Report Guidelines

The University of Memphis
Department of Civil Engineering
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Table of Contents

List of Figures

List of Tables

TITLE PAGE

Some organizations require reports submitted to it from other organizations to use a standard format. When this is the case, all information appears clearly and legibly. The report's title identifies the report's function (what the report does) and the subject (what the report concerns). Figure 1 illustrates a sample title page that is attractive and informs the reader of important information.

Examples:

Vague: Motor Analysis
Clear: Performance Analysis of Model 26K Three-Phase Motor

Vague: Study of Apartment Building
Clear: Cost Feasibility Study of Oceanview Towers

Note: A feasibility study can address cost or technical feasibility; therefore, the title should indicate the appropriate feasibility.

Critique of the Sample Title Page

Information relating to the function and subject, report number, writer, recipient, and date submitted (important in contract disputes) are visible to the reader on the sample title page in Figure 1. The placement of the information is balanced and aesthetically pleasing to the reader.

The title identifies the contents of the report. It begins with a functional heading, "Dodge Boating, Inc.," which tells the reader what the report does. The report's subject, "An Extended Feasibility Study," immediately follows the function title, which tells the reader the reported subject. Because both of these are essential items on the cover page, they are in uppercase letters in the upper half of the page. The report number appears immediately below the title. Less critical items are titled for easy identification and indicated in the lower half of the page.

Dodge Boating, Inc.
An Extended Feasibility Study

Report Number CIVL1101-1 (W)

Date Submitted: October 1, 2017

Prepared by:

Group Name
Individual Group Member's Names
Address
Memphis, TN

Prepared for:

Dr. Charles V. Camp
The University of Memphis
Department of Civil Engineering
Memphis, TN 38152

Figure 1. Sample Title Page

COVER LETTER

The cover letter is addressed to the official who authorized the report and is signed by the official authorized to produce the report. It is the official acknowledgment of completion of the report and includes a statement of its transmittal. It mentions the title and subject of the report and can consist of a summary. It also can acknowledge those who assisted in preparing the report. Unlike the cover letter, the letter of transmittal is a permanent part of the report. It has a formal tone and uses a standard business letter format. It is placed behind the title page.

Organizations that routinely write reports for clients usually have a standard form or format for the letter of transmittal.

The organization and style of the cover letter are businesslike, as in the sample letter shown in Figure 2. Although parts of the sample cover letter are conversational, the tone is more formal than that of the cover letter.

Critique of the Sample Cover Letter

- The sample letter in Figure 2 follows a standard business format.
- The first paragraph summarizes the purpose of the report and the findings. The last sentence in this paragraph adds a personal comment relating to the writer's previous determination.
- The second paragraph is conversational in tone regarding future projects: "We appreciate the help . . ."
- Ms. Smith cordially closes the letter and includes her title.
- Because the cover letter is permanently attached to the report, there are no enclosures.

Context and major finding

Work accomplished

Methods

Appreciation for staff support

Finding reiterated

Offer to answer questions

Work remaining

Business Opportunities
& Investigations, Inc.
111 Gawin Street
Benson, AK 58392
(433) 542-9485

October 3, 2004

Mr. Charles Richmond, President
Coastal Corporate Investments, Inc
2332 Sudan Road
New Berne, AL 43627

Dear Mr. Richmond:

As we briefly discussed at Pamlico Tar River Foundation's oyster roast in early November, Dodge Boating, Inc., is a quite profitable enterprise. Following up on your interest in the company; our researchers and analysts have put together the figures you requested on the company's status and potential based on evaluations of the financial statements and examinations of the firm's tangible and intangible assets. We also held a brief meeting with Ms. Pamela Hawke, the current owner and CEO of Dodge Boating.

We appreciate the help your of office staff, especially James Overton and Maria Sanchez, gave us in providing the criteria you use for determining whether to recommend investments for your clients. Based on your formula, our initial research shows that Dodge Boating, Inc., is a sound business opportunity for your investors, and we encourage you to continue with investigations.

After your review, I would be delighted to answer any questions you have about the report, about Dodge Boating, or about any other possible investments. At that point, our team will have completed a more detailed evaluation of Dodge Boating, Inc., including a Level I Environmental Assessment. I look forward to hearing from you.

