technical report; provides information about the report to NTIS; required by ADOT for technical reports; also called Form DOT F 1700.7

Verso...................A left-hand, back, or even-numbered page in a report; opposite of recto

About this Edition

Sources Used for *Instructions and Specifications*

The Research Center's (RC) manual borrows from and supplements the Federal Highway Administration's (FHWA's) *Guidelines for Preparing Federal Highway Administration Publications* (*Guidelines* 1988), which is the primary guide for preparing reports. This manual also borrows heavily from the Texas Transportation Institute's *Guidelines for Preparing, Editing, and Submitting TxDOT RMC Reports*. The primary published sources for editing standards and decisions include:

- *The Chicago Manual of Style* (15th ed. or later) http://www.chicagomanualofstyle.org).
- *Merriam-Webster's Collegiate® Dictionary* (10th ed. or later) http://www.m-w.com).

For in-text references and bibliographical style, authors should use the author-date style explained in *The Chicago Manual of Style*.

While the guidelines are meant to be comprehensive, they may not answer all of an author's questions. The Research Center encourages authors to contact the Project Manager (PM) for clarification **prior** to the report review process.

Deliverable Types Covered by These Instructions

Technical Reports

Technical report—a report intended to be technical in nature and to thoroughly document all data gathered, analyses performed, methods used, results achieved, and inventions developed under the research project.

Distribution: following approval, defined by ADOT.

Technical Memoranda

Technical memorandum (tech memo)—a short-form report required for many ADOT research projects after completion of certain tasks. The tech memo is formatted the same as the technical report and is submitted as an appendix.

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Publishing Process

Process Explanation

Requests for revision occur at any point of the review process. The Principal Investigator (PI) is responsible for making those revisions. Any questions or discussion must be directed to the Project Manager (PM). Project reports go through the following process:

1. The PI submits an electronic draft report to the PM. This draft must be compatible with the Research Center's version of Microsoft Word.
2. The PM reviews the draft and suggests improvements.
3. The project's Technical Advisory Committee (TAC) reviews the report and suggests additional improvements.
4. The PM discusses TAC changes with the PI.
5. The Research Center's editorial staff edits the approved report.
6. The PM finalizes editorial changes with the PI.
7. The Research Center staff lay out the report for printing.
8. The Research Center director reviews the report.
9. The report is posted to the web; an announcement is sent offering print copies.
10. Two weeks after posting the report to the web, the report is sent to the printer.
11. Paper copies are mailed to those with a standing request and any who might have requested one.

Note on Responsibility

Authors are responsible for checking proof copies thoroughly. If errors are found after publication and it can be determined that the Research Center is at fault, the report will be reprinted at the author's request and the Research Center's expense. If, however, the fault for the errors cannot be determined as the Research Center's, the report can still be reprinted at the author's request, but the author will have to provide funding to cover printing costs.

Report Not Published

The Research Center will occasionally decide to not publish a project's report. The draft will then serve as documentation that required deliverables were completed. This includes circumstances where the Research Center:

- Approves a deliverable but elects not to publish it.
- Does not approve a deliverable.
- Approves a deliverable containing classified or sensitive information.

Editing Process

Editorial Markup

Markup Basics

Edits are made electronically using comments and tracked changes in MS Word for author review. Editors use the electronic comment feature to insert items for author attention or suggest rewording for clarity or active voice. Editors save the revised file with a clearly identifiable name for version control.

After the edit, the author will receive the edited electronic file(s), usually sent using the same method by which it was received.

Editorial notation in electronic edits should be easy to understand. If the author needs assistance reviewing editorial edits, see the section on Reviewing an Electronic Edit or contact the PM.

Reviewing an Electronic Edit

When the PI receives an edited file, he must review and address each change individually. Because editors do not have the technical level of knowledge that authors have, editorial changes made to the file may inadvertently introduce inaccuracies if not reviewed and approved or rejected. Reviewing an electronic edit requires knowledge of using Microsoft Word. The following sections offer suggestions for using Word features to review the edit.

View Changes

The track changes feature of MS Word enables authors to quickly and easily check the changes an editor has made in the electronic file. The PI will usually receive a file that already has the changes displayed. If markup is not already displayed in the document:

1. On the **Review** tab in the **Tracking** group, select **Final Showing Markup** in the top pull-down menu.
2. In the second pull-down menu, under **Show Markup**, make sure that everything is checked to display.
3. To hide changes for easier reading, adjust the two pull-down menus. For example, hide all changes and comments by selecting **Final** in the top menu or hide changes but show comments by unchecking all but the comments in the second menu.

By default, the changes will probably appear in the text of the file, unless set differently for an individual computer. As with most Microsoft features, there are other options:

- To see the changes in the reviewing pane: On the Review tab in the Tracking group, select Reviewing Pane Vertical or Reviewing Pane Horizontal in the third pull-down menu.
- To see changes and comments in balloons: On the Review tab in the Tracking group, click the Balloons button and select Show Revisions in Balloons.

A user can also select Show Only Comments and Formatting in Balloons.

Review Changes

Because editors do not have the technical level of knowledge that authors have, technical review of the edit is vital—editorial changes made to the file may inadvertently introduce inaccuracies if not evaluated and approved or rejected. Using the track changes feature effectively enables authors to maintain quality control while saving inputting time.

To accept or reject changes once the markup is displayed:

1. On the **Review** tab in the **Tracking** group, make sure the tracked changes feature is off so that one does not incorporate more changes during the review. If the **Track Changes** button shows in the same color blue as the background of the ribbon, it is off. If it shows in orange (or other color depending on the color scheme), then simply click it to turn off tracked changes.

2. On the **Review** tab in the **Changes** group, click the **Next** button to go to the next marked change. (The **Previous** button goes to the previous marked change.)

3. Click on the appropriate button in the Changes group to **Accept** or **Reject** the change**.** Options under these icons can affect how changes are displayed and what changes the author accepts or rejects.

4. Continue reviewing changes and accepting, rejecting, or deleting until a dialog box notes there are no more changes in the document.

To save time, the author may want to visually review each change the editor made, reject those he does not agree with, and then click **Accept All Changes in Document** to accept the rest of the changes. Please do not accept all changes without a careful review of the markup first.

Author Queries

Occasionally, editors will come across items that need author input. The editor will insert the question as a comment. The author should make sure to use a view that shows the full markup including comments. After completing the revisions, the author needs to be sure to delete all comments.

Author queries might include asking the author to clarify statements or check consistency. The editor might use comments to give the author options for edits, explain edit notations, or suggest passive-to-active grammatical conversions.

Technical Report Front Matter

Overview

Front matter includes the table of contents, list of figures, etc.

Cover

The Research Center will provide the cover for reports.

Technical Report Documentation Page (TRDP)

Requirement

The author must complete the technical report documentation page (also denoted as Form DOT F 1700.7) for the National Technical Information Service (NTIS). It is a requirement for technical reports.

Where to Find the TRDP File

The TRDP template is included in the Research Center's report template files. Go to http://mpd.azdot.gov/TPD/ATRC/docs/TRDP.doc

Font Size

The author must enter TRDP information in 10- to 12-point type and needs to maintain the same point size consistently for all entries on the entire TRDP.

Margins

Margins are preset in the template files, so there is no need to change them. Margins on the TRDP are 0.5 inch all around.

Alignment

The text in the boxes must align with the number of the box. Indents may be used in the abstract to indicate the beginning of new paragraphs.

Fill Entire Page

The TRDP must be lengthened to fill the page vertically. Adjust accordingly to fit:

- If the TRDP is too short, add blank lines following the abstract (Box 16).

- If the form goes off the page, cut some of the text from the abstract or reduce the font size of all text entries. Do not use less than 10-point text for the information entered in the boxes.

TRDP Box Information

See Figure 1 for a sample TRDP. Use the following instructions for filling out the TRDP. If the author completes a TRDP for a product, required completion will vary from the following instructions given for report TRDPs.

Box 1. Report No. — Enter as FHWA-AZ-09-644-1, where:

- FHWA = Federal Highway Administration, AZ = Arizona.
- 09 = calendar year the report is completed (published).
- 644 = project number.
- 1 = phase of report, if project produces more than one phase.

Box 2. Government Accession No. — Leave blank.

Box 3. Recipient's Catalog No. — Leave blank.

Box 4. Title and Subtitle — Enter entire report title, in title case (initial capital letter on significant words); precede subtitles with a colon.

Box 5. Report Date — Enter month and year the report is published.

Box 6. Performing Organization Code — Leave blank.

Box 7. Author(s) — List first name, middle initial if available, and last name of all authors, primary author first; maintain formality across all author names (e.g., all middle initials or none) unless following author preference in name style. Give the names of the researchers, not just the company.

Box 8. Performing Organization Report No. — Leave blank.

Box 9. Performing Organization Name and Address — Enter name and address of the organization that the principal investigator works for (followed by the names and addresses of the other authors' organizations, if applicable).

Box 10. Work Unit No. — Leave blank.

Box 11. Contract or Grant No. — If funded with state planning and research (SPR) money, format the contract number thus: SPR-PL1 (Federal program year) (project number)-(phase or volume). The program year is the fiscal year the project funding comes from:

Year	Program
2006	69
2007	171
2008	173
2009	175
2010	177
2011	179
2012	181
2013	183
2014	185
2015	187

Example: SPR-PL1 (69) 622
If project funds come from another source, enter that contract number.

Box 12. Sponsoring Agency Name and Address — Enter:

Research Center
Arizona Department of Transportation
206 S. 17th Ave. MD075R
Phoenix, AZ 85007

Project Manager: [Project manager's name]

Box 13. Type of Report and Period Covered — Enter Final (month/year project started—month/year project ended) For example: Final (11/07–12/09).

Box 14. Sponsoring Agency Code — Leave blank.

Box 15. Supplementary Notes — If appropriate, enter "Project performed in cooperation with the Federal Highway Administration."

Box 16. Abstract — Include a brief (200–250 words) summary of the most significant information contained in the report. When applicable, the abstract must include advice on how the results of the research can be used.

Box 17. Key Words — Enter terms or short phrases that identify the important topics in the report; capitalize the first word. Choose terms from the Transportation Research Thesaurus (http://ntlsearch.bts.gov/repository/trt.do or http://trt.trb.org/trt.asp)

Box 18. Distribution Statement — "This document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161."

Boxes 19 and 20, Security Classif. — Unless advised otherwise in writing by the Research Center, enter “Unclassified.”

Box 21, No. of Pages — Enter total number of pages in the report, excluding covers.

Box 22, Price — Leave blank.

Box 23. Registrants Seal — Leave blank.

