ENGINEERING REPORT WRITING GUIDELINES

In the practice of engineering, the report is a critical means of communication. In some cases it may represent the final outcome of your work – that is, it may be your "product." In other cases, the report, often combined with a presentation, may be the opportunity to take on a larger engineering contract, or the next stage of development. In any case, to be successful, your report needs to be professionally written. Accuracy, clarity, "flow," and efficiency in communication are key elements to success.

Engineering reports are not typically measured by quantity, but rather by quality. The body of the report should convey the necessary information for most readers, and appendices should be used to provide any necessary supporting data, research, or extensive analysis.

Your Project Report should be written as a Professional Engineering Report. The following pages provide a guideline and format for a typical engineering report. This format is generally consistent with industry and professional engineering practice. The sections are written in the order they are to appear in the Project Report. **Read the information in each section carefully, as your report will be assessed based on the format and content described below.**

Further details on the Interim and Final Report are discussed in the Interim and Final Report Requirements documents.

Cover Page

The report should include a cover page to convey essential information at a glance. It should include the report (project) title, the names of the author(s), the date submitted (or completed), the course name, and the instructor name(s). In some cases, the cover page may include the company from which the report was created (or their logo), and/or the name of the organization for whom the report was written. Note that if there are many authors, it may be more appropriate to identify the "group name" on the cover page, and add a second page with the names of all of the authors. As well, each of the authors should sign next to their name to verify that the report is of their own individual work and contains properly referenced material.

A basic example may be seen on the following page. Please note that cover pages do not contain a page number.

Other Important Requirements

- Number all pages at the bottom except the cover page using the format provided
- Use "1.5 line spacing" in the entire body of the text, except the executive summary, which should be single spaced
- Use font size 11, font type Times New Roman.
- Avoid jargon or slang in technical writing.
- Proof read all materials for spelling and grammar (and use the Spelling Tool to check for obvious spelling errors)

This is the Concise Title of the Report:
This is the Subtitle of the Report if Applicable

Presented to: Professor and/or Client
(Person(s)/Company to whom the report is submitted)

(Interim or Final) Project Report
Course name/number
Faculty of Applied Science
Queen's University

Prepared by Team #
Name 1
Name 2
Name 3
Name 4

Date of submission

Team Signatures

We do hereby verify that this written report is our own individual work and contains our own original ideas, concepts and designs. No portion of this report has been copied in whole or in part from another source, with the exception of properly referenced material.

Author line (printed name and student number) student signature date

(**Each** member must print, sign and date underneath the plagiarism statement.)

Executive Summary

The executive summary should be no more than one page. It should provide a brief overview and outcome of the project. Appropriately named, the executive summary should convey the essence of the overall report in few words, so as to be read quickly by an "executive" who has little time to read the complete report, but needs an overview for relevant discussion or future reference.

This section would not normally include any analytical details, but brief references to quantitative information may be part of the text if it is critical to convey the overall message. The executive summary should be carefully written to ensure good flow and proper grammatical construction.

Table of Contents

The Table of Contents and lists of figures and tables appear sequentially after the executive summary. The executive summary and associated tables are numbered numerically with roman numerals. The executive summary is numbered as page (i), Table of Contents (ii) and so on.

The Table of Contents lists everything from the Introduction to the individual appendices with page numbers aligned on the right hand side. Lists of tables and figures include table or figure numbers, description with page numbers aligned on the right hand side of the document. They should be listed in the order they appear in the report.

See below for examples of Table of Contents, List of Figures and List of Figures:

Table of Contents

PAGE

List of Figures

PAGE

List of Tables

PAGE

Introduction

The introduction presents the background and rationale for the project, typically in one to two pages. This would normally include a clear definition of the issue being addressed by the report, including the significant objectives, and where relevant, historical information leading up to the project would be discussed.

The Introduction should also describe the scope of the work done (or to be done) at this stage. In some cases, the scope is presented in a separate section ahead of the introduction, but it is often more meaningful if presented with pertinent background information. Specific technical reports may also include a "Purpose" heading, but in many cases for more qualitative studies, the purpose of the project is blended into the introduction.

Keys to writing an introduction for a technical report include:

- Clear and specific objective/purpose based on sound theoretical principles/factual information.
- Thorough review of the fundamental background/historical information related to the objective.
- Well referenced theoretical/historical concepts.
- To describe fundamental issues, good use of structures, diagrams and/or equations are recommended when applicable.
- Any structures, diagrams and equations must be numbered and referenced in the body of the text at least once.
- A discussion of the previous work completed in the area if relevant.
- Limitations/assumptions of the current work.

Discussion

The Discussion section is the main body of the report, where both qualitative and quantitative information is presented. Drawing from research, analysis, innovative ideas or concepts, idea selection, and proposed solutions, this is where the "meat" of the report is presented. Relevant tables, values, professional quality drawings, and in some cases perhaps even a few equations are often included for support of textual information in this section.

