

**ARIZONA
TRANSPORTATION
RESEARCH
CENTER**

GUIDELINES FOR PREPARING ATRC RESEARCH REPORTS

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rev. July 2003

Prepared for:

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in cooperation with
U.S. Department of Transportation
Federal Highway Administration

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I. INTRODUCTION

The Arizona Transportation Research Center (ATRC) manages the applied research and development program of the Arizona Department of Transportation (ADOT). The ATRC oversees both the process by which ADOT management selects research projects and the actual research done in the projects. It also supervises the publication of the results, usually as a final report, to comply with Federal Highway Administration (FHWA) regulations requiring documentation of the activities and results of research projects (23 Code of Federal Regulations 420.207).

ATRC reports meet high standards for both content and presentation. Project managers and Technical Advisory Committees (TACs) ensure that the research is scientifically valid. ATRC staff thoroughly review report drafts to see that they are clearly written and logically organized. These guidelines provide authors direction on report presentation. They do not give rules for grammar and spelling. However, the project manager will return for rewriting a report that is poorly organized, has spelling and grammatical errors or significantly varies from these guidelines.

Guidelines for Preparing ATRC Research Reports is divided into six sections:

- I. Introduction
- II. Research Report Publishing Process
- III. Research Report Overview
- IV. Typographical and Visual Features of the Research Report
- V. Additional Sources of Information
- VI. Final Distribution of the Research Report

Authors shall follow these guidelines.

While the guidelines are intended to be comprehensive, they may not answer all of an author's questions. The ATRC strongly encourages authors to contact the project manager or the ATRC Librarian for clarification of the guidelines **prior** to the report review process. Questions may be directed to:

Project manager
ATRC
(602) 712-3130

or

Dale Steele, Librarian
ATRC
(602) 712-3138

II. THE RESEARCH REPORT PUBLISHING PROCESS

The project manager and Technical Advisory Committee (TAC) work closely with researchers to ensure that the research is correctly done. As the project concludes, they will review draft reports for accuracy and validity and may suggest revisions. The researcher should format drafts according to these guidelines.

When the report is accepted by the TAC, the project manager submits it to the local office of the Federal Highway Administration for its review. FHWA staff primarily look at the report's content and may suggest revisions.

After the report is accepted by the FHWA, it is given to the ATRC Librarian for review. The ATRC Librarian first reviews it for grammar, spelling and organization problems. If the report needs to be rewritten, the Librarian returns it to the project manager, who oversees its revision.

Once the report is clear and grammatical, the Librarian reviews it for adherence to these guidelines. The Librarian will return non-compliant reports to the project manager for revision.

The Librarian may suggest revisions to language and structure in the same review if the report is generally well-written and requires little correction.

The Librarian or report author will convert compliant reports to .pdf format and print from this version a copy to submit to the ATRC Manager for final review. If the ATRC Manager requires significant corrections, the project manager will oversee them. The ATRC Librarian will make minor corrections if they are relatively few in number.

The final .pdf version of the report is the master copy from which the report is printed.

III. RESEARCH REPORT OVERVIEW

ATRC research reports have the following elements, as appropriate, in this order:

- Report Cover (furnished by ATRC)
- Disclaimer Notice (inside front cover; furnished by ATRC)
- Technical Report Documentation Page (sample attached in Appendix A)
- Metric Conversion Factors Page (furnished by ATRC)
- Table of Contents (including List of Figures and List of Tables if applicable)
- Executive Summary
- Body of Publication
- Appendixes (as appropriate)
- Glossary (as appropriate)
- References (as appropriate)
- Bibliography (as appropriate)

REPORT COVER

The ATRC provides the cover using information provided on the Technical Report Documentation Page.

DISCLAIMER NOTICE

The ATRC provides the disclaimer notice.

TECHNICAL REPORT DOCUMENTATION PAGE

The author completes the Technical Report Documentation Page. The ATRC can provide blank forms on paper, as an e-mail attachment, or on computer disk. The Technical Report Documentation Page is critical for the research report: it provides information for the cover and many libraries use it for cataloging information. Many research database providers – notably the Transportation Research Information Services (TRIS) and the National Technical Information Service (NTIS) – get from it the information that they enter into their databases. A sample Technical Report Documentation Page and instructions for completing it are in Appendix A. If it is for an

engineering report, the author needs to submit an original paper copy of the Technical Documentation page with an original Registrants' seal in the lower right corner.

