1. Preliminary Analysis

2. Assembling Data

3. Organizing Data

4. Effective Writing

5. Editing

LTRC
Publication
Guidelines

Louisiana Transportation Research Center

LTRC
Publication
Guidelines

TABLE OF CONTENTS

PUBLICATION GUIDELINES

A research study is not complete until the results have been published. Communicating research results in an accurate, lucid report is just as important as the research itself. This document is probably the only way in which recognition of the researcher's work can be achieved and a permanent record of those achievements can be established. This guide presents some of the requirements for writing interim and final reports and provides solid information for the creation of all written materials to be published by LTRC.

Organization

Research reports are written to serve as a basis of decision and action. The expert opinion of the report writer is therefore required in the form of recommendations; these recommendations should be the crux of the report. It is important, then, that the whole report be put together to contribute to the single end of giving weight to the recommendations.

Making a good written report involves five main steps:

1. Preliminary analysis
2. Assembling data
3. Organizing data
4. Effective writing
5. Editing

The fact that three of these steps occur before the actual writing is an accurate indication of the relative importance of preparation and execution. The preparatory steps represent at least three-fourths of the job. If the writer thoroughly understands his problem in advance, the actual writing will almost take care of itself.

While the form and content of the research report is fairly defined, all good writing conforms to the basic structure of introduction, exposition, and resolution.

Some references that you will find useful in your writing are listed below.

- Day, R., *How to Write and Publish a Scientific Paper*, ISI Press, Philadelphia, 1983.
- Zinsser, W., *On Writing Well*, Harper & Row, New York, 1976.

Preliminary Analysis

The first step in writing is to identify exactly what you hope to accomplish, or what your purpose is. If you are writing a report, this question will already have been answered by the research study proposal. Then ask yourself what the chief components of the problem are. Remember that no part of the preliminary analysis–the statement of purpose, scope, or plan of procedure--is necessarily final. In the course of the investigation, you must always expect the unexpected, and when it arrives you may have to change your course accordingly.

Assembling Data

The work of assembling data will vary with the type of report. For a complex study, the preliminary assembling of data will consist of a literature search. Once this is accomplished, the next step is to start on a laboratory and/or field investigation according to the proposed work plan. Although this collection of data will follow the proposed work plan, it may be necessary to change this pattern during the course of the investigation. For example, it may become necessary to make a statistical evaluation of a certain phase of the study. In this case, it will be almost mandatory to revise the pattern of data collected. In general, data accumulation will depend to a large extent on the type of methods of analysis (statistical, graphical, empirical, etc.).

Organizing Data

Once the collection of information is complete, it is time to bring order to the process. In organizing data, a sense of relative values is fundamental. What facts are significant? What facts are the most significant? What is their significance?

It is not easy to set aside facts and statistics, which have been laboriously obtained, simply because they obscure the view of more important matters. But unless this cutting is done, the people for whom the report is intended will not be able to understand it. Keep in mind the requirements of the prospective reader. Your reader may not be interested in specific details at all, or may only be interested in specific aspects of your research. In either case, including all raw data is not necessary or desirable. It can be filed and made available to support your findings if questions arise.

Arrange the facts coherently and in order of significance. You should be guided by the reader's point of view. What does he want to know, and how can it be presented for his clearest understanding?

Very few authors are experienced or talented enough to write a cohesive report without making a preliminary outline. Even something as basic as the list of the 19 parts of a report presented on page five brings direction and order to the process of writing. You are strongly encouraged to assemble your writing based on a comprehensive outline of the information to be included.

Effective Writing

The qualities of style essential to a well-written report are *correctness*, *clarity*, and *conciseness.*

Correctness is attained principally by using words correctly. Choose words with care, and consider all the implications of your choice to ensure that you are conveying your intended meaning. Don't hide behind words–be clear, concise, and to the point. Never say in three words what could be stated with one. Take care that your tone, while dignified, is never pompous.

Punctuation. Punctuate correctly. Consult a style manual if in doubt. Parts of this guide are derived from the *United States Government Printing Office Style Manual* and other style manuals generally accepted as authoritative by publishers (*Chicago Manual of Style*, etc.)

Sentences. Write short sentences. Each sentence should contain one complete thought.

Paragraphs. Paragraphs should represent logical divisions of the subject matter. There should always be a good reason for putting a group of sentences in a particular order. Use connectives (since, although); connective adverbs (however, nevertheless, moreover); transitional phrases (on the other hand, in the next place, in addition to) as often as possible.

Sequence. The report must be in logical order. (This is where an outline is essential.) Every sentence must logically follow from the preceding one, every paragraph from the one before. Logic is the guide your readers will use to follow your thoughts. Without it, the reader will quickly lose interest in your writing.

Abbreviations, acronyms, and symbols. Do not use obscure abbreviations. Abbreviations and acronyms must be defined the first time they are used in the report, followed by the abbreviated term in parentheses.
> *Example:* According to the Federal Highway Administration (FHWA)... The FHWA report said...

Words such as "percent" must be spelled out, rather than using the symbol.
> *Example:* 12 percent
> one-half of one percent

When speaking of temperature, it is proper to use the degree symbol followed by an "F" for Fahrenheit or a "C" for Centigrade:
> *Example:* 125° F or 32° C

Common units of measure such as feet, inches, millimeters, pounds, etc., should be spelled out in the body of the text. If such units of measure are used repeatedly through-

out the text, their abbreviations are acceptable. The same rule applies to acronyms.