Sincerely;

Betty Smith
Account Representative

Figure 2. Sample Cover Letter

TABLE OF CONTENTS

A table of contents is required when a report is longer than several pages to help readers determine its subject matter, organization, and the location of sections of interest. Readers sometimes use the table of contents as an abstract. When the major headings have subheadings and sub-sub headings, these are indented from the major and subheadings. Figure 3 shows a sample table of contents.

Including a table of contents in a report serves two purposes. First, it helps readers who do not want to read the whole communication in sequence but instead want to find particular parts of it - the description of the research method, the proposed schedule, the budget, and so on. To these readers, the table of contents is like an expressway through your document that leads them directly to their destination.

A table of contents also helps readers who will read your text sequentially. Also, like a summary, a table of contents enables readers to quickly see the general scope and arrangement of the material you cover so they can build the mental framework to organize the various pieces of information they will gain from the communication. Because such frameworks are so helpful to readers, many people read the table of contents before looking at anything else in a communication.

LIST OF FIGURES AND TABLES

When your readers are looking for a part of your communication, they may not look for a specific paragraph but a particular table, drawing, or graphic aid. You can help them by including a list of tables and figures. By custom, the list of figures and list tables follow the table of contents. Figure 4 shows a sample list of figures.

Table of Contents

Figure 3. Sample Table of Contents

List of Figures

Figure 4. Sample List of Figures

GENERAL STRUCTURE FOR REPORTS

When trying to use and understand information readers find in reports, they usually ask the same basic questions. The general structure for reports is a pattern in which writers and readers have successfully answered those basic questions. Therefore, you will prepare yourself to understand the report structure and use it effectively by thinking about your readers' questions. The readers' six basic questions are as follows:

- ***What will we gain from your report?*** - Most people want to read only those communications that are directly useful to them. Therefore, you need to explain the complications that are relevant to the readers' interests, responsibilities, and concerns.
- ***Are your facts reliable?*** - Readers want to be sure that the facts you supply will provide a sound basis for their decisions or actions.
- ***What do you know that is useful to us?*** - Readers don't want you to tell them everything you know about your subject; they want you to tell them only those facts they must know to do the job that lies before them.
- ***How do you interpret those facts from our point of view?*** - Facts alone are meaningless. People must interpret facts by pointing out relationships or patterns among them to give facts meaning.
- ***How are those facts significant to us?*** - Readers generally want you to go beyond an interpretation of the facts to explain what the facts mean regarding the readers' responsibilities, interests, or goals.
- ***What do you think we should do?*** - Because you will have studied the facts in detail, your readers will often want you to tell them what action they should take.

The general structure for reports contains six elements, one for each of the six basic questions: ***introduction***, ***method of obtaining facts***, ***facts***, ***discussion***, ***conclusions***, and ***recommendations.*** Table 1 lists the six elements and how they are related to the readers' basic questions. Of course, each component of the report structure may serve essential purposes and answer the general question identified with it. Also, the six elements may be arranged in many ways, and one or more of them may be omitted if circumstances warrant. Presenting two or more of the six elements under a single heading is common.

Table 1. Elements of a Report and their Relationship to the Readers' Basic Questions.

Report Element	Readers' Question
Introduction/Background	***What will we gain from your report?***
Procedure/Methods	***Are your facts reliable?***
Results	***What do you know that is useful to us?***
Discussion	***How do you interpret those facts from our point of view?***
Conclusions	***How are those facts significant to us?***
Recommendations	***What do you think we should do?***

Introduction

In the introduction of a report, you answer your readers' question, "What will we gain by reading your report?" You can answer the question in a sentence or less in some reports. In more extended reports, your explanation of the relevance of your information to your readers may take many pages, in which you tell such things as:

- What problem will your report help solve
- What activities did you perform toward solving that problem
- How your audience can apply your information in their efforts toward solving the problem

Besides telling your readers what your communication offers them, your introduction may serve many other functions. The most important of these is to tell your main points. In most reports, your main point will be your major conclusions and recommendations. Although you should save a complete discussion of these topics for the sections devoted to them at the end of your report, your readers will usually appreciate a summary of them - perhaps in a sentence or two in your introduction. In brief reports (for example, one-page memos), a statement of your main points may even replace the conclusions and recommendations that would otherwise appear at the end. The INTRODUCTION section should conform to the following guidelines:

- It gives a short, conceptual overview of the report
- Defines the purpose and objectives of the report
- Provides an in-depth description of the concepts involved in the experiment or report
- Does not refer to results in this section
- Mathematical derivations are typically not necessary

Although references are not required in the INTRODUCTION section, you should research different sources of information (textbooks, magazines, etc.) to obtain sufficient background material.