METRIC CONVERSION FACTORS PAGE

Measurements in ATRC reports are in the inch-pound (English) system. If they choose, authors may give equivalent metric (Système Internationale d'Unités or SI) units in parentheses. Either way, each report has a Metric Conversion Factors Page printed on the verso of the Technical Report Documentation page.

EXECUTIVE SUMMARY

Each report begins with an executive summary that gives in four or fewer pages a condensed version of the report, with emphasis on the results and conclusions.

BODY OF PUBLICATION

Introduction

In general the Introduction should include the following:

- Background information on the subject. Acknowledgements, if necessary, are printed on an inside cover.
- Scope of the project, research, or study.
- Organization of the contents.

Main Text

The main text presents the research.

Conclusions and Recommendations

A report's subject matter may require it to have a Conclusions section, a Recommendations section, or both. Conclusions are opinions based on the results; recommendations are suggestions for action.

APPENDIXES

Appendixes contain extensive supplementary material that is indirectly related to the report such as raw data and technical memoranda prepared in connection with the study. Brief commentary goes in a footnote. The main text has all information that is directly related to the topic.

REFERENCES

Complete bibliographic citations are given for all sources that are referred to in the text. If the author chooses to use a style that calls for a single list of references, these should be located at the end of the report unless there is justification for putting it elsewhere.

BIBLIOGRAPHY

A bibliography is optional. It may be provided if there are additional useful sources that are not included in the References section. Entries should be in a uniform style, based on a standard source, such as the United States Government Printing Office's *Style Manual 2000*^[1] or the *Chicago Manual of Style*.^[2] Like the References page, the Bibliography normally is at the end of a report unless there is justification for putting it elsewhere.

COPYRIGHTED MATERIAL

The FHWA's *Publications and Printing Handbook*,^[3] Chapter 5, Section 4 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 to 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.

IV. TYPOGRAPHICAL AND VISUAL FEATURES OF THE RESEARCH REPORT

COVER

Federally-funded reports have a gray cover, with the ADOT logo and a background graphic design. Each cover has the following elements:

- Title (28pt Arial, all caps, bold)
- Report number (Final Report [number]) (Arial 18pt, upper & lower case, bold; “Final Report 497”)
- Author’s name(s) and address (10 pt. Arial)
- Date (month and year) (18pt Arial bold)
- ATRC address (10 pt Arial)
- FHWA cooperation statement (10 pt Arial)

ATRC prepares the cover. The Disclaimer notice is printed on the inside front cover.

TABLE OF CONTENTS

The Table of Contents (TOC) listings:

- Begin with the Executive Summary or the first section that follows the TOC. Pages preceding and including the TOC are not listed. These include the Technical Report Documentation Page, the Metric Conversion Factors Page, the List of Figures and the List of Tables.
- Are on unnumbered pages.
- Reflect the hierarchy of the report’s sections. TOC entries are in the same type size and weight as the body text and the same case as the section titles (i.e., all upper case, upper and lower case, etc.). They are not in bold face. Indentation may clarify the hierarchy. Normally the TOC needs no more than three levels of hierarchy, i.e., chapters, sections, subsections.
- Read exactly as the section headings do in the text.
- Include the appendixes’ titles.

- Include entries for tables and figures (if applicable) on separate pages. If both lists are short, they may be combined on one page. Entries exactly match the title or caption wording.

TEXT

Abbreviations

A standard dictionary or the U.S. Government Printing Office (GPO) *Style Manual 2000*^[1] are the acceptable sources for abbreviations. Abbreviations of measurements do not have periods. Numbers from one through nine are spelled out. Numerals may be used for numbers 10 and above.

Dangling Lines

The last line of a paragraph should not be alone on a following page, nor should the first line of a paragraph be by itself on a preceding page. Headings and sub-headings are followed by at least one line of text; two are preferable.

Font

The main text is in plain type. Cursive, italic or ornamental faces are appropriate only for emphasis of specific words or for headings. The ATRC prefers use of 12-point type in Times New Roman or a similar font. This document is in 12 point Times New Roman.