Be brief. Ideally, the report should be less than 100 pages. It is not necessary to include all your raw data, although it is almost always necessary to write out the first draft of a report as fully as possible. However, any good writer knows that disciplined pruning is always necessary to eliminate the repetition of words and thoughts. The secret of good writing is to strip every sentence to its cleanest components. Cut out every long word that could be a short word, every adverb that carries the same meaning as the verb, every unnecessary sentence and paragraph. Your writing will be more forceful by virtue of what is left out.

Avoid jargon. There are two types of jargon: technical terms and obscure, pretentious language marked by long words and redundancy. Technical terminology is sometimes difficult to avoid. If such terminology is known by all of your intended readers, there is no problem. If such terms may not be known to any part of your potential audience, they should be defined the first time they are used. The second type of jargon–inflated, pretentious language–should always be avoided.

Use the active voice. Active voice is generally more precise and less wordy than the passive voice. For example, instead of saying, "It was found that," use "the authors found" or even "I found." Instead of "Specifications were provided by design engineers," say "Design engineers provided specifications." (NOTE: first person is permissible, but if used, you must use it consistently throughout the report.)

Editing

Your document must be edited by a professional editor prior to producing a camera-ready copy for LTRC.

PUTTING TOGETHER THE TECHNICAL REPORT

The following list contains all the required elements in proper sequence for an interim or final report acceptable to LTRC.   For consistency, each part of the report must be titled accordingly, in the listed order. Any deviations from this format must have the approval of the LTRC group manager and the Publications and Electronic Media Development program manager.

1. Technical Report Standard Page
2. Title Page
3. Abstract
4. Acknowledgments (optional)
5. Implementation Statement
6. Table of Contents
7. List of Tables
8. List of Figures
9. Introduction
10. Objective
11. Scope
12. Methodology
13. Discussion of Results
14. Conclusions
15. Recommendations
16. List of acronyms/abbreviations/symbols
17. References
18. Glossary (optional)
19. Appendix (optional)

Technical Report Standard Page

This form (shown on page 46) will be furnished by LTRC for insertion in all interim and final reports. Contract researchers are required to complete the abstract (part 16) and provide key words (part 17). The length of the abstract shall not exceed that space provided on the form and will largely be the same as that information appearing in the "Abstract" portion of the report. The report number will be assigned by the appropriate LTRC group manager.

Title Page

Include the study title, authors, type of report, report and project numbers, and conducting research agencies. A standard disclaimer statement shall be included, and the paper should be formatted as illustrated on page (47). Note that this page is counted as page "i," but the number does not appear on the page.

A disclaimer statement appears on the lower portion of the title page, just before the date of publication.

For federally funded projects, the disclaimer should read:
> The contents of this report reflect the views of the author/principal investigator who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Louisiana Department of Transportation and Development, the Louisiana Transportation Research Center, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

For state funded projects, the disclaimer should read:
> The contents of this report reflect the views of the author/principal investigator who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Louisiana Department of Transportation and Development or the Louisiana Transportation Research Center. This report does not constitute a standard, specification, or regulation.

Abstract

A well-prepared abstract enables readers to identify the basic content of the report quickly and accurately, to determine its relevance to their interests, and to decide whether they need to read the report in its entirety. When writing the abstract, remember it may be the only section read and should be self-contained. It should contain no bibliographic, figure, or table references. The abstract should be as brief as possible and include:
- the principal objectives and scope of the investigation
- a brief description of the methodology employed
- a summary of the results or findings.

Acknowledgments

Significant contributions by personnel not directly responsible for the study may be acknowledged. The support and direction of the Project Review Committee may be acknowledged and the names of committee members listed. This portion of the report is optional. When listing the names of those whom you wish to acknowledge, only

professional and academic titles are acceptable (Dr. Smith). Social titles (Mr., Mrs., Ms.) are not appropriate.

Implementation Statement

The implementation statement describes the manner in which the results of the investigation may be implemented and what value they might have in application.

Table of Contents

The table of contents lists, in the order in which they appear, the divisions and subdivisions of the report. It may be nothing more than the main headings, roughly equivalent to the chapter headings of a book.

List of Tables

This part of the report may be omitted when the number of tables is fewer than five.

List of Figures

This part of the report may also be omitted if the number of figures is fewer than five.

Introduction

The introduction is not only desirable, but necessary. Its purpose is to supply sufficient background information to allow readers to understand and evaluate the results of the present study without referring to previous publications on the topic. This page should be considered page 1, although no numbering should appear on it. The introduction should briefly and clearly state your purpose in conducting the study.

A good introduction:
- presents the nature and scope of the problem and what prompted the investigation
- reviews the pertinent literature and any earlier work that has a bearing on the present study
- presents any other pertinent information that must be understood before the questions under study can be approached.

Objective

The objective of the report should be a clear, concise, and comprehensive description of the goals of the research study. The objective may be provided by the Project Review Committee (PRC) or the Request for Proposals (RFP). Additions or changes to the original objectives should be included.

Scope

The scope should not be confused with the objective. The objective defines the goal to be attained; the scope determines the boundaries of the ground to be covered. It governs the degree of comprehensiveness to be adopted and the consequent scale of the report. It also rules out irrelevant items. In other words, the scope answers the questions of what should be put in and what should be left out.