Figure 1. Technical Report Documentation Page Example

<table>
<tr><td colspan="2">1. Report No.
FHWA-AZ-YR-XXX(X)</td><td colspan="2">2. Government Accession No.
LEAVE BLANK</td><td colspan="2">3. Recipient's Catalog No.
LEAVE BLANK</td></tr>
<tr><td colspan="4" rowspan="2">4. Title and Subtitle
Key words in initial capital letters (title case)</td><td colspan="2">5. Report Date
MONTH, YEAR</td></tr>
<tr><td colspan="2">6. Performing Organization Code
LEAVE BLANK</td></tr>
<tr><td colspan="4">7. Author
Names in conventional order (i.e. John A. Doe)</td><td colspan="2">8. Performing Organization Report No.
LEAVE BLANK</td></tr>
<tr><td colspan="4" rowspan="2">9. Performing Organization Name and Address
Name
Street Address
City, State Zip Code</td><td colspan="2">10. Work Unit No.
LEAVE BLANK</td></tr>
<tr><td colspan="2">11. Contract or Grant No.
SPR-PL-1(XX)ITEM XXX</td></tr>
<tr><td colspan="4" rowspan="2">12. Sponsoring Agency Name and Address
Research Center
Arizona Department of Transportation
206 S. 17th Avenue MD075R
Phoenix, Arizona 85007
Project Manager:</td><td colspan="2">13.Type of Report & Period Covered
FINAL (mm/yr–mm/yr)</td></tr>
<tr><td colspan="2">14. Sponsoring Agency Code
LEAVE BLANK</td></tr>
<tr><td colspan="6">15. Supplementary Notes
Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration</td></tr>
<tr><td colspan="6">16. Abstract
1. 200-250 words A brief summary of the report stating state the purpose, methods, results and conclusions of the work effort.</td></tr>
<tr><td colspan="2">17. Key Words
Select specific and precise terms or phrases that identify principal subjects covered in the report</td><td colspan="2">18. Distribution Statement
This document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia, 22161</td><td rowspan="2" colspan="2">23. Registrant's Seal</td></tr>
<tr><td>19. Security Classification
Unclassified</td><td>20. Security Classification
Unclassified</td><td>21. No. of Pages
total, including front unnumbered pages</td><td>22. Price</td></tr>
</table>

Disclaimer

The Research Center provides a standard disclaimer printed on the inside front cover.

Acknowledgments

Content

Acknowledgments may be included if the author wishes, but are unnecessary and uncommon. Acknowledgments are the last page of the front matter.

Style

Avoid phrases such as "the authors want to thank" since authors are actually thanking individuals and groups through the acknowledgments section. Use consistent formality for any names in the acknowledgments (e.g., all middle initials or none, all courtesy titles or none) unless individuals have a name preference.

Table of Contents

Content

In the table of contents (TOC), list all chapter titles and main headings (references, appendixes, etc.) with their corresponding page numbers. Include at least first-level headings within the chapters. Go no farther than second-level headings, but exceptions will be considered by the PM.

Subsequent heading levels may be listed if desired, but list the same level of headings for all chapters. List full chapter titles as they appear in the text. For appendixes, list appendix letter (if any) and title (e.g., Appendix A: Imaging Figures).

Long Titles

When the chapter or section title is more than one line long, break it where logical and do not let it get within three leader dots of the page number. Indent second and subsequent lines.

To break long lines automatically within the TOC (or other front matter lists), use the right-indent feature of the word processor. To prevent long titles from breaking based on the body of the report, use a soft return (SHFT+ENTR) to break the title in the body of the report—it will be read by the table of contents as a space instead of a line break.

First Element Listed in TOC

The TOC should begin with the first section of text – usually the executive summary.

Consistency and Page Numbers

The author should check to make sure that:

- All headings in the TOC read exactly like those in the text.
- The page numbers listed in the TOC correspond to their in-text referents.

Remember that new chapters or sections should begin on odd-numbered right-hand (recto) pages.

Indention

Use indention consistently to show section subordination and coordination.

Capitalization

Use of all capital letters places emphasis on short items, but hinders readability when used on extended items—such as within the TOC. Because chapter titles and first-level headings in the report use all capital letters, they will appear in all caps in the TOC if typed into the body of the report using all capital letters.

The recommended practice to avoid all capital letters appearing in an autogenerated TOC is to type the chapter titles and headings in the body of the report as they're wanted to appear in the TOC (usually with initial capital letters for every word except articles, conjunctions, prepositions, and the word "to"). Use style characteristics to display the item in the report body in all capital letters, but it will appear in the TOC correctly.

Dot Leaders

All leaders (e.g., dots separating section titles from their page references) should align. Leader dots should be generated automatically by the TOC function or tab function, not typed manually. This is also true for the List of Figures and List of Tables

Using autogenerated tables is usually the best method (see Table of Contents, List of Figures, and List of Tables and Dot Leaders/Tabs, plus Appendix for word-processing tips).

List of Figures and List of Tables

Requirement

The List of Figures (LOF) and List of Tables (LOT) are required for reports containing five or more figures or tables, respectively, and may be included at the author's discretion if there are fewer figures/tables.

Separate Pages

In Research Center technical reports, the LOF and LOT are separate sections and should be placed on separate pages, unless short enough to fit on a single page. They are grouped here for explanation because they are so similar.

Pagination

For proper pagination:

- The LOF follows the TOC (recto or verso page).
- The LOT follows the LOF (recto or verso page).
- The lists do not require right-hand placement or odd page numbers.
- The lists show printed page numbers.

Content

The LOF and LOT should contain the figure and table numbers, captions, and page numbers of figures and tables, respectively. List figures and tables from appendixes (or other back matter) as well.

Example:

Page

Figure 1. Survey Results Gathered by Students in the Tempe, AZ, Area 8

Consistency and Page Numbers

The author should check to make sure that:

- All captions in the LOF and LOT read exactly the same as those in the text.
- The correct corresponding page numbers are listed in the LOF and LOT.

List of Abbreviations and Symbols (Optional)

Content

If the report contains numerous or unusual acronyms, abbreviations, and/or symbols, provide a list in the front matter, as well as define them upon first reference in the text. The list provides a helpful reference for readers, but each acronym still needs to be defined on first use in the document.

If included, the list should contain all acronyms, abbreviations, and symbols used in the document.

Pagination

If included, the list of abbreviations and symbols should start on its own page. The list of abbreviations and symbols:

- Follows the LOT directly (recto or verso page).

For more information on placement of the List of Abbreviations and Symbols, see the section in this document identifying major sections of a technical report.

Technical Report Pagination

Overview

Introduction

The text and appendixes should be arranged and paginated correctly.

Multiple Volumes

If a report is very long, it can be separated into volumes according to content. Most of the time, a single report should not be more than 500 total pages (250 published double-sided sheets). The volume number should be listed on the TRDP.

Double Sided

Reports are published double-sided and should be paginated accordingly. Please check to make sure that when the report is printed pages will fall where they are supposed to.

Even and Odd Page Placement

Because technical report files are set so they will print correctly when published double sided, right-hand and left-hand page placement (odd and even page numbers, respectively) matters. See the following sections for detailed explanation regarding page numbering, page placement, and specialized pagination.

Two terms related to pagination that are used throughout these guidelines might be unfamiliar. A recto page refers to a right-hand, front, or odd-numbered page in a report and is the opposite of verso. A verso page refers to a left-hand, back, or even-numbered page in a report and is the opposite of recto.

Page Numbering

Format

Page numbers are centered at the bottom of pages.

Some pages—such as the TRDP and all blank pages—have unprinted page numbers but are counted in pagination. Use the following format:

- Number the body of the text with Arabic numerals (1, 2, 3, etc.) beginning with page 1. Page numbers run consecutively throughout the entire report, including appendixes (i.e., 1, 2, 3, etc.).

Major Sections

Front matter and report sections should be arranged and numbered according to Table 1. The sections marked with an asterisk fall on odd-numbered pages.

New chapters (or major sections) must begin on recto (odd) pages. Insert a blank page, if necessary, to force the new chapter onto a recto page. Blank pages are completely blank, except for the printed number.

For specific instructions regarding appendix pagination, see *Appendixes* below.

Example:
If a chapter ends on page 5, leave a blank page for page 6 and start the new chapter on page 7.

Table 1. Pagination Example.

Section	Page Number Shown	Page Number Not Shown
Technical Report Documentation Page*		x
Metric Conversion Page		x
Table of Contents*		x
List of Figures		x
List of Tables		x
List of Abbreviations and Symbols (optional)		x
Acknowledgments		x
Executive Summary*	1	
Subsequent chapters	odd page	
References*	odd page	
Appendix Title Page* (optional)	odd page	
Appendix Content Pages*	odd page	

* Signifies a page that must be a recto page

Landscaped Pages

Place page numbers in portrait orientation, even on landscaped pages, so that page numbers appear consistently in the same location throughout the report. See Appendix: Page Orientation (p.73) for word-processing tips.

In these cases, make sure that when the printed book is turned clockwise 90 degrees, the illustration is right-side up (see Figure 2).

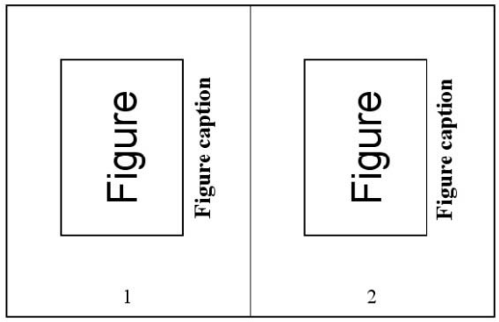

Figure 2. Placement of Landscaped Pages.

Oversize Pages

Oversize pages are difficult to handle. The Research Center urges authors to carefully consider whether the item could be redesigned to fit a standard page, either in portrait or landscape orientation. If pages larger than 8.5 x 11 inches are necessary, remember that the backs of these pages might need to be assigned page numbers. When inserting a page larger than 8.5 x 11 inches:

- It is placed on an odd-numbered page.
- The back of the oversize page contains another oversize page with the subsequent even page number.

If inserting more than one oversize page in a row, begin the series on an odd-numbered page. If the series ends with an odd-numbered page, insert a blank page after it (even numbered). If the series ends with an even-numbered page, begin the next regular-size page directly after it. Reports are printed double sided, so it helps to visualize how they will be printed.

Example:
If the front of an oversized insert is page 11 and the next page will be regular size, then the back of the oversize page will be a page 12. The next regular page will be page 13.

Appendixes

If there is only one appendix, name it “Appendix,” not “Appendix A.” If there are more than one, designate each appendix with a letter (e.g., Appendix A, Appendix B).

There are two ways to format appendixes:

- Heading—The appendix may simply have an appendix heading at the top of the page (e.g., Appendix A: Survey Results) followed by the beginning of the appendix proper on the same page. This page should be an odd-numbered page.
- Cover page—The appendix may begin with a cover page. If using a cover page, center the appendix designation and title in the middle of the page and use a printed page number. This cover page should appear as a recto page.

Skip the next page (blank verso), and begin the appendix information on the next page. There is no need to repeat the heading at the top of this page.

Base the style choice on the content of the appendix.

Because appendixes should follow the reference section in Research Center reports, they will need to be stored in a separate file if automatic citations are used (which Word places at the end of the file). If an appendix also has references, include a reference section with it.

Technical Report Format

Overview

Since formatting errors can be difficult to change during the editorial process, authors must adhere to the following specifications. They will help the author properly format the file before submittal, reduce the amount of time spent on revisions, and promote consistency among Research Center reports. If assistance formatting the work report document is needed, contact the Research Center.