Footnotes

Text occasionally needs supplementary comment which is not directly related to it and which is too small to include in an appendix. This commentary may be put in a footnote. As with references, footnotes may be placed at the bottom of the page or at the end of the report. Regarding text footnotes, FHWA guidelines^[4] state:

- Use superscript figures without parentheses or brackets for footnote references.
- Text footnotes begin with 1 in each chapter.
- Footnotes must begin on the page carrying the footnote number. Avoid breaking a footnote between pages.
- Footnotes should be single spaced. Indent the first line four spaces.
- Footnotes to tables or figures begin with 1 for each table or figure. Use superscript numbers.
- Asterisks may be used only when a numeral in a table or figure might cause confusion, such as being mistaken for an exponent.

As with references, footnotes are consistently formatted in an accepted style.

Graphics

Graphics include maps, tables, figures, and photographs. They may use color, but where feasible, should be designed so that they will be clear and legible when reproduced in black and white. Cross-hatching, varied line forms, reverses, dots and other graphic devices can be used in addition to color to make the graphic clear. Text should be in appropriate fonts and font sizes so that graphics will be clear and easily read.

Enough space should separate the graphic from the text to set it apart. Usually this is ca. ½-inch on the top and under the caption.

Graphics should be placed on the page so they can be viewed without turning the report sideways. If a graphic must be placed sideways on the page, the top of the graphic is at the left side of the page, going into the gutter. The page number location is consistent with the other pages, i.e., at the bottom of the short side of the page.

Graphics are numbered, captioned and, if copies, credited. The numbering is in a single sequence (Table 1, Table 2) from the beginning through the appendixes. Each graphic has a caption that identifies it. These captions are brief and not easily confused with the text. They are centered on the page, with those for figures at the bottom of the graphic; those for tables at the top of the table.

Original graphics are preferred, although copies may be used. The copy should cite the original source within brackets [Source: Reference #]. The citation should be placed below the caption at the left margin. Company logos or institution names should not appear on the copy.

Tables, graphs, charts and other graphics must be adequately labeled to provide clear information regarding the graphic as a stand-alone piece of information. All abbreviations, acronyms and symbols must be clear to the reader without reference to other parts of the document. This can be accomplished through the use of footnotes or other explanatory comments on the graphic (or on the last page of a multi-page table or chart).

Word processing software allows graphics to be designed and placed in text. ATRC readily accepts reports submitted as word processing files as long as the format is compatible with the word processing software it currently uses.

Graphics should be sized to be legible on a common screen size (700 x 800 pixels).

Headings and Subheadings

Headings and sub-headings help the reader understand the report by showing its organization. They are formatted according to these guidelines:

- Chapter headings – are in bold type, all capital letters, in type that is 2 points larger than the text, centered at the top of a new page.
- First level headings – are in bold type, all capital letters, in type the same size as the text, flush left on the page.
- Second level headings – are in bold type, initial capital letters, in type same size as the text, flush left on the page.
- Third level headings – are in plain type; initial capital letters; underscored; in italic, or roman type; same size as the text, flush left on the page.
- A suitable numbering scheme may be followed to show hierarchy, e.g., 1 for first level headings, 1.2 for second level, 1.2.3 for third level; an alternative is I for first level, I.A. for second, I.A.1 for third level, and so forth.

Line Spacing

Spacing is uniform throughout the text of the research report. Single spaced text is preferred in most cases, with double spacing between paragraphs. This document was prepared using single line spacing.

Lists

Lists are bulleted unless the sequence of items is critical, in which case numbers are used instead of the bullets. Lists are formatted according to these guidelines:

- A colon ends the preceding sentence which leads to the list.
- Each item begins with a capital letter and ends with a period.
- Each item is indented.
- Entries are spaced so that they are clear; if necessary they are separated by a line space.
- The same grammatical structure is used for each item, as in this list in which each entry begins with a noun.

Margins

The space used on a page for the document may not exceed 6 inches by 9 inches, excluding page numbers. Margins should be set at 1.25 inches for the left and right margins; and 1 inch for the top and bottom margins. Text should be flush with the left margin. Do not use running headers or footers in the text of the report (including report titles, author affiliations, logos, or dates).

Page Numbering and Order

Page numbers are vertically centered on the page, ½ inch above the bottom, in Arabic numerals in the same size and font as the text. Page numbering begins at the Executive Summary and continues to the final page, including appendixes and other back material. Decimal numbers, hyphenated numbers or numbers combined with letters for chapters are not permitted.