Procedures/Methods

In a report, the discussion of your method of obtaining your facts can serve a wide variety of purposes. Report readers want to assess the reliability of the facts you present: the discussion of your method tells the reader how and where you got your facts. It also suggests to your readers how they can gain additional information on the same subject. For example, if you obtained your information through reading, you would direct your readers to those sources. If you obtained your data through an experiment, survey, or other special technique, your account of your method might help others design similar projects.

- The procedure section gives a "technical description" of how the measurements were obtained (it does not include calculations).
- Provide an in-depth description of how the measurements were obtained (including the type of instrumentation).
- Use past tense to describe what was performed
- Use present tense to describe: (a) the capacity of a device; (b) a property of a material; (c) where values are located in the report.
- Avoid writing, ". . . *readings were taken . . .*"
- For every procedure, you must have a figure.
- The actual values of the measurements can be stated in the RESULTS section.

Results

Your facts are the individual pieces of evidence that underlie and support your conclusions and recommendations. If your report is based upon laboratory, field, or library research, your facts are the verifiable pieces of information you gathered: the laboratory data you obtained, the survey responses you recorded, or the knowledge you assembled from printed sources. If your report is based on your efforts to design a new product, procedure, or system, your facts reflect various aspects of what you designed or created.

In summary, your facts are the separate pieces of information you present as objectively verifiable. You may present your facts in a section of their own, or you may combine your presentation of your facts with your discussion of them, as explained next. The RESULTS section should conform to the following guidelines:

- The RESULTS section briefly states or points to the actual measurements and then describes how the calculations were made.
- State each equation in terms of what has been previously measured or calculated.
- Define every symbol in the equation (if not defined earlier in the report).
- Refer to where the values are located in the report.
- Never refer the reader to your original datasheets.
- All measurements or calculations should be either in written text or in a table.
- State every equation used in your calculations, except conversion formulas, statistical formulas, simplistic formulas, and geometric formulas.
- Avoid writing, "*The formula used was . . .*"
- Do not include sample calculations in this section.
- Do not interpret the results in the RESULTS section.

Below is a sample equation and the definition of the variables.

The Reynolds number R_e can be determined as follows

$$R_e = \frac{VD}{\upsilon} \tag{3}$$

where V is velocity (ft/s), D is hydraulic diameter (ft), and υ is the kinematic viscosity (ft^2/s). Values for R_e can be found in Table 3 and are plotted as a function of time in Figure 4.

Discussion

Facts, taken alone, mean nothing. They are a table of data, a series of isolated observations, or pieces of information without meaning. Therefore, an essential element of every report you prepare will be your discussion of the facts, in which you interpret the facts in a way significant to your readers.

Sometimes, writers have trouble distinguishing between a presentation of the facts and a discussion of them. The following example may help to make the distinction clear. Imagine that you observed that when the temperature is 65°F, the precision of a surveyed distance is ±0.03 ft; when it is 70°F, the precision is ±0.03 ft; when it is 75°F, the precision is ±0.04 ft, and when it is 80°F, the precision is ±0.06 ft. Those would be your facts. If you were to say, "As the temperature rises above 70°F, so does the precision of the distance measured," you would be interpreting those facts.

Of course, in many reports, you will be dealing with much larger and more complicated sets of facts that require much more sophisticated and extended interpretation. But the basic point remains the same: when you begin to make general statements based upon your facts, you interpret them for your readers. You are discussing them.

In many of the communications you write, you will weave your discussion of the facts together with your presentation of them. In such situations, the interpretations often serve as the topic sentences for paragraphs.

Whether you integrate your presentation and discussion of the facts or treat the two separately, you need to remember that your readers count upon you to select the relevant facts and discuss those facts in a meaningful way.