See Appendix for specific instructions, helpful hints, and word-processing tips.

Page and Paragraph Specifications

Columns

Use a single-column, full-page format.

Type

Use Times New Roman 12-point type for text including table captions, figure captions, and explanatory text for equations. Print figure and table titles in bold. This formatting will promote consistency of presentation in the report and help avoid printing problems during publication.

Font choice for equations and text within figures and tables may vary, but similar items should use a consistent font style and size if possible. Text in figures and tables can be smaller than 12-point type but not be less than 7 points.

Margins

Check for a minimum 1.25-inch side margins and 1-inch top margins on all pages (except the TRDP). Margins for pages with figures and tables may be slightly smaller if necessary. TRDPs should have margins set to 0.5 inch.

Spacing

Use single-space vertical spacing. Double space only to separate headings and subheadings from text.

Paragraphs

Separate paragraphs with a blank line.

Justification

Left-justify report text. Text with ragged right margins (left-justified text) is easier to read than full-justified text. Full justification often causes uneven gaps to appear in a line of text. Left justification is required for the reader's sake.

Headers and Footers

Headers and footers are not permitted.

Widows and Orphans

Avoid leaving a single line of text alone at the top (widow) or bottom (orphan) of a page. Most word-processing programs have an automatic feature to prevent such occurrences.

Leave of a page without at least two lines of text with a heading at the bottom of a page. If feasible, avoid splitting bulleted lists from their introductory sentences or leaving a single bullet alone at the top or bottom of a page.

Headings

Authors must number chapters. Subsections need not be numbered. Table 2 shows sizes and styles for headings and subheadings.

Table 2. Heading and Subheading Format Styles.

CHAPTER 1. TITLE OF FIRST CHAPTER
(14 pt. bold, all caps, centered)

FIRST-LEVEL HEADING
(12 pt. bold, all caps, flush left, separate line, skip a line before and after).

Second-Level Heading
(12 pt. bold, initial caps, flush left, separate line, skip a line before and after).

Third-Level Heading
(12 pt. italic, initial caps, flush left, separate line, skip a line before and after).

Fourth-Level Heading. (12 pt. bold, initial caps followed by a period, two spaces, and subsequent text; skip a line before only).

Grammar and Style

Overview

Introduction

The following guidelines serve to answer many specific questions related to style, punctuation, and English language usage. They provide helpful hints for how to cut down on editing marks (and thus on correction time).

Writing style encompasses a number of elements, including a writer's voice, word choice, spelling, and tone. Consistency of style is important. Equally important is choosing the right style for the right purpose.

Style can also refer to mechanical questions, like "Do I use a comma before 'and' in a series?" This question is also known as the serial comma question. (For example, is it "red, white, and blue" or "red, white and blue"?)

Consistency and Correctness

Editors mark consistency and correctness issues as necessary changes. Beyond the detailed requirements of these guidelines, consistency of style and correctness of grammar will drive the editor's work in reviewing research reports.

An example of stylistic consistency:
If the report reads "multi-modal," don't switch to "multimodal" halfway through the report.

Word Use

Acronyms, First Reference

Spell out what an acronym stands for at its first use in both the executive summary and the text and type the acronym in parentheses after those references.

Acronyms defined on the TRDP need to be defined again on the first use in the report, but acronyms defined in other parts of the front matter (such as the disclaimer) do not need to be redefined in the body of the report. There is no need to show an acronym if it is not used subsequently (except in special cases, such as when the acronym is more widely known than the phrase it represents).

Example:
High-occupancy vehicles (HOVs) are very important. HOVs can carry many people and save fuel.

Acronyms, Plural

To make a plural of an acronym, simply add an "s." An apostrophe should not be used unless the acronym is possessive.

Examples:

- Plural: High-occupancy vehicles would be HOVs.
- Possessive: The HOV's rate of speed was excessive.

Active versus Passive Voice

Active voice attributes an action to a person or thing. Passive voice focuses on what was done rather than who or what did it. Authors should primarily use the active voice for Research Center reports.

Example:

- Active: "The researchers analyzed the data." This example says exactly who performed the action.
- Passive: "The data were analyzed by the researcher." This example is less direct and has a weak structure. Sometimes "by the researcher" is left off completely, and the reader is left to wonder who performed the analysis.

Example:

- Active: "The test uses collected data to determine . . ." "Analysis results from the collected data showed . . ." These examples provide two alternatives for avoiding overly frequent use of "The researchers . . . " when converting passive voice to active.
- Passive: "Collected data are used to determine . . ." This sentence does not tell the reader how the collected data determine the result.

Why Voice Is Important

- The Research Center wishes reports to be readily understandable, and research in technical communications shows that the use of active rather than passive voice is much more effective in documents written for the practitioner.
- Readers quickly process and understand information written in active voice, and active voice helps preserve objectivity and accuracy by clarifying who or what is performing the action.

Use of the Word "Data"

Research Center reports use the word "data" as plural. The singular word "datum" is rarely used.

Examples:

- The data show a significant trend.
- Researchers analyzed these data using several methods.
- This data set shows values that can be compared to the earlier data set.

Prefixes

Most prefixes do not require a hyphen in current usage. Simply add the prefix unless there is a chance that the new word will be misunderstood. Answers to questions about hyphenation of a particular word can be found in lists of words under each prefix in a collegiate-level dictionary.

Always use hyphens with “quasi-,” “ex-,” and “self-.”

Examples:

- semiopaque, transoceanic, semipermeable.
- ex-marine, quasi-intellectual, self-discovery.
- recover/re-cover, recreate/re-create, resent/re-sent (depending on the meaning).

Pronoun Use

Pronouns must agree in number and gender with the nouns they reference. Readers need to be able to identify clearly which noun the pronoun references (its antecedent). Usually that necessity means that the antecedent should be the last subject used before the pronoun.

Remember that pronouns must agree with the singular or plural nature of their antecedents. Singular groups (ADOT, division, team) require singular pronouns and modifiers (it, this—not they, their, or these). To emphasize the collective nature of a noun, specify the population meant: ADOT officials (plural) rather than ADOT (singular), the committee members (plural) rather than the committee (singular).

Gender-Neutral Pronoun Use

Partly because of the need for gender-neutral language these days, pronoun use is particularly troublesome for some authors.

When gender is not specified and usage calls for a singular pronoun, try to reword the sentence to avoid using a gender-specific pronoun. To reword a sentence, maybe change a singular subject to a plural subject or omit the need for a pronoun at all. (See the examples below.) Use “he or she” and “his or her” constructions in instances where a singular gender-specific pronoun cannot be avoided. Do not use “they” or “their” with a singular subject.

Examples:

- Problem: If a researcher discovers a need to retest, he . . . Possible rewording: If researchers discover a need to retest, they . . .
- Gender-specific pronoun: Each researcher examined the results. He or she reported findings to…

States

In most cases, spell out names of states used in report text. To abbreviate state names in references, tables, and figures, use the standard abbreviation or the postal code.

Examples:

- In text: Glendale, Arizona, is in the Valley of the Sun.
- Optional in references, tables, and figures: New Orleans, La., or New Orleans, LA.

Trademarks

Try to avoid using names of trademarked products when referencing generic concepts (e.g., don't use "Excel" when "spreadsheet" is meant). When using trademarked or registered names, place the registered trademark (®) or trademark (™) symbol after the name on first reference and thereafter do not use the trademark symbol.

Indicate the trademark owner somewhere in the report, in fine print in a footnote if necessary.

Years

When describing decades, simply add an s. If the "19" or "20" is not used, place an apostrophe before the year to take its place. As with contractions, the apostrophe indicates that information has been left out.

Example:
during the 1980s and '90s

Internet and Technology Terminology Guide

Handling Technology Terms

Some tech terms have become commonplace and no longer need to be capitalized (e.g., web, website). Tech terms that are brand names are capitalized and use trademark symbols when applicable (e.g., Excel, Macintosh). Brand names that begin with a lowercase letter (e.g., iPod, iPad) always use the lowercase first letter, even at the beginning of a sentence.

Some terms appear frequently in technical documents. The Research Center uses the following styles.

Spelling for these terms:
- Screenshot as one word.
- Drop-down menu should use the hyphen consistently.
- Email as one word.

Capitalization with these terms:
- Macintosh; PC; personal computer.
- hypertext transfer protocol (HTTP); a transfer protocol; hypertext.
- Internet protocol (IP); the Internet; the net; an intranet.
- Open Source Initiative (the corporation); open-source platforms.
- World Wide Web Consortium; the World Wide Web; the web; a website; a web page.

The basic alphabet keys, as well as all named keys, are capitalized even if they are lowercased on a particular keyboard. Menu items and icon names are usually spelled and capitalized as in a particular application. Acronyms for file formats are rendered in full capitals. Notice that quotation marks are not necessary to designate menu items as long as they are capitalized.
- The function key F2 has no connection with the keys F and 2.
- The Option key on a Mac is similar to the Alt key on a typical PC.
- Choosing Cut from the Edit menu is an alternative to pressing Ctrl+X.
- Save the file as a PNG or a GIF, not as a JPEG.

URLs

Web addresses should be functional if feasible. If it is known that a particular web address is no longer valid, indicate that in parentheses following the link name.

In a printed work, if a uniform resource locator (URL) has to be broken at the end of a line, the break should be made:
- *After* a colon or a double slash (//).
- *Before* a single slash (/), a tilde (~), a period, a comma, a hyphen, an underline (_), a question mark, a number sign, or a percent symbol.
- *Before or after* an equals sign or an ampersand.

A hyphen should never be added to a URL to denote a line break, nor should a hyphen that is part of a URL appear at the end of a line. Keep in mind that a manually broken link (by a space or soft return, for example) will no longer be functional.

For example:
http://www.azdot.gov/TPD/ATRC
/Research/emphasis_areas.asp

Capitalization

Captions and Titles

In titles, headings, figure and table captions, and the like, capitalize every word except articles (a, an, the), conjunctions (and, because, but, if, as, or), and prepositions (to, of, in).

Example:
Travel Predictions and Models beyond the Year 2000

References to Chapters, Figures, or Tables in Text

When referring in the text to a chapter, figure, or table, capitalized citations are required.

Example:
Chapter 1, Figure 6, Table 9

East, West, North, and South

Capitalize directions with a state, city, or any other geographical region only if it is part of a proper name. Regions familiarly accepted as proper names may be capitalized. Simple directional modifiers should not be capitalized when they precede a proper name.

Examples:
North Carolina, West Texas or west Texas, Gulf Coast or gulf coast, Gulf of Mexico, Arizona Strip, Midwest, western United States, southern Louisiana

Position Titles

As a rule, do not capitalize a person's position title, such as project manager, director, etc. Capitalize position titles only if they come before the name and are official titles, such as President Tyler, Congressman Smith, Director Jones, etc.

Example:
John Smith, research assistant; Tom Smith, director of the center

Programs or Research Items

Capitalize a program or research item (database, software, etc.) only if it is an official proper name or title. If it is a generic product type, do not capitalize it.

Examples:
- intelligent transportation systems (ITS), ground-penetrating radar (GPR), ADOT districts.
- Materials Division, the Holbrook District.