Methodology

The reader of the report may place a greater confidence in its conclusions if he knows how they were reached. Hence, a brief and definite statement of the nature of the study is essential. The methodology should include a description of materials, apparatus or equipment, treatment of data (whether computer, statistical or mathematical), standard sampling and test methods, and so forth and can be presented in chronological order. Standardized test procedures should be referenced but not described. Variations from standard procedures should be explained.

Discussion of Results or Analysis of Data

This element is as difficult as it is crucial. It is the very kernel of the report, since it is the basis from which conclusions are drawn. It is imperative that the evidence be organized and presented so that the reader can follow the reasoning, step by step, to the writer's conclusions. This element of the report should present a comprehensive analysis of the entire problem. When writing it, keep in mind logical order, interdependence of parts, relative importance of parts, emphasis, and sequence. Processed data and data summaries in either graphic or tabular form are desirable. Raw data should only be included if absolutely essential and then should appear in the appendix.

Conclusions

The findings of the investigation are presented in the order of their importance, the most important first. Conclusions must be drawn from unquestionable premises and be based on adequate data. They must agree in every respect with the details presented in the preceding pages. If the conclusions are made on the basis of limited materials, equipment, etc., then a statement to that effect must be made.

Recommendations

Sometimes this may be part of the conclusions. However, it is best to separate this element whenever feasible. It should include any future course of action that may be or should be taken to confirm the findings. This may involve either field evaluation of materials and/or equipment or cost analysis and savings in cost. In general, recommendations should be made concerning the integration of the findings by their inclusion into specifications, standards, procedures, methods, or techniques.

Acronyms/abbreviations/symbols

List in alphabetical order all abbreviations, acronyms, and symbols used in the report.

References

Because the research report usually involves a great amount of reading and study, this element is especially important. A full list of references cited should be given at the end of the report. It is necessary that each numbered reference in this section correspond to the designated number (in parenthesis and italicized) in the body of the report. (More information on the proper style for references follows in the *Publication Specifications* section.)

Bibliography

There is a difference between a list of references and a bibliography. A list of references is used to identify the sources of information cited in the text, and all of the references listed will correspond to citations in the text. If you merely consulted works but did not cite or refer to them at specific places in the report, you should use a bibliography, which is a list of all works consulted. Works in a bibliography should be in alphabetical order, by author's last name.

Appendix

All data which cannot be worked into the body of the report without interrupting the thought, or are too technical, are put in the appendix. Any reproduced materials must be of excellent quality and immediately relevant to the content of the report. You may not include copyrighted material (book or magazine excerpts) without the express written permission of the author.

PUBLICATION

Review

Reports submitted for publication are reviewed and recommended for publication by the project review committee. The final publication decision is made by LTRC on the basis of the committee recommendation.

Report Review Criteria

- The text should be written in simple, concise, and effective language.

- The content of the report should be new or original, deal with issues that are timely, and have lasting value.

- Coverage of the subject should be complete, well organized, and supported by understandable and useful tables, figures, and references.

- Data presented must be valid, and research methods described should be appropriate to the studies reported.

- Conclusions should be valid, appropriate, and properly supported.

- The report must be useful to practitioners, researchers, or both.

- Generic names of products and equipment should be used unless the author considers the trade names or manufacturers' names essential to the purpose of the report.

Publication of Reports

Authors must submit a double-spaced, single-sided copy of the report, revised in accordance with reviewer comments and prepared following LTRC publication specifications, to the Publication and Electronic Media Development Office at LTRC. Authors also are required to submit their reports in digital files on 3.5-in. diskettes to expedite the publication process (see *Digital Submission of Reports*, page (25).

If the report contains graphics, they should be embedded in the file and submitted on a ZIP disk or CD. Files are not to be compressed in any way. One set of original artwork (master copy) for figures, including reproducible copies of drawings and graphs and glossy photographic prints, must accompany the final report.

Original artwork will not be returned after publication of the report unless requested by the author. Note that this material cannot be returned until publication is completed. Reports that do not conform with the specifications in this guide are subject to considerable delay in publication pending return of the report for revision or completion by the authors. Reports published by LTRC are subject to editorial modification in the interest of clarity, conciseness, consistency, and adherence to established LTRC editorial style.

Research Sponsorship

Authors of reports that report results of research sponsored directly or indirectly by federal programs should indicate this sponsorship in the "Acknowledgments" section.

Clearances and Copyrighted Material

Authors must assume full responsibility for securing any necessary clearances and written permissions for publication from any contracting or supervisory agencies involved in the research or from holders of copyrights on material used in the report. All contributions to the work must be properly acknowledged. When a report that contains previously copyrighted material, authors must obtain written permission from the copyright holder(s) to publish the material.

Style

To achieve uniformity and consistency in publications, the LTRC editorial staff uses certain standard reference works for guidance. In matters of spelling, definition, and compounding of words, *Webster's Third International Dictionary (Unabridged)* is generally followed. Published standards of scholarly organizations are accepted in questions of usage of technical terms. For technical and engineering usage, refer to the *ASTM Style Manual*. Other matters of style and usage are based on published documents that are widely accepted as authoritative (e.g., *Chicago Manual of Style*, *United States Government Printing Office Style Manual*). Authors should avoid jargon, acronyms, use of personal pronouns, and sexist language in their reports.