Conclusions

Like interpretations, conclusions are general statements based on your facts. However, conclusions focus not simply on interpreting the facts but on answering the readers' question, "How are those facts significant to us?" Brief, explicit statements of conclusions are almost always desired and welcomed by report readers.

Recommendations

Just as conclusions grow out of interpretations of the facts, recommendations grow out of findings. They answer the readers' question, "If your conclusions are valid, what should we do?"

As mentioned above, you can help your readers immensely by stating your major recommendations at the beginning of your report. On the other hand, if your communication is long or if a full discussion of your recommendations requires much space, you can summarize your recommendations generally at the beginning of your report and then treat them more extensively at the end.

Although readers usually want recommendations in reports, you may encounter situations where you will not want to include them. That might happen, for instance, in either of the two following cases:

- The decision being made is clearly beyond your competence, and you have been asked to provide only a small part of the information your readers need to make the decision.
- You are working in a situation where the responsibility for making recommendations belongs to your boss or other people.

Table 2 lists a general checklist for technical reports.

Table 2. Checklist for Overall Report

Item	Check Box
Title Page and required information	
Letter of Transmittal in a proper format	
Table of Contents	
List of Figures/Tables (if required)	
Executive Summary	
Introduction/Background Section	
Procedure/Methods Section	
Discussion Section	
Summary/Conclusions	
Recommendations	
The text should be double-spaced	
Avoid using "I, we, my lab partners, . . ."	
All numerical values must have units	
All text in 12 point font size	
Section titles are centered and typed in all caps and bold font	
Equations are centered and numbered	
Table headings placed at the ***top*** of the table	
Figure captions placed at the ***bottom*** of the figure	
Figures and tables are numbered consecutively based on the order they appear in the report	
Figures and tables are located immediately after the page where they are first mentioned	
For landscaped figures, the bottom is oriented towards the right and the top towards the left	
Proper pagination	

TABLES

Tables are often used because the information may be presented without interpretation by the writer. However, numerical data are frequently interpreted by the writer and presented in the same or subsequent tables. Tables show data or facts in matrix form (a rectangular array of numerical quantities or facts) and give the reader latitude to analyze and understand their meaning. For example, data collected from a laboratory experiment are ordinarily recorded in tables (see Table 3). Also, tables are used effectively for non-numerical facts (see Table 4). Tables may be accompanied by graphs or charts that demonstrate the relationship between the data or facts.

Follow these guidelines to set up a table:

- Place the table number with a title near the top of the table.
- Label the top of each column and the left side of each row with a title.
- When all units of measurement for the table are the same, place the units with the caption of the table (e.g., "Length, ft."). Otherwise, include the units of measurement in parentheses with the column or row headings.
- For a table with numerical data, line up the decimal points in each column
- Indicate detailed explanations for data or facts in the body of the table with a superscripted number after the data or facts in the table. The explanations appear below the table (see Figure 6).
- When tables have more than five columns and five rows, when possible, separate the data or facts into subsets to encourage reader attention. Then, either display the separation of these subsets with double or bold lines or display these subsets in two or more tables.

Table 3. Turbine Test Data and Results - Nozzle Setting = 6.

Wheel Speed(N) (rpm)	**Brake Load (lb)**	**P_{net} (lb)**	**NxP_{net} (lb/min)**	**Brake Horsepower**	**Efficiency,** h **(%)**
300	8.2	6.4	1920	0.55	52
400	7.3	5.4	2160	0.62	58
500	5.7	4.0	2000	0.57	54
600	4.5	2.8	1680	0.48	45
670[1]	3.0	1.3[2]	870	0.25	23

[1] Maximum wheel speed

[2] P_{net} less than 2.0 is estimated

Critique of the Sample Tables

Table 3 shows a six-column by a five-row table from a laboratory report. The table is divided into three subsets separated by double vertical lines. The left section, "Wheel Speed," is the independent measured variable. The center section, which includes "Brake Load" and "P_{net}," presents the measured dependent variables. The right section consists of three columns of calculated data (results). Although the methods for determining the calculated data are appropriately not indicated, sample calculations for determining these data should be included in a prior section of the report or given in an appendix.