"State," "City," and "Federal"

In general, do not capitalize "state" or "federal" unless quoting laws or bills that do so. Do capitalize "state," "city," and other words if they refer to a specific, official governmental entity.

Example:
The State of Arizona employs many workers, and the City of Phoenix purchases supplies. The geographic area covered by the state of Arizona contains several cities, and the city of Phoenix is not far from the city of Mesa, Arizona.

"District"

Do not capitalize the word "district" unless it refers to a specific agency region.

Example:
Three ADOT districts use the technique. The Prescott District expects to implement it during fiscal year 2012.

Punctuation

Bulleted Lists

When a document lists complex material, it is helpful to pull the list out of the paragraph and separate it with bullets (•) for readability. Lists with three or more items and listings of two items if they are longer than a line of text should use bullets.

Use bulleted lists instead of numbered lists unless the items have order, ranking, or correlation to numbered data. If using a numbered list, capitalize and punctuate it the same way as a bulleted list.

Though editorial style guides for bulleted lists vary greatly, the Research Center has simplified and standardized the style recommended for use in its reports.
Follow these guidelines when creating bulleted and numbered lists:
- Use a phrase or sentence to introduce the list and end it with a colon (:) unless the introduction and all items in the list are complete sentences, in which case end each with a period (.).
- Ensure that the lead-in sentence clearly identifies whether all items apply (and) or whether they stand independent (or). Generally, items in the list will not contain any conjunction linking one item to another.

- For all bulleted lists, whether they are full sentences or phrases, capitalize the first word of each item—even for sub-bullet items.
- For all bulleted lists, whether they are full sentences or phrases, end the item with a period (or, in unusual cases, a question mark)—even for sub-bullet items.
- Use parallel grammatical construction within bulleted lists. For example, begin each item with a verb or a noun (depending on what is appropriate given the lead-in phrase) or make each item a complete sentence.
- For consistency throughout the document:
    - Use or omit blank lines consistently before or after a complete list.
    - Use the same spacing between items consistently in every list.
    - Use consistent formatting, such as indention and bullet appearance, throughout the report.

Commas in a Series

When listing a series within text, use a serial comma (i.e., the comma before the "and"). Especially in technical writing, using the serial comma can make the difference between a clear and an unclear sentence.

When elements within a series contain internal commas, use a semicolon to separate elements; otherwise the series can be confusing.

Examples:

- The authors were Smith, Johnson, and Walker. (serial comma)
- The authors were Smith, chairman; Johnson, treasurer; and Walker, secretary.

Commas in Compound Sentences

A true compound sentence contains two full sentences joined by a conjunction. A sentence with compound elements generally contains one subject and two verb phrases. Use a comma to separate the parts of a compound sentence but no comma in a sentence with compound elements.

Examples:

- This report identifies some of the key policy questions, but local officials must determine answers at the grassroots level. (compound sentence)
- This report identifies some of the key policy questions regarding the project and sheds light on some of the possible answers. (compound elements)

Commas with a State and Year

Use a comma before and after the name of a state that follows a city. A comma should also come before and after a year that follows a month and day (but there is no comma between a month and year only).

Examples:
- Flagstaff, Arizona, is the site of Northern Arizona University.
- January 10, 2009, is the date of the meeting.
- February 2010 will be dedicated to a literature search.

Hyphens in Modifying Phrases

Place a hyphen between words that serve as a modifying phrase. The purpose of the hyphen is to help clarify for the reader that both words modify the word that follows. In certain constructions, leaving the hyphen out can prove confusing. Industry usage overrides guideline style (e.g., portland cement concrete). Check for consistency in the use of phrases or words repeated within a report.

Note: In Research Center reports, do not place a hyphen between a number and a metric measurement unit when they are used as a single adjectival phrase. Hyphens may be used or omitted between a number and an English unit as long as use is consistent.

Examples:
- Figure 1 shows a cross section. The cross-section diameter is 1 inch.
- high-resolution photograph, 12-year period, 5 m span, 5 ft wall or 5-ft wall.
- crumb-rubber mixture (but no hyphen in "crumb rubber" used as a noun).

Hyphens in Modifying Phrases that End in "-ly"

If the modifying phrase contains -ly, do not use a hyphen.

Example:
a thermally induced reaction

Em Dashes

Em dashes (also denoted by 1/m) are used to separate thoughts—and insert information—within sentences. Though often represented by two hyphens (--), the proper symbol is the em dash. To create this symbol in MS Word type CTRL+ALT+Num-. If the program is set for autocorrect, create an em dash by typing two hyphens between words, with no spaces.

En Dashes

En dashes (also denoted by 1/n) are slightly shorter than em dashes. Create this symbol in MS Word by typing CTRL+Num-. If the program is set for autocorrect, create an en dash by typing a hyphen between words with one space on each side.

En dashes note a span of numbers (e.g., October 11–12, 1992–1995). En dashes can also clarify adjectival phrases where a simple hyphen might cause confusion. This is true of open compounds (e.g., "New York" in the first example below) and compounds where two or more of the elements are hyphenated (the second example below). See also *Chicago*, 14th ed., Rule 5.117.

Examples:

- New York–London flight.
- quasi-public–quasi-judicial body, but non-English-speaking.

Parentheses and Periods

When parentheses or brackets are used to enclose a stand-alone sentence, the period falls inside the parentheses. (This sentence is an example.) If the material in the parentheses is part of a sentence, the period falls outside the parentheses (like this).

When parentheses occur inside parentheses (as here [i.e., the text being read now]), the interior parentheses become brackets.

Punctuation and Quotation Marks

Commas and periods always go inside quotation marks. Semicolons and colons normally go outside quotation marks. Question marks and exclamation points depend on use.

Examples:

- The article, “How to Grow Red Tomatoes,” was replaced by “How to Grow Yellow Onions”; we finally settled on “How to Encourage Gardening.”
- Did you read “The Tell-Tale Heart”? He asked, “Where are you going?”

Smart Quotes versus Straight Quotes

Replace straight quotes with smart quotes and apostrophes. See Appendix, Word-Processing Tips, Smart Quotes.

Examples:

- “smart quotes” rather than "straight quotes."
- Frank’s study is late.

Titles in Italics versus Quotation Marks

Generally, when referring to documents in text, the titles of long works (e.g., books) are in italics, and the titles of short works (e.g., journal articles) are in quotation marks. Works that are not published (e.g., course titles) are usually in quotation marks.

Examples:

- Place the following types of works in italics: reports, books, manuals, journals, proceedings, newspapers, and dissertations.

- Place the following types of works in quotation marks: articles, book chapters or sections, papers, pamphlets, courses, seminars, classes, and projects.

Spelling

American versus British Spellings

Use conventional American spelling for Research Center reports.

Examples of American/British spellings:

- traveled/travelled
- acknowledgment/acknowledgement
- judgment/judgement
- focused/focussed
- color/colour
- toward/towards
- backward/backwards
- defense/defence
- naturalization/naturalisation
- a historical/an historical

Names of Roadways

Titles of roadways should be written consistently throughout the document. Upon first reference, spell out the name: Interstate 10. The following are the ways to write titles of interstate highways upon second reference:

- I-17.
- I-17N and I-17S (no spaces).

Other roadways and highways, such as state routes and US routes, are formatted [type] [space] [number] on second reference:

- State Route 114 (first reference), SR 114 (second reference).
- US Route 281 (first reference), US 281 (second reference).

Spell Check

Please run spell check after completing a document or making corrections to the document.

The spell check feature will bypass text that is not marked to check. To verify that all text in a document is set to U.S. English and marked for spell check, select all the text and go to the **Review** tab and the **Proofing** group. Click the **Set Language** button and select **English (U.S.)** and clear the box that instructs Word not to check spelling. This will ensure that spell check does not fail to check any sections because they were accidentally set to another language or exempted.

Spelling errors can creep in during any revision process, no matter how careful the person making the corrections. Spell check also serves as a final review of the document, and though sometimes time consuming, it is one of the easiest things to do to improve the quality of the document. A reader may miss some of the finer points of grammar, but a misspelled word is distracting to all who read the report.

Spell check can also help with acronyms if the author clicks off the default **Ignore words in UPPERCASE** in **Office Button/Word Options/Proofing**. For any acronym that does not spell a common word, spell check will find the initial use, where the author can check to see if the term was defined. If the program is given the **Ignore All** command at that point, spell check will find typos in later use of that acronym.

Carefully re-read the text for words that are spelled correctly but misused.

Numbers

When to Spell Out Numbers

The rules prescribed here differ from those in *Chicago* and better meet the needs of technical reports. Within a sentence, use of words versus numerals may vary from these rules in order to remain consistent with each other.

Spell out:

- Numbers between one and nine (e.g., eight cars).
- Rankings of first through ninth (e.g., the ninth car).
- A number that begins a sentence (but try to avoid this construction) (e.g., Eighty-seven percent of the people surveyed liked the idea. Preferred Construction: Of the people surveyed, 87 percent liked the idea.).

Use a numeral for:

- Numbers 10 and greater (e.g., 10 trucks).
- Rankings of 10 and greater (e.g., the 10th truck).
- Percent (e.g., 5 percent).
- Notations with measurements (e.g., 5 m, 2 ft).
- Time when used as data (e.g., 5 seconds).

The author may deviate from the standard rules to keep a sentence from having both numerals and words, except for measurements and percentages, as long as this is done consistently throughout the report. For example, both of the following examples are correct:

- Researchers counted five cars and 10 trucks.
- Researchers counted 5 cars and 10 trucks.

Commas with Numerals

Use commas to separate digits into groups of three when the number is greater than four digits. When a number in text is four digits, it should not have a comma when used in text (commas might be needed in tables and figures for alignment). Dollar amounts of four digits or more may use or omit a comma.

In tabular columns that show both four-digit and five-digit or greater numbers, use commas as needed for clarity, alignment, and appearance.

Examples:

- 100,000 and 1000.
- $1000 or $1,000.

Decimals, Not Fractions

Where reasonable, use decimals instead of fractions. Place a zero before the decimal point for quantities less than one. Industry usage in some instances (e.g., references to equipment or tools) may require use of fractions. If using fractions, use a consistent form throughout (1/4 or ¼).

Example:
0.25 (not 1/4 or ¼ or .25)

Measurements, Symbols, and Equations

English versus Metric Units

ADOT’s current policy states that all printed and film reports must use English

The PI should give measurements in the system used to take them. If taken using Systeme Internationale (SI) units, the measurements should be followed in parentheses by their equivalent customary American units. Round metric values to the same number of digits as were in the inch-pound number (11 miles at 1.609 km/mi equals 17.699 km, which rounds to 18 km). Convert mixed inch-pound units (feet and inches, pounds and ounces) to the smaller inch-pound unit before converting to metric rounding (10 feet, 3 inches, = 123 inches; 123 inches x 25.4 mm = 3124.2 mm; round to 3124 mm)

Common Unit Symbols and Abbreviations

The following are some units and their symbols.
Metric Units

- liter L
- meter m
- millimeter mm
- hectare ha
- kilogram kg
- newton N
- kilopascal kPa

Units not to use:
Do not use the prefixes deci-, centi-, or deca-.