PUBLICATION SPECIFICATIONS

General

Submit one double-spaced report copy (see instructions below for submittal of diskettes). The type should be clearly legible and no smaller than 11 points.

Submit all materials on single-sided, 8 ½" x 11" white paper.

The advent of word processing has enabled the individual to create a document using typesetters marks, previously impossible with a typewriter. Therefore, italicize any words that would conventionally be underlined, make sure to differentiate between quotes (" ") and inch marks ("), and make sure that you use a long dash–called an em dash–rather than the single hyphen (-).

Typing a Manuscript for Printing

It is the writer's responsibility to present LTRC with a *camera-ready* copy of the report, typed in the most current version of WordPerfect or MS Word and produced with a high quality printer on good quality paper. In addition, please include a copy of the report *on disk or CD-rom*.

For body text, use a *12-point serif font*, such as Times New Roman, Times Roman, or Chicago Times. All body text must be left-justified.

Spacing and Margins

Line spacing on a final copy should be 1.25 spaces; review copies submitted for editing should be double spaced. Margins should be 1.25 inch on the inside margin, one inch on all other sides. Double space between paragraphs.

Page Numbering

Page numbers should be *3/8 inch* from the bottom of the page, located at the outside bottom corner of the page. Remember that document pages will be printed on the front and back side. Therefore, the page number for an odd numbered page should be on the right-hand side of the page, while the page number for an even numbered page should be on the left-hand side of the page. Both WordPerfect and Word have features that automatically place page numbers to the "Bottom Outside Alternating" (Format <Page <Numbering <Position).

Each page is to be numbered accordingly except for the following:
- Technical Report Standard Page
- Title Page
- Introduction
- Blank sheets
- Heading pages for appendices

Use small, italic Roman numerals (*iii, iv*, etc.) for all pages up to the Introduction. The Title Page is not numbered but is to be counted as *i* and *ii*.

Use italic, Arabic numerals for the body of the report beginning with the "Introduction" (which is not numbered, but counted as page one).

When the report is printed, all odd-numbered pages will be printed on the right, all even-numbered pages on the left. The 17 parts of the report listed on page 9 fall on a right-hand page and should be given odd numbers. Insert a blank page if necessary to make these items fall on an odd-numbered page. This can be done in WordPerfect with the command to "Format < Page < Force Page < Current Page Odd."

Page numbers should be clearly separated from the text or any illustrations, figures, etc.

Element Headings

Start each major element (items 1 through 17 on page (9) on a separate right-hand page as noted in the previous section.

Headings for major elements should be centered and typed in bold and all capital letters. Use a double space after the major element heading.

Within each major element, typically *two* levels of headings (section headings and paragraph headings) are allowed (see exception in example that follows). Section headings within each major element should be left-justified and typed in bold. Only the first letter of the section heading should be capitalized. Paragraph headings should be indented, typed in bold, with only the first letter capitalized.

If an extra level of heading is needed within a major element, the highest level heading within the element should be centered and typed in bold using upper and lower case letters.

The proper format for subheadings follows:

FIRST-LEVEL HEAD

(all capitals, boldface, centered at top of an odd numbered page)

Second-Level Head

(initial capitals, boldface, centered on separate line)

Third-Level Head

(initial capitals, boldface, flush left, on separate line)

Fourth-Level Head. (initial capitals, indented, boldface, followed by a period, with paragraph text immediately following on same line)

Example with three levels within major element:

[1]**METHODOLOGY**

(double space)

[2]**Data Collection**

(double space)

[3]**Topographic Data**

The topographic data used as input to the numerical calculations was based upon USGS quad sheets...
(double space)

[4]**Land Topographic Data.** The land topographic data was primarily based upon using 7.5' and 15' USGS quad sheets....
(double space)

[4]**Inland and Offshore Bathymetric Data.** The inland and offshore bathymetric data was based on....
(double space)

[3]**Barrier and River Data**

Barriers and rivers which occur in the coastal zone have a controlling influence on flood levels.
(double space)

[2]**Surge Simulation Model**

(double space)

The overland flooding model used in the study has been developed by the Federal Emergency Management Agency....
(double space)

[3]**Grids and Input Files**

The offshore and inland grids were based on the Lambert Plane Coordinates (southern grid). The offshore grids....

[1] *Major element heading*
[2] *Major section heading*
[3] *Section heading*
[4] *Paragraph heading*

Digital Submission of Reports

LTRC reports are produced using digital pre-press technology. To expedite publication of reports, authors should submit digital files on 3.5", IBM-compatible high-density diskettes produced in any of the following personal computer word-processing formats: WordPerfect (Version 5.0 or later), Microsoft Word (Version 5.0 or later), or Rich Text Format. **Graphics should be embedded in the file.** If the file is too large to fit on a normal disk, then it should be submitted on a ZIP disk or CD.

Authors should label each diskette with the file name, along with the name and version number of the word processing software used to prepare the report. The diskette should contain the entire, exact text of the report, which should be in a single file. *Each figure and table should be embedded in the file.*

Disks will not be returned to authors.