Five pages of text plus relevant figures is a reasonable approximation for this section, however it will vary widely depending on the project. The most important element of long'ish reports is effective editing to ensure the material is logically presented with good flow. Detailed background material to support the Discussion section may be included in the Appendices.

Further Discussion

Here I used Heading 2 for Further Discussion. Note that Further Discussion appears in the table of contents.

More discussion

Here I used Heading 3 for More Discussion.

A Discussion section may include the following key points:

- Presentation of ideas in a meaningful order and form. The form of the data may include plots, tables, figures or appendices where applicable/necessary.
- All raw data are placed into appendices.
- Use units consistently!
- Sub-headings are useful to maintain organization. It is important to guide the reader in a logical fashion.

General tips for figures and plots:

- Be clear, concise, legible and uncluttered.
- Place each figure in the order they are discussed in the body text.
- Reference all figures in the body of the text at least once.
- Label and number each caption chronologically.
- Place descriptive titles underneath captions.
- Properly reference figures that are not original to the report writer.
- Provide units, appropriate significant figures and definition of variables.

Conclusion(s)

This section presents the summary statements, or in other words, the outcome(s) of your project. Typically less than one page, this section may be in paragraph or bulleted format, so long as the statements are clear, concise, and factual wherever possible.

Keys to writing a conclusions section are:

- Be concise and convincing.
- Briefly summarize major conclusions developed in the discussion section.
- Present the conclusions in order of importance.
- DO NOT provide new information.

Recommendations

The Recommendations section is critical, since many projects are predecessors to additional work. There are usually recommendations relating to the work accomplished in the project, as well as suggestions for further work, and/or how that work should be carried out. This section is also typically less than one page.

Keys to writing a recommendation section are:

- List other parameters or improvements worth investigating in future work.
- Use strong and convincing recommendations.

Group Statement

Since this is an educational exercise, the group statement is an opportunity for your team to comment on the group dynamics, how the work was distributed, thoughts about the project, and just as importantly, a brief reflection on what and how you have learned.

Citations/References/Bibliography

Professional engineers must ensure that extracts from other's work are credited in a bibliography (sometimes just called "References"). Not only is this professional etiquette (and legally required), but it also provides the reader with sources of additional information. References that are only used for background information need not all be listed in this case, but extracts that are modestly paraphrased, as well as specific quotes, values, photographs, graphs, tables, or other figures should be referenced with in-text citation and listed in the Bibliography.

Note: see the Bibliography section at the end of this document for an example of a list of references.

Proper referencing of all materials is the obligation of all engineers and scientists. All ideas NOT original to the author(s) of a report MUST be referenced. Referenced material may include lectures, conferences, textbooks, journal articles, ideas from coworkers etc. Any idea that is NOT original to the report author is considered plagiarism. Plagiarism is considered as a serious academic offense. Please refer to the

Faculty of Applied Science web site at:
www.queensu.ca/calendars/appsci/PolicyonAcademicDishonesty_973.htm
for details on academic dishonesty. **It is important to understand that in most plagiarism cases, the students are not deliberately attempting to "steal" information or to pass it off idea as their own; in most cases, students are simply forgetting to cite materials properly.**

There are many correct methods of writing a reference list. Regardless of the method you choose, use only one method consistently within a report. Referencing within the body of the text can be done as follows, using the "APA" referencing system (this is known as in-text citation, as opposed to footnotes/endnotes):

Example 1: According to Atkins *et al.,* (1995), the kinetic energy of a body is defined as the energy it possesses as a result of its motion.

Example 2: Atkins *et al.,* (1995) concluded that the kinetic energy of a body…

Example 3: Atkins and coworkers (1995) stated that the kinetic energy…

Example 4: The kinetic energy of a body is the energy it…. (Atkins *et al.,* 1995).

If using the APA system, references are listed in the Bibliography section in alphabetical order by first author.

Appendix

Detailed reference information, analyses, detailed drawings, or other relevant data that are not specifically required in the body of the report, but may be valuable for the reader's reference, should be included in the Appendix. All information in the appendix should be relevant to the project – do not use it for "padding".

Bibliography (for the creation of this handout)

Pfeiffer, W.S. & Boogerd, J. (2004). *Technical Writing: A Practical Approach.* Third Canadian Edition. Toronto: Pearson Prentice Hall.

Macartney, D. (1998). *Principles of Scientific Communication*. Kingston, ON:Queen's University.

Misserie, Angie (2004). Guide to Writing Technical Formal Reports, Sheila Norris ed. Retrieved November 16, 2004 from http://www.chemeng.queensu.ca/undergraduate/course/reports/guide.htm.

Strong, D.S. (2003-2008). APSC 190 Student Guide, and personal notes.