Final reports are printed on both sides of the paper, therefore the print master of the report may need to have blank pages interspersed to allow new chapters to begin on odd-numbered pages.

Pages are numbered as part of the report even if the page contains only a table or figure.

Page Size

Reports are printed on standard white paper measuring 8.5 inches wide by 11 inches long. Foldout pages should be used only when necessary. Before opting for foldouts, authors should consider whether the information on a table, graph, or illustration can be formatted or designed to fit on a standard page. The project manager may choose to not accept a report that requires foldout pages.

References

References may be located and cited in various ways; the ATRC allows authors some flexibility. Sources of quotes and specific facts are identified either in the text or in the reference. Under “References,” FHWA guidelines^[5] state:

“Reference numbers should be superscript numbers enclosed in parentheses or brackets. Place them *after* end punctuation. If there is more than one reference, separate them with commas, but no spaces. Example: Xxxxx.^(2,3,9) For more than three references numbers, use a separate sentence in parentheses. (See references 1,5,7 and 18)

“The above style is the FHWA standard; however any style will be accepted as long as it is consistent and all reference elements are included (authors, title, publication number, publisher’s name and city, publication date). If the editors determine that the style is too inconsistent, FHWA’s style will be enforced.”

These FHWA guidelines locate references at the end of the report (see “Order of Elements for R&D Reports”). Another commonly used citation style has the reference number refer to a brief citation at the bottom of the page with the complete citation at the end of the report. Some authors choose to give the complete citation in the footnote with no further listing. Academic journals commonly use a format where the reference is the author’s name, the source’s date of publication, and if necessary the page, enclosed in parentheses. The complete citations are at the end of the report in alphabetical order by author’s name.

Much information is found on the world wide web. Correct citations to web sites are as important as correct citations to other sources. Authors should use the guidelines in a standard style manual to ensure that their citations are complete. Authors should format web citations according to either the American Psychological Association’s guidelines^[6] (available at <http://www.apastyle.org/elecref.html>) or the International Organization for Standardization Standard 690-2^[7] (available at <http://www.nlc-bnc.ca/iso/tc46sc9/standard/690-2e.htm>).

The ATRC looks at completeness and consistency of citations in deciding whether they are acceptable. Authors should choose an accepted style from a standard style manual and follow it. They should make sure, for example, that page numbers are included for citations to journal articles, papers in proceedings, and chapters from books. They should be sure that the reference to a quote or specific fact includes the specific page where it is found, rather than the entire book or article. The References page normally will be at the end of the report, after all the Appendixes unless there is reasonable justification for placing it elsewhere.

V. ADDITIONAL SOURCES OF GUIDANCE

This publication borrows from and supplements *Guidelines for Preparing Federal Highway Administration Publications*^[8]. The ATRC Library has a reference copy available for in-house use. *Guidelines for Preparing Federal Highway Administration Publications* is a reprint of Chapter 5 of the FHWA's *Publications and Printing Handbook*^[3], which is on the web at: <http://www.fhwa.dot.gov/legregs/directives/orders/h17104.htm>. Another useful resource is the Turner-Fairbank Highway Research Center's *Quick Reference Guide to Guidelines for Preparing FHWA Publications (G) and the GPO Style Manual, 1984 Edition (GPO)*^[1], on the web at <http://www.tfsrc.gov/qkref/rdqrg.htm>.

The FHWA *Publications and Printing Handbook*, Chapter 5, Section 9 states:

- a. Editorial Style for the FHWA Publications. For consistency and uniformity in all Federal Government publications, the guide for editorial style is the United States Government Printing Office (GPO) *Style Manual*. This manual is a standard of spelling, hyphenation, capitalization, punctuation, abbreviation, numerals, and other style concerns.
- b. Additional Style References. When an additional style reference is needed, the recommended guide is the *Chicago Manual of Style*. For spelling, the GPO *Style Manual* recommends *Webster's Third New International Dictionary*. Another excellent resource is *Webster's New World Dictionary*.

Beyond the basic information presented in these *Guidelines*, ATRC reports follow the style guidance in the GPO *Style Manual* and *Chicago Manual of Style*.