Authoring Templates and Style Sheets

To assist authors in formatting their reports, authoring templates and style sheets may be retrieved from LTRC's World Wide Web site *(http://www.ltrc.lsu.edu)*. Templates and style sheets provide authors with the ability to assign predefined characteristics to structural components of a document. These tools make it possible to automatically label headings, paragraphs, figure and table captions, and other elements. LTRC's website also includes the most up-to-date information regarding editorial procedures.

Parts of the Report

The report should be submitted in the following sequence: technical report standard page, title page, abstract, acknowledgments, implementation statement, table of contents, list of tables, list of figures, introduction, objective, scope, methodology, discussion of results, conclusions, recommendations, list of acronyms/abbreviations/symbols, references, glossary, and appendix.

Authors' Names and Affiliations

The names and current affiliations of all authors should be listed on the title page. If the research was performed while the author had another affiliation and the author wishes that affiliation listed in addition to the current one, the author should note that both affiliations are to be used.

References

References should be numbered in the reference list in the order in which they appear in the text. Denote a reference at the appropriate place in the text by an italic Arabic numeral in brackets, placed at the end of the sentence before the period, e.g., *[2]*. For more than one reference, use separate brackets with a comma in between.

> *Example:*
> Transportation control measures are used to reduce mobile source emissions *[1], [2], [3]*.

Do not cite as a reference unpublished material, personal communications, telephone conversations, or similar material that would not be available to readers in printed form in a library or from the originating agency. Instead, cite the unpublished work in the text and enclose the author's name along with the term "unpublished data" in parentheses.

Double-space between references on the list.

Do not repeat a reference in the list, and do not use *ibid*., *idem*., *op. cit*., or *loc. cit*. If a reference is cited more than one time in the text, repeat the number first assigned to the reference.

Be sure that references are complete. Include the names of corporate or personal authors or editors; title of article, chapter, book, or report; publisher or issuing agency; location of publisher and year of publication; volume and issue or report number; and page numbers.

References to unpublished papers presented at meetings should include name(s) of author(s); title of paper; and title, sponsor(s), location, and date(s) of meeting. References to program manuals, tapes, or other documentation for models should refer to the specific edition being cited and should list the specific department within an agency that has responsibility for the model's continuing use and development (for example, "Interactive Transit Assignment Model. UTPS tape. Office of Planning Methods and Support, Federal Transit Administration."). If a reference has no date, use "undated."

In the case of multiple authors, place last names first, followed by the first name and/or initial.

In the list of references, use the number and a period. Use the following style for the contents of the reference:

1. Author's last name first, followed by initials. In case of multiple authors, put each last name first, followed by the initial. Multiple authors names should be separated by a semicolon.
2. Title of article, book, or report
3. Volume and issue or report number
4. Publisher or issuing agency
5. City and date of publication (this is the proper place to put the year, not with the title)
6. Page numbers
7. NTIS data (optional).

Detailed reference style instructions are available on request from the editorial staff. The following examples illustrate the basic LTRC style for references.

TRB Publications
Zahavi, V., and Ryan, J.M. "Stability of Travel Over Time." In *Transportation Research Record 750*, TRB, National Research Council, Washington, D.C., 1980, pp. 70–75.

Book
Shinar, D. *Psychology on the Road: The Human Factor in Traffic Safety*. John Wiley and Sons, Inc., New York, 1978.

Jones, J. J., and Smith, A. A., *Mechanics of Materials*, Johansen Press, Beta, N. J., 1900 p. 2.

Periodical
Jolliffe, J.K., and Hutchinson, T. P.. "A Behavioral Explanation of the Association Between Bus and Passenger Arrivals at a Bus Stop." *Transportation Science*, Vol. 9, No. 3, May 1975, pp. 248–282.

Government Report
Dempsey, B. *Climatic Effects of Airport Pavement Systems: State of the Art.* Report DOT2DRD-75-196. FHWA, U.S. Department of Transportation, 1976.

Reports, Bulletins, Theses, Dissertations, and Other Irregular Publications
Jones, J. J., "Glass-Resin Composites," NASA Report CR-518, National Aeronautics and Space Administration, Washington, D.C., Aug. 1966.

Jones, J. J., "Fatigue at Interfaces," Technical Report NONR 200 (90), No. 100, Columbia University, New York, 1970.

Jones, J. J., "Tables of Thermophysical Properties,"
Technical Report AFML-TR-69-79, Air Force Materials
Laboratory, Dayton, Ohio, 1969.

Engineering Units

Units used for the reporting of data shall be English units,
followed by equivalent metric SI units in parenthesis.

> *Example:*   The spans are 320 feet (100 meters)
>   long.

Equations

Equations must be generated by or imported into
WordPerfect or Word format. Number the equations in
order, beginning to end. Fractions in displayed equations
should be stacked, in accordance with preferred mathemat-
ical practice.

When referring to an equation in the text, the equation
number should be placed flush right on the same line as
the equation. This serves as a reference point for that
equation when it is used again in the text. Number all dis-
played equations with Arabic numerals in parentheses
placed flush right.

> *Example:*

$$A = B + C$$

$$\tag{44}$$

(means: 44th equation)

Carefully distinguish the following:
All capital and lowercase letters
Capital O, lowercase o, and 0 (zero)

Lowercase l (el) and number 1 (one)
Letter X, Greek , and multiplication sign x
Prime , apostrophe ', and superscript [1]
English and Greek letters such as

> B and ß,
> k and U,
> n and ,
> u and μ,
> p and p, and
> w and

If Greek letters are handwritten, identify them by spelling
out the letter in the margin.