- A title at the top of the table identifies the recorded data. Specific information concerning the nozzle setting is included with the title.
- Each column of the table is labeled, and the units of measurement are indicated in parentheses. Each row is identified by the selected wheel speed for which the data are measured.
- The decimal points for the data in each column are lined up. All data are included with the appropriate number of significant digits.
- Data in the table that require additional explanations are superscripted in the body and are explained at the bottom of the table.

Table 4 shows a non-numerical table used for determining the composition and description of different types of stainless steel. The table is divided into three columns. Units of measurement, not applicable for non-numerical data, are not included. Each row is headed with a type of stainless steel. A title at the top of the table identifies its contents.

Table 4. Types, Composition, and Properties of Stainless Steel

Type No.	***Composition***	***Description***
302	Basic Type Cr 18%, Ni 8%	Good formability
314	Lower C	More weldable than 302
316	Higher Mo	Resists saltwater
317	Higher Mo than 316	Good heat resistance, excellent corrosion resistance
405	Al added to Cr 12%	Excellent heat resistance

GRAPHS

A graph visualizes data that shows the interrelationship between two continuous variables, such as temperature and time or stress and strain. Graphs are used for the following reasons:

- A table in a laboratory report is ordinarily accompanied by a graph that includes the experimental data points and a smooth curve approximating the path of these points to help the writer determine the relationship between the two variables studied in the laboratory. The scatter of these data points on either side of this smooth curve measures the validity of the data.
- A theoretical or design graph (a smooth graph without experimental data points) helps the reader understand the relationship between the variables or is a source of technical information for design or analysis.

Guidelines for Graphs

1. Any appropriate software program may be used to construct graphs. All graphs are to be printed on laser printers.
2. Plot the independent variable (the variable that is controlled during a test or selected) along the horizontal (*x*) axis and the dependent variable (the variable that is measured during a test or determined) along the vertical (*y*) axis except when this is contrary to standard practice. Usually, the axis of the independent variable is longer than the axis for the dependent variable.
3. Margins of 1 in. shall be maintained.
4. Axes should coincide with major subdivisions on the graph and be dark heavy lines.
5. The number of significant digits shown at the main divisions of each axis should be consistent with the precision of the measuring instruments or the reliability of the results.
6. Scales should be selected to facilitate the plotting and checking of data. Preferably, the major subdivisions should represent changes of 1×10^n, 2×10^n, or 5×10^n in the plotted parameter; less desirable but acceptable scales are 4×10^n and 8×10^n. Do not use notation such as "Stress, x 10^3 *psi*" in the labels on the ordinate or abscissa. Instead, use a label such as "Stress (thousand psi)" or place the "x 10^3" beside the largest value on the ordinate and abscissa scales.
7. Include the name of the variable measured and the units of measure, if any, in each axis title. The symbol for the variable is sometimes included. The units of measure can be placed in parentheses. For example, an axis title may read "Moment, M (ft-lb)."
8. The ordinate and abscissa should correspond to a conventional style when appropriate. For example, *force* or *concentration* are plotted on the ordinate, and *deformation* or *time* are presented on the abscissa. When this convention does not apply, the abscissa should be used for the independent variable and the ordinate for the dependent variable.
9. Broken scales should be avoided. It is generally desirable that the origin of the axis system be shown on the graph.

10. Data points should be represented on a graph by a symbol (circle, square, diamond, or triangle).
11. If a continuous mathematical expression plots the points, it should not be denoted by symbols.
12. Scales should be selected to use the available graphing area effectively; the plotted data should use a significant percentage of the paper and be approximately centered on the page.
13. When data represents a phenomenon that should be a smooth continuous function (e.g., load vs. deflection of a beam), a smooth curve should be plotted using a "best fit" curve.

    When data are presented for a non-continuous function (such as daily precipitation vs. day of the year), it is common to connect individual data points with straight lines or use a bar-graph style.
14. The ordinate and abscissa should be given clear labels in a consistent set of units (you would not plot load in pounds against displacement in centimeters).
15. When several data sets are plotted on a single graph, different symbols should be used for each data set and explained in a legend.
16. The graph should have a descriptive title. If you have plotted stress vs. strain, do not simply repeat the ordinate and abscissa labels; this is redundant and adds no useful information. However, a title such as "Uniaxial Tensile Test of A-36 Steel" might be suitable. The date of the experiment/lab and the person or group who prepared the graph should be a part of the title block.
17. Sometimes it is necessary to add a small figure or sketch to clarify the meaning of one or more of the plotted parameters. The need for such additional information must be judged on the ability of the reader to interpret the graph quickly.