VI. FINAL DISTRIBUTION OF THE RESEARCH REPORT

ATRC reports are loaded on the ATRC web site; paper copies are made available to all State transportation department research managers, libraries, the FHWA, the National Technical Information Service, and ADOT personnel. The author receives one copy of the final report by mail. Additional distribution is subject to ATRC approval.

APPENDIX A

TECHNICAL REPORT DOCUMENTATION PAGE EXAMPLE

Technical Report Documentation Page

1. Report No. FHWA-AZ-YR-XXX(X)		2. Government Accession No. LEAVE BLANK		3. Recipient's Catalog No. LEAVE BLANK	
4. Title and Subtitle TITLE IN ALL CAPITAL LETTERS Subtitle in initial capital letters				5. Report Date MONTH, YEAR	
				6. Performing Organization Code LEAVE BLANK	
7. Author Names In Conventional Order (i.e. John A. Doe)				8. Performing Organization Report No. UTILIZE WHEN POSSIBLE	
9. Performing Organization Name and Address Name Street Address City, State Zip Code				10. Work Unit No. LEAVE BLANK	
				11. Contract or Grant No. SPR-PL-1(XX)ITEM XXX	
12. Sponsoring Agency Name and Address Arizona Department of Transportation 206 S. 17th Avenue Phoenix, Arizona 85007				13. Type of Report & Period Covered FINAL, INTERIM, ETC.	
				14. Sponsoring Agency Code	
15. Supplementary Notes Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration Prepared by: _____ Reviewed by: _____ <i>[this line optional]</i>					
16. Abstract <ol style="list-style-type: none"> 200-300 words, A brief summary of the report Abstract should state the purpose, methods, results and conclusions of the work effort. When a report consists of a number of volumes, include the title of each volume in the abstract. The report number (box number 1 of this form) will incorporate the calendar year, SPR item number, and volume number, if applicable. (e.g., FHWA-AZ-02-501(2) indicates a report published during 2002, SPR number 501, volume 2) The report date (box number 5 of this form) should reflect the date of the submission of the "revised" final report. This date is the date shown on the cover. Contract or grant number (box number 11 of this form) indicates the program year and the item number. The type of report & period covered is shown in box number 13 of this form. The date shown corresponds to the date of contract initiation through the date of first submission of the draft final copy. 					
17. Key Words Select specific and precise terms or phrases that identify principal subjects covered in the report			18. Distribution Statement Document is available to the U.S. Public through the National Technical Information Service, Springfield, Virginia, 22161		23. Registrant's Seal
19. Security Classification Unclassified	20. Security Classification Unclassified	21. No. of Pages total, including front unnumbered pages	22. Price		

APPENDIX B: REFERENCES AND BIBLIOGRAPHY EXAMPLES

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2. Davis, R.L., *Large Stone Mixes: A Historical Insight*. NAPA Info Series no. 103/88. Lanham, Md.: National Asphalt Pavement Association, 1989.
3. Acott, M. "Today's Traffic Calls for Heavy Duty Asphalt Mixes." *Roads and Bridges* 26, no. 1 (Jan. 1988): 39-45.
4. Marks, Vernon J., Roderick W. Monroe, and John F. Adam. "Effects of Crushed Particles in Asphalt Mixtures." in *Chip Seals, Friction Courses, and Asphalt Pavement Rutting, 1990*. Transportation Research Record no. 1259. Washington, D.C.: Transportation Research Board, 1990. pp. 91-106.

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Ruiz, Micky and Kim Troedsson. *General Guidelines for Publication of Research Reports*. St. Paul, Minn.: Minnesota Department of Transportation, 1995.

United States Government Printing Office. *Style Manual*. Washington, D.C.: United States Government Printing Office, 1984.

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5. *ibid.*
6. American Psychological Association. “Electronic references” *APA Style.org*. Washington, D.C.: American Psychological Association, 2003. Accessed July 16, 2003 at <http://www.apastyle.org/elecmedia.html>
7. International Organization for Standardization. “Information and documentation – bibliographic references – Part 2: Electronic documents or parts thereof” excerpts from *International Standard, ISO 690-2*. Ottawa, Can.: International Organization for Standardization, 2003. Accessed July 16, 2003 at <http://www.nlc-bnc.ca/iso/tc46sc9/standard/690-2e.htm>
8. Federal Highway Administration. *Guidelines for Preparing Federal Highway Administration Publications*. n.p.: Federal Highway Administration, 1988.