Footnotes

Do not use footnotes to the text. Incorporate such notes
within the text, or delete the notes entirely. Footnotes are
only acceptable when contained in a table or figure.

Abbreviations, Acronyms, and Symbols

Abbreviations, acronyms, and symbols must be fully
defined the first time they are used in the report; the defi-
nition should be given first, followed by the abbreviated
term in parentheses. All such abbreviations, acronyms,
and symbols must be defined in the section of the report
titled such.

Artwork

In the interest of economy and to avoid the introduction of
errors, all figures and most tables are reproduced directly
from original material submitted by the author (photo-

copies are not acceptable because they do not reproduce clearly). Art and tables produced on a dot matrix printer are not acceptable. If computer printouts from dot-matrix printers are submitted but judged not to be of sufficient quality for printing, the author will be asked to provide original redrawn figures or drop them from the text.

Tables

Tables should supplement, not duplicate, the text. Use the following guidelines in preparing tables for publication.

1. Submit originals plus one copy of all camera ready tables.

2. Number tables consecutively in the order first cited in text, using Arabic numerals. Reference must be made to each table by number at the appropriate place in the text.

3. Tables must duplicate LTRC style as closely as possible.
   - All tabular material should be single spaced.
   - Table captions should be typed in bold and centered above the table with only the first letter capitalized. The table title is placed on the line below the table number.
     Example:

Table 4
Variations between WIM and portable scales

A period should not follow a table title. Within the table itself, all headings should have a parallel grammatical form.

- Give each column in the table a head. [In some cases, the first (stub) column may have no head.] Place abbreviated measurement terms in parentheses under the column head. All heads should be aligned in flush left format.
- Insert another half line of space and full-width rule at the end of the table (and above the footnotes, if any).
- Use lowercase italic superscript letters for footnotes.
- When a dash (—) is used in a table, indicate its meaning in a footnote (missing data, incomplete research, data not applicable or unavailable, or problem investigated but no results).

4. Check the accuracy of all totals included in tables before submitting report.

5. For use of measurements, see *Engineering Units* section. The size of type in a table should be no smaller than 10 pt.

Figures

Graphics are acceptable in electronic files. Include the name of the software used to create the graphic (WordPerfect, Microsoft Word, spreadsheet software formats, etc.) or the file format (such as EPS or TIFF). Originals of photographs must be submitted. Digital photographs are only acceptable if they are high resolution (at least 300 dpi). Files for line art that are in Word Perfect, Microsoft Word, or spreadsheet formats will more than likely need to be scanned from hard copy. When submitting these types of graphics, supply an original printout along with the electronic file.

Line art not submitted electronically must be either professionally drawn or original computer graphic print outs that are clean, sharp, and in black and white. Photocopies, pencil drawings, blueprints or ozalid prints, and negatives are not acceptable.

If screening is used, screens should be no more than 30 percent black; higher screen values are often too dark when reproduced and will obscure text or graphic elements within the screen. If more than one element is screened, there should be a difference of at least 10 percent between screen values. Alternatives to screening include stripes and crosshatching; however, stripes and crosshatching should not be used where they will obscure type. Legends identifying the significance of screened or crosshatched elements must be included in the figure.

Use the following guidelines in preparing figures for publication:

1. Give each figure a caption. If there are more than five figures in the report, include a "List of Figures" following the "Table of Contents." If a figure con tains several parts (a, b, c, etc.), cite each part in the caption and label each corresponding part on the figure using the same size type as that in the rest of the figure.

2. Figure captions should be typed in bold and centered *below* the figure box with only the first letter capitalized. Use the figure number and a title below it, no explanation.
    Example:

Figure 1
Idealized random distribution curve

3. Number figures consecutively in the order first cited in text, using Arabic numerals.   Reference must be made to each figure by number at the appropriate place in the text.

4. LTRC requires that published figures be clear and legible. The type in published figures must not be too small to be readable. In addition, letters, symbols, and line weights must be uniform and the same size throughout the figure (i.e., if wording on the ordinate and abscissa is in 10-point type, symbols used to identify data points also should be in 10-point type). Figures must never be more than one page long.

5. To avoid blurring of letters and symbols, do not use transparent tape over any part of line art.

6. The word "figure" is spelled out unless the reference is a simple parenthetical one "(fig. 3.)" and lowercase.

7. Figures should be numbered consecutively through out the report, and text references to them should be by those numbers: "Figure 1 shows...," "see figure 2." Never should a figure be referred to as "the figure opposite" or "the photograph on this page." The exigencies of typing may rule out that placement and then the reference would be wrong.

8. For oversized figures, use ¾ inch margins on the left; ½ inch on other sides. The figure box as well as the caption must be included within that area.

9. If a table, figure, or illustration appears on the same page with straight copy, it should be centered horizontally within the established margins and should be set off by at least three blank lines from the copy above and below. If these items appear on a page by themselves, they should be centered horizontally and vertically within the page margins.

10. If you are using a figure or table, refer the reader to it before explaining it in the text. If the graphic is important to the explanation, place it next to the explanation. If not, place it in the appendix. Illustrations, figures, or tables appearing in an appendix or separate section of a report should follow the same placement guidelines. Do not violate established margins used in the text.