English Units
The following are some English units and their abbreviations to use:

- inch inch or inches (do not abbreviate)
- foot ft
- yard yd
- mile mi
- ounce oz
- pound lb
- ton ton
- quart qt
- gallon gal
- barrel bbl

Units not to use:
Do not use plural forms such as lbs.

Numerals with Unit Symbols and Abbreviations

Use numerals with English abbreviations or metric symbols in text, tables, and figures.

Example:
a width of 12 mm (not 12 millimeters)

Space:

Place a space between the numeral and the unit. Leave a space between the degree symbol and the temperature system abbreviation.

Examples:

- 5 kg (not 5kg).
- 5 ft.
- 5° F.

Period:

Do not place a period after the measurement symbol unless it is at the end of a sentence.

Example:

- 5 kg (not 5 kg.); but a punctuating period may appear following a metric symbol at the end of a sentence, “The weight is 5 kg.”

Plurals:

Do not add an “s” to symbols or abbreviations. If measurement units are spelled out rather than abbreviated, the plural form may be used.

Examples:

- 10 kg not 10 kgs.
- 5 ft or 5 feet.

Adjectival phrase:

Never use a hyphen between the numeral and the symbol. Do not use hyphens in English unit noun phrases (e.g., a height of 5 ft).

Examples:

- a 5 m wall, not a 5-m wall.
- a 5 ft wall.

When to Spell Out Units

Spell out metric or English units when not used with a numeral. Otherwise, use symbols rather than spelling out units.

Examples:

- The amount is given in meters.
- The project studied a 5 mi pavement section.

Percent

Write out “percent” in text and use a numeral with it. In a figure or table, use the percent sign with no space between (or include percent designation in the column heading). The symbol may be used in tables.

Write out any number that begins a sentence, but avoid starting a sentence with a number if possible. When “percent” follows a number that is written out, always use the word.

Examples:

- The increase was 5 percent.
- 10% (in a table or figure).

Slope

Express slope in nondimensional ratios with the vertical component shown first and then the horizontal (V:H). Compare the same units (meters to meters, etc.). Base tapers previously shown as 8:1 will now be shown as 1:8.

Time

If units of time (seconds, hours, etc.) are measurements, then use a numeral with them. If they are more general, spell out the measurement.

If using a numeral, abbreviations (with no periods) may be used for units of time:

- sec (not s)
- min (do not then abbreviate minimum [min.])
- hr
- yr

Examples:

- The project ran for two years.
- Researchers examined data at 2-sec intervals.

Temperature

When expressing temperature using a degree symbol, use the degree symbol next to the number and leave a space between the number and the measurement symbol: (10° C)

Symbols

Use the proper symbols to denote functions in equations, text, and illustrations. This includes the multiplication sign (*) and the minus sign (−).

Remember to verify the accuracy of any symbols used in the report when the manuscript is reviewed at the various publication stages.

Example:

- 5x * 10r = 35yz

Equation Numbering

Research Center specifications require that equations be numbered consecutively throughout the document (e.g., Eq. 1, Eq. 2).

Equation Placement

Place the equation on a separate line, using line space to separate it from the paragraph. Indent or center each equation.

Place the equation number in parentheses flush with the right margin on the last line of the equation elements.

Example:

Eq. 1 explains my hypothesis:

a + b = c (Eq. 1-1)

Creation of Equations

If the document uses mathematical symbols, the most reliable way to ensure their accurate reproduction is to use the equation editor. Using the equation editor creates a unit that appears during PDF conversion as a graphic but still allows the author to make changes in the source file as needed.

If embedding mathematical symbols in text as font characters, the best choice is to use the normal text or symbol character set in Word. Do not use WordPerfect character sets, because they do not convert reliably to PDF.

Equation Symbol Identification

Identify symbols after their first use to aid the reader. This usually appears in a "where" list. Be consistent throughout the document whether using a list to identify symbols or using paragraph form. Also be consistent in introducing the list (colon or not, etc.). If in paragraph form, the Research Center recommends using the semicolon (;) to separate each item in the list.

Figures and Tables

Overview

Requirements

Figures—any graphic representation not in text form.

Tables—any graphic representation in columnar text form.

Figures and tables must be clear and legible. Labels within illustrations must use a consistent font throughout the report. Hand-drawn or hand-written illustrations (or scanned images of hand-drawn illustrations) are usually not acceptable.

Quality

Clear, dark original line art and photographs of sufficient resolution are acceptable. Shaded areas must not obscure text, parts of figures, or table content.

Provide photographs with clear resolution in electronic form (300–600 dpi). Sometimes color photographs do not display well when reproduced as black and white, so it is most desirable to convert color photos to black-and-white images in a graphics program such as Adobe Photoshop®.

As much as is practical, labels within figures must appear in a consistent font throughout a document. Labels and legends must use a font that is easily readable and distinct from surrounding text.

Use consistent formatting for similar tables. Label rows and columns descriptively. If using color, see the section of these guidelines describing best use. If needing to cut and paste figures onto pages, be sure they are straight on the page.

The program used for the figure or table must be compatible with MS Word. Research Center staff may need to resize the illustration for publication and may not have access to the illustration's original software.

Margins

Maintain 1-inch margins on pages with illustrations. Anything less may cause information to be cut off when the report is bound.

® Adobe Photoshop is a product of Adobe Systems Incorporated, San Jose, California.

Appearance and Usage

Font Size

Illustrations must have no type smaller than 7 points. Use a consistent font style and size for similar illustrations throughout the report.

Placement

All figures and tables must be referenced in the text. Figures should appear close to the first reference in the text, but not before. Place figures so that they do not break text that belongs together (e.g., do not break a paragraph) but so they can be seen while reading the text (i.e., on the same page or facing page).

Tables should appear close to the first reference in the text, but not before. Place tables so that they do not break text that belongs together (e.g., do not break a paragraph).

Cite sources

Document any figures, tables, or appendixes taken from another source. See the References chapter for information on how to cite sources and the use of copyrighted materials. Give complete sources for data shown if taken from another source.

Copyrighted material:

See Use of Copyrighted Materials for more information.

Numbering Figures and Tables

Number figures and tables consecutively (e.g., Figure 1, Figure 2, Table 1, Table 2). Figure and table numbering should use the same style.

Remember that MS Word has an automatic feature to help with numbering figures and tables. See Appendix, Automatic Figure/Table Numbering for word-processing tips.

Captions and Titles

Place figure captions BELOW the figure.

Place table titles ABOVE the table.

Both should be:

- Bolded.
- Centered.
- Ended with a period.

Wrap captions to the same width as the graphics. When posting PDF files online, reproduction staff will enlarge specific destinations such as figures and tables for easy viewing. If the caption is wider than the graphic, it limits enlargement possibilities or cuts off part of the caption. Use a soft return (SHIFT+ENTER) to wrap the caption text to fit.

Example:

Figure 1. Type the Caption Here Using Initial Caps,
with a Period at the End and in Bold.

Continuation

When a figure or table continues for two or more pages, note the continuation—with "(Continued)" following the figure caption on each page. Try to avoid this construction by breaking into separate figures or tables.

Units

Clearly identify units used in tables. Give repeated units of measure or degree in the column headings. Do not repeat these units in the columns.

Be sure graphs have clearly labeled axes.

Use the measurement system that the data was collected in. If in SI, give conversions at the bottom of the table.

Compare to LOF/LOT

Make sure that the listings in the LOF and LOT exactly match the captions and titles and that page numbers are correct.

Color Reproduction

When color is required, avoid using light colors, such as yellow or light blue, because they often disappear in any black-and-white printouts and are often not clearly visible even when printed in color.

References

Overview

As a general rule, whenever quoting, paraphrasing, or referring to information or ideas from a publication or outside source that do not fall into the category of "common knowledge", credit the source in a footnote, bibliographic reference, or statement in the text. Do not cite secondary sources such as encyclopedias.

Use of copyrighted material is covered in the section on Use of Copyrighted Materials.

How to Cite References

Citation Style

When referring to work by another author or discussing that author's ideas, credit the author. Research Center reports use the author-date system of citation. The reference is given in parentheses in the text and has the surname of the author, date the item was published, and, if a quote, the page that the reference was taken from. See *The Chicago Manual of Style* for more detail on this style.

Bibliography Page

If the author has not cited sources but has consulted them during research or wants to list them as additional resources, place these sources in a bibliography after the references. The bibliography should begin on the first recto page following the references.

Place these listings in alphabetical order with first author's name inverted, the rest in natural order (i.e., Johnson, Bill, and Charles Murkoff).

Unpublished Works

Do not include unpublished works and telephone conversations in the references or bibliography. They may be cited in the text with a description of the author (or interviewee) and a date of authorship (or when the interview occurred) in parentheses. Also use footnotes for source information if the author chooses.

Example:
A telephone conversation with a representative from FHWA confirmed reasons for the choice (Joe Jones, March 12, 2002).

Cross Check

Make sure that each reference matches its correct in-text referent. Make sure that only works cited in the text are included in the references section.

Formatting References and Bibliography Pages

Content

The “References” section should contain every source cited in the text and only those sources.

The “Bibliography” page is optional and may contain sources that:

- Have not been cited but were consulted during the research.
- Are listed as additional resources.

Use the same style for items in the Bibliography that was used in the References section.

Carefully check that references are not repeated in different formats.

Placement

The References page should come after the main text of the report but prior to any appendixes. The References begin on a recto page.

The Bibliography page, if there is one, should begin on the first recto page following the references.

See *Appendix: Appendixes Following References (Endnotes)* (p.60) for word-processing tips on handling documents with appendixes.

Source Order

Place works in alphabetical order.

Sources Cited More than Once

List a source only once on the References or Bibliography page.

Format for Entries

Research Center reports use a modified version of the format given in *The Chicago Manual of Style*.

The first element is the author's name. The name is inverted (surname first, given name, middle initial.). If there is more than one author, the other authors' names are given in natural order. A period separates the author name from the date. This is a year only. A period separates this from the work's title. If it is a book, it is in italic, if a journal article, it is in quotes. In either case, the title is given in title case (initial caps on significant words).

After a book's title comes the series or report number, if it is part of a series; place of publication followed by a colon; and publisher.

Journal article titles are followed by the journal name in italics and title case, the volume number, the issue number in parentheses, a colon, a space, and the page range of the entire article. The day or month of the issue may follow the page range, if needed. It is separated by a comma from the page range.

For sources with three or more authors, the style is to list all authors by name in the reference entry and use "et al." in text citations.

Alphabetize the Reference list.

Reference Listing Examples

The following source listings show examples of recommended styles.* Note punctuation and use of initials and italics.

Book

1. Newland, D. E. 1988. *Random Vibrations: Spectral and Wavelet Analysis.* New York: John Wiley and Sons, Inc.

Chapter or section in a book

2. McGee, A. M. 2003. "Graduated Driver Licensing." In *Injury Prevention,* J. R. Millman (ed.). Chapel Hill, North Carolina: University of North Carolina Press.