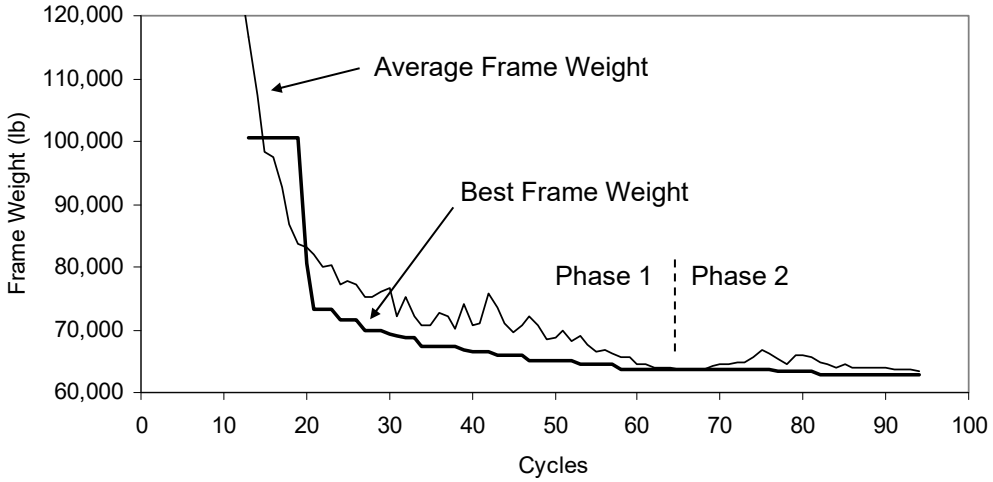

Figure 12. Typical Convergence History of One-Bay, Ten-Story Frame Design.

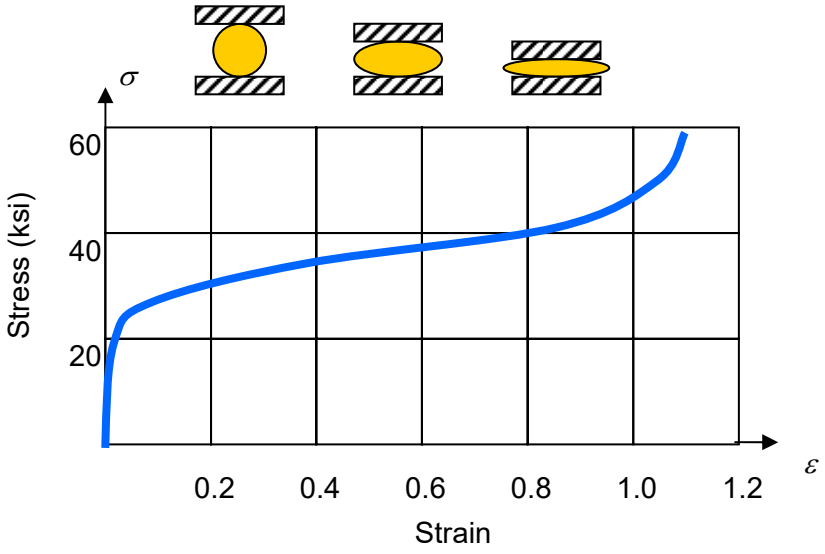

Figure 13. Compression stress-strain diagrams for copper.

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Figure 5. Sample Figures

Table 5. Checklist for Graphs

Guideline #	Item	Check Box
1	Proper paper	
2	Proper orientation on the page	
3	Margins	
12	Plot approximately centered on the page	
4	Axes are clearly defined and coincide with major subdivisions	
5, 6	Convenient scales	
9	Unbroken scales (and origin of axes present in most situations)	
8	Ordinate and abscissa parameters conform to convention or guidelines	
10, 16	Data properly presented with symbols	
11	Mathematical functions properly presented (when appropriate)	
13	Proper curves through data	
9	Proper identification of scales on ordinate and abscissa	
14	Properly labeled ordinate and abscissa	
16	Proper title block	
17	Useful figure or sketch when needed for clarity	