11. Illustrations, graphs, charts, formulae, etc., which are to be photographed "as is" rather than set in type should be in black ink on a white background. They also can be enlarged or reduced, providing that the final product is sharp and legible.

CAUTION: Many originals that are not black and white, such as graph paper, grids or colors on computer-generated graphics, will not reproduce well. Always provide black and white originals.

Photographs

Photos must be   glossy prints and are to be captioned as figures. Xerox copies of photographs are not acceptable. Do not crop or write on photographs.

Do not glue or tape original photos on the original page. Photographs will have to be removed from the manuscript for printing for duplicating purposes. Submit correctly identified photographs in an envelope to accompany the manuscript. To identify photographs, print the following information on the back of the photo in grease pencil or ink (with very light pressure so as not to mar the front surface): the page number on which it is to appear, the figure number (if it is to be labeled that way in the text), and an indication of the top edge. Include in the text a separate photocopy of the pictures correctly placed on the page.

Slides, negatives, and photographs cut out of previous publications cannot be used. Do not mark or tape captions or any other material on the front of photographs or write directly on the back. Original art and photographs will not be returned after publication of the report unless requested by the author.

If a photograph appears on the same page with straight copy, it should be set off by at least one-half an inch from the straight copy above and below.

Placement guidelines for photographs appearing in an appendix or other separate section of a report are the same. Do not violate established margins used in the text.

Appendixes

Include pertinent material in the report itself or, where necessary, include a note that background material, such as derivation of formulas, specifications, or survey forms, is available in the appendix. Every attempt should be made to limit information to one appendix. Multiple appendixes

are acceptable only in cases where vast amounts of data or corollary information are to be included. Photocopies of books, articles appearing in other publications, faxes, or copyrighted material are not acceptable. All information presented must be clean and legible originals.

LTRC Publications and Electronic Media Office

Authors are welcome to contact the LTRC Publications and Electronic Media Office (225.767.9145) at any time regarding publication specifications, reference lists, and related matters.

Note: Reports that do not conform with the specifications in this guide are subject to delay in publication pending return of the report to the author(s) for revision or completion.

COMMON ERRORS

In any writing, there are certain areas that seem to plague the average writer. These errors, while common, are nonetheless incorrect, and are frequently based on erroneous information or a reluctance to double check the rules. What follows are the most frequently committed grammatical errors encountered by the editorial staff of LTRC. It is by no means a comprehensive list, but is provided to help you avoid simple mistakes that hinder the publication process and to make your writing the best it can be.

Abbreviations, acronyms, and symbols

Do not use obscure abbreviations. Abbreviations and acronyms must be defined the first time they are used in the report, followed by the abbreviated term in parentheses.

Example: According to the Federal Highway Administration (FHWA)... The FHWA report said....

Words such as "percent" must be spelled out, rather than using the symbol.

Example: 12 percent
one-half of one percent

When speaking of temperature, it is proper to use the degree symbol followed by an "F" for Fahrenheit or a "C" for Centigrade:

Example: 125° F or 32° C

Common units of measure such as feet, inches, millimeters, pounds, etc., should be spelled out in the body of the text. If such units of measure are used repeatedly throughout the text, their abbreviations are acceptable. The same rule applies to acronyms.

Commas

Some writers seem to think sprinkling commas every few words is a good rule, but it makes for difficult reading. A few places commas should be avoided:

- After the conjunctions *and*, *but*, and *or*, unless the comma sets off a phrase which cannot stand alone as a sentence. It's wrong to write "But, she did get it done on time." Use the comma only if there is such a phrase, as in, "But, *to be fair*, she did get it done on time." Use a comma before the conjunctions *and*, *but*, and *or* when they are joining two independent clauses.
- Between a month and year in a date: not *November, 1990* but *November 1990*. The comma stops two sets of numerals from running into one another, as in *November 20, 1990*.

The comma *is* preferred before the last item in a list: "the first, second, and third chapters." Leaving it out – "the first, second and third chapters" – is a habit picked up from journalism. Omitting the final comma runs the risk of suggesting the last two items (in the example above, the second and third chapters) are a special pair.

Data

From Latin, *data* is a plural noun: "The data *are*," not "the data *is*." The (now nearly obsolete) singular is *datum*.

E.g. *versus* i.e

The abbreviation e.g. is for the Latin *exempli gratia*, "for example." *I.e.*, Latin *id est*, means "that is." They're not interchangeable. Both abbreviations should be followed by a comma.

It's *versus* Its

There is no shortcut; all you can do is memorize the rule. *It's* with an apostrophe means it is; *its* without an apostrophe means belonging to it. An analogue might provide a mnemonic: think of "he's" ("he is" gets an apostrophe) and "his" ("belonging to him" doesn't).

Jargon

Jargon is the bane of too much writing–not only academic and technical writing but business English suffers from jargon and technobabble. Some technical terms are useful and even necessary, but the English language should not be abused with these phrases: *sign off on, re, imperative, utilize, functionality, network, parameters, and paradigm.*

Justification

All body text should be "ragged right" (or "flush left"). Unless your producing three or more columns to a page (newspaper style) don't use full justification, which introduces awkward gaps into the lines.

Numbers

The old rule about spelling out numbers less than ten holds true for the most part, but there are some exceptions.