Article in a periodical

3. Sansalone, M., J. M. Lin, and W. B. Street. 1998. "Determining the Depths of Surface-Opening Cracks Using Impact Generated Stress Waves and Time-of-Flight Techniques." *ACI Materials Journal* 95(2): 168–177.

* Some examples come from TRB's *Information for Authors (Information 2009)* (see http://www.trb.org/Guidelines/Authors.pdf for more examples) and from *The Chicago Manual of Style*.

TRB publication

4. Dewan, S. A. and R. E. Smith. 2003. "Creating Asset Management Reports from a Local Agency Pavement Management System." *Transportation Research Record: Journal of the Transportation Research Board* 1853*:* 13–20.

Government report

5. Von Quintus, H. L. and A. L. Simpson. 2002. *Documentation of the Backcalculation of Layer Parameters for LTPP Test Sections.* Publication FHWA-RD-01-113. Washington, D.C.: Federal Highway Administration.

Use of Copyrighted Materials

Permission to Use Copyrighted Materials

FHWA's Publications and Printing Handbook, Chapter 5, Section 4.a (*Publications* 1987) states:

a. Written Release Required.
1) Copyrighted material may not be used in an FHWA publication unless written permission of the copyright owner is obtained. Prior use of copyrighted material in another Federal Government publication does not necessarily constitute permission to use it in the FHWA publication.

2) If a contractor-prepared publication contains copyrighted material, the contractor is responsible for identifying it, obtaining the copyright owner's written permission to use it, and including a footnote giving credit to the owner. The written permission must be provided to the Contracting Officer's Technical Representative (COTR)….

b. Release Language.
1) The following release language should be used for contractor-prepared publications:

> (Name of copyright owner) hereby grants to (name of contractor) and the United States Government a royalty-free, nonexclusive, irrevocable right to use, reproduce, distribute, and sell (identify the copyrighted work, or the portion of it to which rights are granted) throughout the world."…

Report authors are responsible for securing copyright releases and including the release statement in the text; legal liability for failure to do this falls on them.

For overall copyright explanations, see http://www.copyright.gov.

Sponsored Research

Before releasing any information that results from sponsored research, be sure to have the approval of the sponsoring agency. “Release” includes publishing, presenting, posting on a website, or even informal sharing with colleagues outside ADOT.

Sponsored research includes any technical findings resulting from research, not just published project reports. It covers documents that have not yet been reviewed and approved by the sponsor or ones that the sponsor has reviewed but not approved for publication.

Proprietary Information

Proprietary information should not be used since this may restrict availability of reports.

Permission Documentation

Include the original copy of copyright permissions with the edit copy of the manuscript for the Research Center to maintain in the project file.

Works Cited (References)

Chicago Manual of Style. 2003. 15th ed. Chicago: University of Chicago Press.

Guidelines for Preparing Federal Highway Administration Publications. 1988. FHWA-AD-88-001. Washington, DC: Federal Highway Administration.

Guidelines for Preparing, Editing, and Submitting TxDOT RMC Reports. 2010. College Station, TX: Texas Transportation Institute.

Information for Authors. 2009. Washington, DC: Transportation Research Board. http://www.trb.org/Guidelines/Authors.pdf

Publications and Printing Handbook. 1987. H 1710.4. Washington, DC: Federal Highway Administration.

Appendix:
Word-Processing Tips in Microsoft Word

Appendix Table of Contents

Overview

The following tips are designed to help authors and support staff format their documents more easily and consistently.
The following instructions apply to Microsoft Word 2007. Earlier versions may have steps that vary.

Templates

Definition

Template—Every MS Word document is based on a template. A template determines the basic structure for a document and contains document settings such as autotext entries, fonts, key assignments, macros, menus, page layout, special formatting, and styles. Unless a specialized template has been chosen, Word assigns a template (usually the "normal" template).

Creating a Template Based on an Existing Document

To create a template based on an existing document, follow these steps:

1. Open the document on which the template will be based.
2. Click the **Office Button** and select **Save As**. The **Save As** window opens.
3. Enter a title for the template in the **File name** field.
4. Open the **Save as type** drop-down menu under the file name.
5. Select **Word Template**.
6. Click **Save**. The document is saved as a Word template (*.dotx).

Built-in templates can be accessed via the **Office Button**; the **New Document** window has the option **My templates…**, which will lists templates in the application's template folder.

Selecting a Template

To select/use an existing template, follow these steps:

1. From the **Office Button**, select **New**.
2. In the **New Document** window, select a blank document and click **Create,** or select an existing template from **My templates…** and click **OK**.

File Handling

Large Files

Generally it is easier to work on a document that is contained within one electronic file. However, this is not always possible when files become too large to easily handle. Large files are better broken into smaller files because there will be less delay in transferring, opening, and saving the files. Also, when files are long, Word's memory can get overloaded and sometimes corrupt the file.

Reduce problems with large files by using techniques such as creating master/sub documents, linking graphics rather than embedding them, and dividing files by chapter or section.

Master/Sub Documents

For large files that need to be broken into smaller files, a master document that links to subdocuments can be useful. The file can be printed as one document without overloading computer and printer memory, and a complete table of contents can be created in the master document. For more information, search Word's help feature.

Appendixes Following References (Endnotes)

In ADOT reports, the references section should be placed after the main body of the report but before the appendixes. However, Word will not allow an autogenerated list of references (endnotes) to come anywhere but at the end of the file. Therefore, appendixes need to be placed in a separate file. (Word allows placement of endnotes at the end of each section, but given the arrangement of sections within ADOT reports, this option isn't feasible.)

See Combining TOCs from Separate Files regarding inclusion of appendix headings in document front matter lists.

References in Appendixes

If there are references in the appendixes, the references can be listed in a separate references section for all the appendixes or individually for each appendix.

Imported Files

Importing an Excel Table into Word

To place a Microsoft Excel® table into Word, follow these steps:

1. In Excel, select the table and copy it.
2. In Word, paste the material.
3. Format the table in Word to be consistent with the other tables in the document.

Tips:

- If placing the cursor just below an existing Word table in the document and pasting an Excel file with the same number of columns, the pasted material will adopt the format of the Word table.
- In some cases, it is necessary to choose **Paste Special** from the **Paste** pull-down menu and select formatted text or object. In most cases, the best result comes from simply pasting material using the default settings.

The Research Center no longer recommends pasting the table as a picture because the table becomes a graphic and therefore is no longer accessible by the editor.

Converting WordPerfect Characters to Acrobat

WordPerfect characters, other than standard text, do not convert to Acrobat. They will either appear as a blank spot or will convert incorrectly. If the file is originally created in WordPerfect, even if converted to Word before going to Acrobat, this glitch may appear. Please check each special character to make sure that it has converted correctly.

If the characters appear incorrectly in the converted file, the best alternative is to replace them with Word characters in the Word file and reconvert. If this option isn't practical, fix them in Acrobat using the **TouchUp Text** tool.

Format and Spacing

Paragraph spacing

Word offers the ability to adjust paragraph spacing rather than insert a blank line. Adding paragraph spacing prevents the manually inserted hard return from causing a blank line to appear at the top of a page. Using paragraph spacing instead of blank lines has several advantages — it enhances consistent spacing, avoids undesirable page breaks, and provides a solid basis for electronic accessibility conversion when needed.

® Microsoft Excel is a product of Microsoft Corporation, Redmond, Washington.

To adjust paragraph spacing, follow these steps:

1. Select the paragraphs in which the paragraph spacing will be changed.
2. On the **Home** tab in the **Paragraph** group, click the expansion box arrow in the lower right corner.
3. Select the Indents and Spacing tab.
4. In the **Spacing** section, enter the spacing desired in the **Before** or the **After** box (12 pt. will create a full line spacing).

Widows and Orphans

Widow—a line that appears alone at the top of a page.

Orphan—a line that appears alone at the bottom of a page.

Widows and orphans are undesirable in page layout and can be avoided by turning on widow and orphan control:

1. Select the paragraphs in which to control widows and orphans.
2. On the **Home** tab in the **Paragraph** group, click the expansion box arrow in the lower right corner.
3. Select the Line and Page Breaks tab.
4. Select the **Widow/Orphan control** check box.

Also a style may be modified by turning on widow and orphan control.

Keep with Next

Headings should be kept together with at least two lines of text. Headings alone at the bottom of a page are undesirable in page layout.

To keep text together, follow these steps:

1. Select the paragraph (or heading) that’s to be kept with the following paragraph.
2. On the **Home** tab in the **Paragraph** group, click the expansion box arrow in the lower right corner.
3. Select the Line and Page Breaks tab.
4. Select the **Keep with next** check box.

Also, if desired, modify a style, such as Heading 1, so that it stays with the text after it.

Note that if using a blank line to separate paragraphs, apply this to both the heading and the blank line following it. This is one reason why setting paragraph spacing is preferable to using blank lines.

Adding a Page Break

To force a manual jump to the next page, use a page break. Do not use returns to space to the next page. Use the **Keep with next** command or other formatting features where possible. To force a manual page break, click CTRL+ENTER or follow one of these steps via the menu (both achieve the same end):

1. On the **Insert** tab in the **Pages** group, click the **Page Break** icon; or
2. On the **Page Layout** tab in the **Page Setup** group, click the **Breaks** pull-down menu and click **Page**.

Adding a Blank Page

In an ADOT report, major sections begin on a recto (odd-numbered) page. The easiest way to force them onto recto pages is by inserting an odd-page section break:

1. Click at the bottom of the page at the end of the first section.
2. On the **Page Layout** tab in the **Page Setup** group, click the **Breaks** pull-down menu.
3. Click **Odd Page**.

To change how an existing section starts:

1. On the **Page Layout** tab in the **Page Setup** group, click the expansion box arrow.
2. On the **Layout** tab, select the way the section should start in the **Section Start** box.

If switching to a section with manual numbering (telling Word what page number the new section should start on), "odd page" will not work. Therefore, when transitioning from one section to another, the next section's page numbers should be set to **Continue from previous section**. Do not type in a number for **Start at**.

However, when transitioning from the front matter to the body of the report (Roman numerals to Arabic numerals), the page number will need to be changed to start at 1 for the body of the report. This means that a blank page will need to be added manually if the front matter ends on an odd-numbered page:

1. Click at the end of the front matter.
2. On the **Page Layout** tab in the **Page Setup** group, click the **Breaks** pull-down menu.
3. Click Next Page.

4. Click **Next Page** again. This creates the blank page that makes up an entire separate section. Blank lines may need to be deleted to bring the Chapter 1 material to the top of the next page.
5. Open the Chapter 1 footer and deselect **Link to Previous**.
6. In the blank page's footer, deselect **Link to Previous**.
7. In the Chapter 1 footer, click **Page Number**, **Format Page Numbers**, and **Start at 1**. Change the number format to **Arabic numerals**.
8. Click **OK**.
9. In the blank page's footer, delete the page number.

Text Styles

Applying a Style Tag

Style tags promote consistency and allow for creating autogenerated lists like a table of contents. Styles will also allow changing text attributes throughout an entire document. For example, rather than having to reformat every heading in the document, change the attributes associated with the heading style tag. Once the heading attributes are altered, Word will automatically make the change throughout the entire document.

When a Word document is first created, the application automatically assigns all text the style tag titled "Normal" or Word's best guess at what was intended.
Change the style associated with the text by:

- applying an existing style tag (also referred to as a "built-in" style) or
- creating a customized style tag.

Built-in Style Tags

A built-in style tag is a tag whose attributes have been preset by Word, such as Heading 1, etc. To apply a built-in style to text, follow these steps:

1. Highlight the words, paragraph, list, or table that has a style to be changed.
2. If the **Styles** pane is not open, on the **Home** tab in the **Styles** group, click the expansion box arrow in the lower right corner.
3. Select the desired style. If it does not appear, click **Options** at the bottom of the **Styles** pane. Select **All styles** from the **Select styles to show** drop-down menu. Click **OK**.
4. The previously highlighted text assumes the characteristic(s) associated with the style tag.

Custom Style Tags

To create a new custom style tag, follow these steps:

1. Open the **Styles** task pane if it is not already open. (On the **Home** tab in the **Styles** group, click the expansion box arrow in the lower right corner.)
2. Click the **New Style** button**.**
3. In the **Name** field, enter a name for the new style.
4. Select a style type from the **Style type** drop-down menu.
5. Select the desired attributes (click the **Format** button to see more options).
6. When done selecting the attributes, click **OK**.

An existing style can be used as the basis of a new/custom style tag:

1. Select the text on which to base the new style, e.g., Heading 1 (referred to as the base style).
2. On the **Home** tab in the **Styles** group, click the bottom arrow on the styles menu.
3. Click Save Selection as a New Quick Style.
4. Name the new style, e.g., Table Caption.
5. The attributes associated with the new style will be the same as those associated with the text just highlighted. Make additional, customized changes.
6. Click **OK**. The new style is added to the list of style tags.

Modifying an Existing Style Tag

Use Word's capability to redefine a style if changing the attributes of previously tagged text.

To make this change, don't retag (or reformat) every heading in the document, but rather simply change the attributes associated with the heading style tag. Once the heading attributes are altered, Word will automatically make the change throughout the entire document.

When changing a base style (e.g., Heading 1), all custom styles that originated from that base style will also reflect the change.

To modify an existing style tag, follow these steps:

1. Open the **Styles** task pane if it is not already open. (On the **Home** tab in the **Styles** group, click the expansion box arrow in the lower right corner.)
2. Right-click the style to be modified.
3. Click **Modify**.
4. Change the tag's attributes.
5. Click **OK**.

To use a modified custom style in a new document that has been based on another template, select the **Add to Quick Style list** check box in the **Modify Style** window. Word will then add the modified style to the template attached to the active document.

Be careful when formatting text that has italics, bold, superscripts, subscripts, etc. If the text is given the same style a second time, these items will be turned into regular text.

Table of Contents, List of Figures, and List of Tables

Creating Autogenerated Lists

In order for MS Word to automatically generate the TOC, LOF, and LOT, the correct style (Heading 1, Heading 2, etc.) must be applied to all headings and table/figure captions.

To create a TOC, LOF, or LOT, follow these steps:

1. Click where the table of contents is to be inserted.
2. On the **References** tab in the **Table of Contents** group, click the **Table of Contents** button.
3. Click Insert Table of Contents.
4. Click **Options**.
5. Under **Available styles**, find a style that has been applied to headings in the document.
6. Under **TOC level**, to the right of the style name, enter a number from 1 to 9 to indicate the level that heading style is to represent. Note: If using only custom styles, remove the TOC level numbers for the built-in styles, such as Heading 1.
7. Repeat steps 5 and 6 for each heading style to include in the table of contents.
8. Click **OK**.
9. Select any other table of contents options desired. Click **OK**. Word generates the TOC.
10. Verify that all appropriate headings were included.

Adjusting Entries with Two or More Lines

ADOT style requires at least three leader dots between the entry text and its page number. If a list generates without sufficient space, adjust the formatting of the list:

1. Select the list and right click on it.
2. Select Edit Field.

3. Click the **Table of Contents** button.
4. Click the **Modify** button.
5. Highlight **TOC1** and click the **Modify** button.
6. Click the **Format** button and select **Paragraph**. Set **Indentation Right** to 0.5. Click **OK**.
7. Click the **Format** button and select **Tabs**. Set the right dot leader tab to 6.5 (if using a 1-inch margin).
8. Click **OK** until the windows are all shut.
9. A message appears asking if it is desired to replace the selected table. Click **OK**.

Manually format the list by forcing a soft line return (using SHIFT+ENTER). However, this formatting will be lost if regenerating the list fully.

Saving TOC Styles

Once the appropriate TOC style (i.e., the desired font choice, spacing, etc.) has been chosen, save the style for use in future documents:

1. Select the entire TOC.
2. Click the References tab and the Table of Contents drop-down box.
3. Select Save Selection to Table of Contents Gallery and give the style a name. Click OK.
4. When closing the document, save the changes to the gallery.

The next time a TOC is created, this style will appear as an option in the Table of Contents drop-down box. (To delete a style, right-click on it in the Table of Contents drop-down box and choosing Organize and Delete.)

Updating Lists

MS Word allows users to update either the entire list—replacing existing headings with new input from the body of the report—or only the page numbers shown in the list. If choosing to update the entire list, manual formatting added to the list after its generation may be lost. If updating only page numbers, manual formatting will remain in place.
To update the TOC, LOF, and LOT, follow these steps:

1. Right-click on the table and select **Update Field**, or select the table and hit F9.
2. Select either **Update page numbers only** or **Update entire table**. If updating the entire table, format changes that were made to the table may be lost.
3. Verify that changes were made correctly.

Manually Adjusting Lists

Most formatting of lists (TOC, LOF, and LOT) should be specified during their creation. However, after generating lists, there may be some formatting to adjust manually (i.e., change something in the list by hand).

Avoid manual formatting as much as possible. Any manual formatting added to a list after generation may be lost when the list is fully updated. Manual changes will need to be reapplied each time the list updates.

Combining TOCs from Separate Files

If there are appendixes in a file separate from the body of the report and it is desired to add their headings to the main TOC, follow these steps:

1. In the appendix file, begin page numbering using the page number following the references section; i.e., if the last page of the references is page 122, then begin the appendix body on page 123.
2. Save the file at this stage.
3. At the end of the appendix file, create a TOC for the appendix.
4. Select the generated TOC field and press CTRL+SHIFT+F9 to turn the field into stable text.
5. Copy and paste this text into the TOC of the main report file. Save the main report file but *do not* save the appendix file.
6. When the file is ready to publish, delete the TOC in the saved appendix file.

Pasting Lists (Fields) from Other Files

When copying and pasting lists such as TOCs, LOFs, and LOTs from one document to another, sometimes the text does not stay stable (i.e., it cannot find the source text, etc.). To avoid changing the content of the list, click the list field and then press CTRL+SHIFT+F9. This changes the field to stable text that can be copied and pasted into the new file. Once a field result is changed to regular text, the information is static and cannot be updated the way field results can. Make sure *not to save* the original file after changing the list to regular text.

Dot Leaders/Tabs

If creating a TOC, LOF, and LOT without using an autogenerated list, there will need to be dot leaders set up. Using manual periods instead of dot leaders will prevent text from lining up properly. To set up dot leaders, follow these steps:

1. After the figure caption, press tab and type the page number.
2. Select the lines of text to have dot leaders.

3. On the **Home** tab in the **Paragraph** group, click the expansion box arrow in the lower right corner.
4. Click **Tabs**.
5. Under **Tab stop position**, type the position for a new tab (this should usually be the right margin) and clear any extraneous tabs.
6. Under **Alignment**, select **Right**.
7. Under **Leader**, click the period (**.**), and then click **Set** and **OK**.

Footnotes, Endnotes, Captions, and Cross References

Endnotes/Footnotes

To insert an endnote or footnote, follow these steps:

1. Click where to insert the note reference mark. The number should be placed before the period and at the end of the sentence or section where the text cited or discussed the author or idea (unless needed elsewhere for clarity).
2. On the **References** tab in the **Footnotes** group, click the expansion box in the lower right corner to open the **Footnote and Endnote** window.
3. Select Footnotes or Endnotes.
4. By default, Word places footnotes at the end of each page and endnotes at the end of the document. The placement of footnotes and endnotes can be changed by making a selection in the **Footnote and Endnote** window.
5. In the **Number format** window, click the format wanted.
6. Click **Insert**. Word inserts the note number and places the insertion point next to the note number.
7. Type the note text.
8. Double-click the number to get back to the text. Italicize the endnote number in the text and place parentheses around the number.
9. Insert subsequent footnotes or endnotes by clicking the **Insert Footnote** or **Insert Endnote** button on the **References** tab in the **Footnotes** group. As additional footnotes or endnotes are inserted in the document, Word automatically applies the correct number.

Do not repeat a reference. To insert a previously referenced endnote, follow these steps:

1. On the **Insert** tab in the **Links** group, click the **Cross-reference** button.
2. For Reference type, select Endnote. For Insert reference to, select Endnote number. Under For which endnote, select the endnote referred to.

3. To see both the text and the endnote at the same time, go to the **View** tab in the **Document Views** group and click the **Draft** button. On the **References** tab in the **Footnotes** group, click **Show Notes**. A second pane will appear at the bottom with the footnotes/endnotes. Toggle this view on and off by clicking the button.
4. To view and/or change the endnote separator (the line before the notes), select it from the drop-down menu in that same pane.

Automatic endnotes and footnotes will update numbering as needed. However, it is needed to verify that all endnotes, footnotes, and cross references are updated in the final file. To update all fields, select the entire document (ALT+A) and press F9.

Automatic Figure/Table Numbering

A portion of the table or figure caption ("Figure" and the number) can be generated automatically by Word. The advantage to automatic captions is that numbers can be automatically updated if adding, deleting, or moving a figure. Cross-references to captions can also be autogenerated and easily updated. To insert automatic figure/table numbers, follow these steps:

1. Position the cursor where it is desired to insert the caption.
2. On the **References** tab in the **Captions** group, click the **Insert Caption** button. The **Caption** window opens.
3. Select **Figure** or **Table** and click **OK**. Word inserts a consecutive figure/table number.
4. Type the rest of the caption.
5. Apply the correct style to the caption (note that if it is desired to autogenerate the list of figures and list of tables, figures and table captions will need to have different styles applied (i.e., Figure Caption style for figure captions and Table Caption style for table captions).

Automatic Cross Reference to Figures/Tables

To create an internal link to a figure or table number in the current document, follow these steps:

1. On the **References** tab in the **Captions** group, click **Cross-reference.** The **Cross-reference** window opens.
2. For Reference type, select Figure or Table. For Insert reference to, select Only label and number. Under For which caption, select the figure/table referred to.
3. Click **Insert**.

Page Breaks Inserted by Word

Sometimes automatic cross references cause a glitch in Word where a page break is inserted before the cross reference or other glitch appears. To control this, select the problem cross reference and lock the field by pressing CTRL+F11. This prevents Word from updating the cross reference and inserting a page break. However, if it is needed to later update the field, it will be necessary to press CTRL+SHIFT+F11 to unlock the field.