1. Never begin a sentence with a numeral: either spell out the number, or rewrite the sentence to move the number from the beginning.
2. Very large round numbers should be spelled out: not *1,000,000,000*, but *one billion*. If ever you need real precision in expressing very large numbers, scientific notation might make sense.
3. In a series of numbers, either spell them out or use numerals for every member of the list: don't switch in the middle, as in "pages two, six, 10, and 23."
4. Dates should always get numerals: "October 3, 1990."
5. There is no reason to use both numerals and words for the same number. Do not use redundancies like "two (2)" or "12 (twelve)."
6. The only time you should mix spelling and numerals is in very large numbers: not *8,600,000*, but *8.6 million*.
7. Use numerals for anything difficult to spell out: not *four and sixteen seventeenths, thirteen thousand three hundred twenty six,* or *three point one four one five nine*. You can spell out simple fractions like *one half* or *two thirds*.

Passive Voice

The active voice takes the form of "A *does* B"; the passive takes the form of "B *is done* [by A]."

There are two problems with the passive voice. The first is that sentences often become dense and clumsy when they're filled with passive constructions. The more serious danger of the passive voice, though, is that it lets the writer shirk the responsibility of providing a subject for the verb.

> "I'm sorry that the report was poorly written." The passive voice shirks responsibility.

> "I'm sorry I wrote a bad report." The active voice forces one to be specific and confident.

In your own writing, therefore, try to prefer the active voice whenever you can. Instead of the passive "You will be *given* a guide," try the active "We will *give* you a guide."

Proofreading

You should always read over your work carefully before handing it to someone else, looking for typos, misspelled words, problems with agreement, missing words, and so on. There is nothing wrong with using a spelling checker, but they routinely miss so many things that you still have to read your work closely.

Remember, though, that proofreading is only one part of the revision process.

Punctuation and Quotation Marks

In America, commas and periods go *inside* quotation marks, while semicolons and colons go *outside*, regardless of the punctuation in the original quotation. Question marks and exclamation points depend on whether the question or exclamation is part of the quotation, or part of the sentence containing the quotation. Some examples:

- See the chapter entitled "The Conclusion, in which Nothing is Concluded." (Periods always go inside.)
- The spokesman called it "shocking," and called immediately for a committee. (Commas always go inside.)
- Have you read "Fundamental Principles of Engineering"? (The question mark is part of the outer sentence, not the quoted part, so it goes outside.)
- He asked "How are you?" (The question mark is part of the quoted material, so it goes inside.)

In American usage, all quoted material goes in "double quotation marks"; if you need a quotation inside a quotation, use 'single quotation marks' (also called "inverted commas") inside: "This for quotations, 'this' for quotations inside quotations." Quotations inside quotations are the *only* place for single quotation marks–don't use them to highlight individual words.

Spell Check

The spelling checkers built into most word processors leave a lot to be desired, but they're not all bad. Spelling checkers are usually right when they tell you a word is misspelled (only names and rare words are likely to be

stopped incorrectly). The problem, though, isn't false *positives*, but false *negatives*–when the spelling checker tells you something is right when it isn't. If you type to instead of too, the spelling checker will let it slip right through, since both are legitimate words. Typos are one thing, but if you have any question about the meaning or usage of a word, use a real dictionary, not a spelling checker.

So there's nothing wrong with using a spelling checker to spot slips of the fingers. Just remember that a computerized spelling checker doesn't absolve you from the need to proofread everything carefully.

Utilize and Utilization

Use is almost always better, whether pronounced *yooz* as a verb or *yoos* as a noun. Don't complicate what would otherwise be clear.

Verbosity

The secret of good writing is to strip every sentence to its cleanest components. Cut out every long word that could be a short word, every adverb that carries the same meaning as the verb, every unnecessary sentence and paragraph. Your writing will be more forceful by virtue of what is left out.

TECHNICAL REPORT STANDARD PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle	5. Report Date	
	6. Performing Organization Code	
7. Author(s)	8. Performing Organization Report No.	
9. Performing Organization Name and Address	10. Work Unit No.	
	11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Louisiana Transportation Research Center 4101 Gourrier Ave. Baton Rouge, LA 70808	13. Type of Report and Period Covered	
	14. Sponsoring Agency Code	
15. Supplementary Notes		
16. Abstract		
17. Key Words	18. Distribution Statement Unrestricted. This document is available through the National Technical Information Service, Springfield, VA 21161.	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price

---

[Enter Report Title Here]

by

[Principal Investigator]
[Co-principal Investigator]

[Affiliation or department]
[physical address or university name]
[city, state, zip]

LTRC Project No. [00-000]
State Project No. [000-00-0000]

conducted for

Louisiana Department of Transportation and Development
Louisiana Transportation Research Center

The contents of this report reflect the views of the author/principal investigator who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Louisiana Department of Transportation and Development or the Louisiana Transportation Research Center. This report does not constitute a standard, specification, or regulation.

[Month Year]

PROOFREADING SYMBOLS

Symbol	Meaning
∧	insert
∧	insert a comma
¶	begin a new paragraph
No ¶	do not begin a new paragraph
⊙	add a period here
‑strikeout‑	delete
/	delete
⸝	delete work or phrase
A	insert a hyphen
△	insert a dash
b	make uppercase
B	make lowercase
∼	reverse these items
⌒	close up a space
#	insert a space
SP	spelling