Automatic Cross Reference to Headings

To create an internal link to a heading in the current document, follow these steps. These instructions will only work if heading styles have been applied throughout the document.

1. On the **Insert** tab in the **Links** group, click the **Cross-reference** button**.**
2. For **Reference type**, select **Heading**. For **Insert reference to**, select **Heading text**, **Page number**, etc., depending on the nature of the cross reference. Under **For which heading**, select the heading beinge referred to.
3. Click **Insert**.

Updating Cross References

To update the cross references in the document, follow these steps:

1. Select the entire document (CTRL+A) (note that this will also select any autogenerated table of contents, list of figures, and list of tables).
2. Hit F9.
3. When the dialog box opens, select either **Update page numbers only** or **Update entire table.** Click **OK.**
4. Verify that changes were made correctly.

Software to Aid in Reference Citation

Many researchers find a software program called Endnote helpful in citing references. The program works with MS Word and allows for selecting the reference to cite. For more information, visit www.endnote.com.

Tables

Inserting a Table

To create a table use Word's Insert Table feature. This feature allows for inserting a table as well as set table properties and add or delete rows and columns.

1. On the **Insert** tab in the **Tables** group, click the **Table** button.
2. Either select the cells for the table, or select **Insert Table…** and type in the number of rows and columns.

Setting Table Properties

To set properties of an existing table, follow these steps:

1. Click in the table.
2. The **Table Tools** (**Design** and **Layout** tabs) become active. Select from the options on these tabs.
3. On the **Layout** tab in the **Alignment** group, click the **Align Center** button.
4. On the **Layout** tab in the **Table** group, the **Properties** button opens the **Table Properties** window, which gives options for table, row, column, and cell.

Adding and Deleting Table Rows and Columns

To add a row to a table, follow these steps:

1. Place the cursor in the table in the row below (or above) where the additional row is wanted.
2. Right-click the table.
3. From the pop-up menu, select **Insert** and choose **Insert Rows Above** (or **Insert Rows Below**).

Follow these steps to add a column to a table:

1. Place the cursor in the table in the column to the right (or left) of where the column is to be added.
2. Right-click the table.
3. From the pop-up menu, select Insert and choose Insert Columns to the Left (or Insert Columns to the Right).

Images

Inserting an Image

To insert an image in the document, follow these steps:

1. On the **Insert** tab in the **Illustrations** group, click the **Picture** button (or the **Clip Art** button for clip art). The **Insert Picture** window opens.
2. Locate, select, and insert the desired object.

Layout of Image

To ensure that a graphic moves when the surrounding text moves, follow these steps:

1. Right-click on the graphic.
2. From the pop-up window, select **Text Wrapping** and **In Line with Text**.

If placing the image in line with text causes problems, choose **Top and bottom** instead (the image will need to be manually moved):

1. Right-click on the graphic.
2. From the pop-up window, select **Text Wrapping** and **More Layout Options**. The **Advanced Layout** window opens.
3. On the **Text Wrapping** tab, select **Top and bottom**. Enter whatever distance from text is desired or leave it at zero.
4. Click **OK**.

Page Numbers

Page Orientation

Sometimes it is necessary to orient illustrations and tables by landscape (11 inches x 8.5 inches), rather than portrait (8.5 inches x 11 inches), on the page. In these cases, make sure that when turning the printed book clockwise 90 degrees, the illustration is right-side up.

Place page numbers in portrait orientation, even on a landscaped page, so that page numbers appear consistently in the same location throughout the report.
The easiest way to do this is to flip the graphic in the program it was created in. Then insert the image into the portrait page.

Otherwise, the page orientation will need to be changed to landscape and a portrait page number created:

1. Before the page that is being changed to landscape, insert a section break: on the **Page Layout** tab in the **Page Setup** group, click the **Breaks** button and select **Section Break Next Page**. Delete any extra returns.
2. After the page that is being changed to landscape, insert a section break the same way. Delete any extra returns.
3. Double-click in a header or footer. This causes the **Headers & Footers Tools** (**Design** tab) to become active. Click inside the footer following the landscaped page and deselect **Link to Previous**. This will preserve the page numbers for the sections following the landscaped pages.
4. Click inside the footer for the first landscaped page and deselect **Link to Previous**. Delete the page number.
5. Click the Close Header and Footer button.

6. On the first landscaped page, on the **Page Layout** tab in the **Page Setup** group, click the **Orientation** button. Select **Landscape**.
7. Insert the illustration and caption or table on the landscaped page.
8. Double-click in a header or footer. Click in the footer of the first landscaped page. On the **Design** tab in the **Header & Footer** group, click the **Page Number** button. Select **Page Margins** and then **Large, Left**.
9. Click on the page number. On the **Format** tab in the **Text** group, click the **Text Direction** button once to change the direction of the text.
10. On the **Home** tab, change the size of the font.
11. Click the Close Header and Footer button.

Two Sets of Page Numbers

Occasionally, it will be necessary to create a file with two sets of page numbers. For example, if creating an appendix that contains a previously printed document with internal page numbering, leave the internal page number intact but add consecutive page numbers for the full document. To create a second set of page numbers within a document, it will be necessary to work with Word fields.

The quickest way to create a duplicate set of page numbers, and the way most frequently needed, is to add a predefined number of pages to the automatically generated page number. The internal appendix page numbering for the previously printed document would be the "real" page number recognized by Word. To get that number:

1. Start a new section.
2. Double-click in the footer.
3. Deselect Link to Previous.
4. Deselect **Link to Previous** in the footer of the next section.
5. Click in the footer of the section that needs two page numbers.
6. On the **Design** tab in the **Header & Footer** group, click the **Page Number** button. Choose where the page number is to appear.
7. Click the **Page Number** button and choose **Format Page Numbers**. The **Page Number Format** window opens.
8. Select the button for **Start At** and enter 1 (or the appropriate starting page number for the previously printed report).
9. Click **OK**.
10. If the appendix restarts page numbering internally (such as from front matter to the body of the report), change the numbering using the **Start At** function as required.

To create the consecutive page numbering for the entire document, it will be necessary to construct a false page number that includes the current page number known to Word and adds any pages prior to the last **Start At** command. The steps to construct that false page number are:

1. Go to the page that needs two page numbers and determine the number of pages preceding it (usually shown on the status bar at the bottom of the screen). For purposes of this example, we will say there are 50 pages.
2. Double-click in the footer and place the cursor where the consecutive page number should go (usually just below the internal page number).
3. On the **Insert** tab in the **Text** group, click the **Quick Parts** button and select **Field**. The **Field** window opens.
4. Select **Page** and click **OK**. The second page number appears.
5. Click the **Quick Parts** button again and select **Field**.
6. Click the **Formula** button. The **Formula** window opens.
7. In the formula line, type =50+1 and click **OK**. (For this example, using 50 as the preceding number of pages.)
8. Show field codes (ALT+F9 will toggle highlighted fields).
9. Highlight the page number code inserted in steps 3 and 4—{ PAGE * MERGEFORMAT }—and cut it (using the menu choice or CTRL+X).
10. Highlight the number 1 in the remaining formula code inserted in steps 5 to 7 and replace it by pasting the page number code that was just cut. The code should then look like this sample: { =50+{ PAGE * MERGEFORMAT } }.
11. Toggle the field code and check several consecutive pages to see if it presents the total page count expected.

Special issues may arise when transitioning from roman to Arabic numerals, and vice versa.

Other Techniques and Shortcuts

Word Count

On the **Review** tab in the **Proofing** group, click the **Word Count** button. The results will show pages, words, characters, paragraphs, and lines.

Selecting Noncontiguous Text Items

Select some text (individual characters, words, sentences, paragraphs) and then hold down the CTRL key while making another selection. Word highlights everything that has been selected.

Selecting a Large Block of Text

Place the cursor where the selection should begin. Press F8. Scroll down and place the cursor where the selection should end. Press ESC or the next command (such as CTRL+C).

Inserting a Comment

In order to mark a file for revision, authors and editors can insert comments that can be toggled on and off from view/printing. Follow these steps:

1. Select the text or item that is meant to comment on.
2. On the **Review** tab in the **Comments** group, click **New Comment**.
3. Type the comment text.

Smart Quotes

To have smart quotes (“ ” and ‘ ’) generated as they’re typed, follow these steps:

1. Click the **Office Button**, and then click the **Word Options** button.
2. Click **Proofing**, and then click **AutoCorrect Options**. The **AutoCorrect** window opens.
3. Click the AutoFormat As You Type tab.
4. Under Replace As You Type, select the "Straight quotes" with “smart quotes” check box.
5. Click **OK**.

To change the appearance of individual quotation marks, press CTRL+Z immediately after typing the quotation marks.

If there are straight quotes (" and ') already in a document (this often happens when text is imported, such as from email), find and replace all instances of single or double quotes in the document. On the **Home** tab in the **Editing** group, click the **Replace** button**.** In both the **Find what** and **Replace with** boxes, type ‘ or “, and then click **Find Next** or **Replace All**.

Quick Access Toolbar

To add commands to the Quick Access Toolbar (that line of icons above the tabs and next to the Office button):

1. Click the appropriate tab or group to display the command that is wanted to add to the Quick Access Toolbar.
2. Right-click the command, and then click **Add to Quick Access Toolbar** on the shortcut menu.

When pressing and releasing the ALT key, little flags come up on the ribbon, customized to each user’s layout. Press those numbers or letters to execute the function.

Shortcuts

Instead of going to the top menu in Word, certain combinations of keys can have the same effect. Table 1 shows some useful Word commands.

Table 1. Microsoft Word Shortcuts.

Command	**Key Combinations**
Insert a page break	CTRL+ENTER
Insert a soft return	SHIFT+ENTER
Insert a nonbreaking space (useful between numerals and measurements)	CTRL+SHIFT+SPACE
Insert a nonbreaking hyphen (useful between numerals and measurements)	CTRL+SHIFT+HYPHEN
Insert em dash (—)	CTRL+ALT+Num-
Insert en dash (–)	CTRL+Num-
Print	CTRL+P
Delete a word	CTRL+BACKSPACE
Go to the beginning of the document	CTRL+HOME
Bold	CTRL+B
Italicize	CTRL+I
Copy	CTRL+C
Paste	CTRL+ V
Save	CTRL+S
Select all	CTRL+A
Select to the beginning of the document	CTRL+ SHIFT+HOME
Select to the end of the document	CTRL+SHIFT+END
Open	CTRL+O
Spell-check	F7
Update field	F9
Insert a hyperlink	CTRL+K
Repeat the last action	F4 or CTRL+Y
Find	CTRL+F
Find and replace	CTRL+H
Undo	CTRL+Z
Go to page, section, line, etc.	CTRL+G
Toggle between upper-, lower-, and sentence case for selected text	SHIFT+F3
Toggle smart quotes to straight quotes right after they have been typed	CTRL+Z
Lock a field to prevent it from updating, such as a cross reference to a figure or table	CTRL+F11
Unlock a field to update it	CTRL+SHIFT+F11
Toggle show hidden codes	ALT+F9
Show Word Help	F1