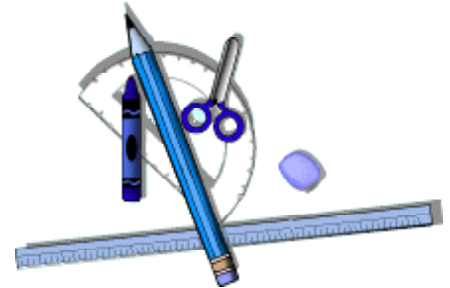


# Technical Writing

## Features & Conventions



As a student, engineer or scientist you will be required to write technical reports as part of your degree as well as throughout your career. Examples of such reports include annual environmental reports to regulators, annual reports to shareholders, project proposals, tender documents and journal articles. This handout will briefly examine the main/common technical writing features and conventions used by scientists and engineers.



## The Components of a Report

Depending upon its length and purpose, a technical report may include the following components

- Title Page
- Disclaimer
- Abstract
- Acknowledgments
- Contents Page
- List of Figures and Tables
- List of Symbols and Definitions
- Introduction
- Main sections and subsections
- Conclusions
- Recommendations
- References
- Appendices

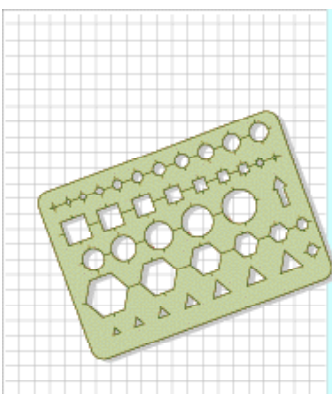
### Sample Report Contents Page

Table of Contents	
Contributors & Acknowledgments	
1. Introduction	
2. Quality & Safety .....	6
3. Men and Women in the Engineering Profession .....	10
4. Expansion of Goodvibes into South-East Asia .....	3
5. Vibration Isolation for CD Players .....	16
5.1 Vibration Isolation Theory .....	16
5.2 Vibration Isolation Products .....	17
5.3 Technical Proposal for Vibration Isolator .....	18
6. Conclusion .....	25
7. References .....	26
Appendix A: Minutes of Meetings .....	28
Appendix B: Memorandums .....	38
Appendix C: Peer Reviews .....	45

*use a decimal system for identifying section headings and sub-headings, e.g. 5., 5.1*

## Layout

### 1. Title Page



The title page will vary according to the style required by the assessor or your company. At a minimum, the title page should include:

- Name of the university
- Name of school e.g. School of Mining Engineering
- Name and code of the subject e.g. MINE1740 Mining Legislation
- Title of the report
- Name of author or authors
- Date of submission

Some schools publish styles guides that you are expected to follow when submitting a report. Check with your school office as to whether your school has one.

## 2. Chapter Numbering System

The numbering of chapters and subheadings is normally undertaken throughout the report. The Introduction is generally numbered 1 with the Reference section having the last number. Third level headings are the generally accepted limit (e.g. 8.4.3); too many levels becomes confusing. The preliminary sections (i.e. Table of Contents) prior to the Introduction are not numbered. Appendices should have a heading such as: Appendix A. APL Program for Analysing LANDSAT Data (chapter 7).

## 3. Figures and Tables

Figures include diagrams, graphs, sketches, photographs and maps. Tables represent data in columns. All figures and tables should be numbered and labelled. This caption is placed above a table and below a figure. Each should have a very simple, descriptive caption explaining the figure or table. Any symbols or abbreviations used in the figure or table must be explained in the text. The figure must also be referred to in the text, identified by its number (e.g. Figure 4 shows pore pressure ... ). Avoid using "the figure above" or "the figure below", as text locations may change when editing your report. All figures and tables must be referenced if copied or adapted from another source.

## 4. Equations and Formulae

Equations should be numbered as they appear in the text, with a number in brackets on the right hand side margin. This number is used for identification throughout the rest of the text. Equations are generally centred, with consecutive equations on separate lines and with the equal sign (=) vertically aligned, eg:

$$y = mx + b \quad (1)$$

$$X = l(h + f) \quad (2)$$

## 5. Font

Fonts that are easy to read are generally chosen for a report. Times New Roman, Arial and Helvetica are the most popular. Font size should be a minimum of 12 point for the body text, larger sizes are used for the headings with first level headings being the largest. The same font should be used throughout the report. It is important not to distract the reader from the contents of the report. Most word processing programs have report templates in them which can be used as a basis for your report style.

## 6. Appendices

Appendices are supplements to a report. They are included as separate sections, usually labelled Appendix A, Appendix B etc., at the back of the report. An appendix includes:

- a) information that is incidental to the report;
- b) raw data and additional evidence which supports the report;
- c) technical data or specifications which are too long and or detailed but which supports the report;
- d) Maps, folded diagrams, tables of results, letters are other examples.

# C o n v e n t i o n s

## 1. Language & Style

- *Aim to inform*

Scientific or technical writing is different from literary writing in a number of ways. Primarily, the aim of technical writing is to inform rather than to entertain. Hence, the style of writing adopted is generally simple and concise.

As informing an audience is the primary aim of the scientific writer, emotive language is avoided. The scientific writer should try to transmit information as objectively as possible.

### An example of a literary sentence:

The wind was blowing fiercely and the air outside was growing chilled.

### An example of a scientific sentence:

Onshore winds travelling at 45km per hour brought temperatures down to 15 degrees Celsius.

- **Be concise**

Avoid too many long sentences. Sentences with 4 or more clauses, or parts, are confusing to read. Your text will probably read better if you consider making two sentences rather than one long sentence. If you want to include a qualification or an example then a long sentence is usually appropriate. Use words and expressions economically. If you can use one word instead of 2 or 3 then choose the one word (get around = avoid). This also creates a more written and formal style.

**An example of a long sentence:**

After consulting three manufacturers: Dibble and Co., Sooky Ltd. and Bungle Pty, we have found that there are two types of vibration suppression devices for portable CD players and both are simple in design but have inherent drawbacks.

**More concise sentences might be:**

Three manufacturers were consulted: Dibble and Co., Sooky Ltd. and Bungle Pty. We have found two types of vibration suppression devices for portable CD players. Both types are simple in design but each has inherent drawbacks.

- **Be clear**

Avoid being unclear and ambiguous. This can happen when you do not specify what you are writing about and can even depend how you use words like 'it', 'this', 'thing', 'way', 'some' etc. Do not use contractions of verbs and pronouns as these are 'spoken forms' (doesn't, can't, it's, they're). The formal writing you will do at university and in the workplace will require the full form (does not, can not, it is, they are).

**An example of unclear expression:**

The way we did the experiment was not so successful. Some of what we needed wasn't there.

**An example of clear expression:**

We were unable to complete the experiment. The glass tubing and tripods required for the experiment were not located in laboratory G025.

- **Be correct**

Check that the spelling, punctuation and grammar of your sentences is correct. If using a computer spell checker, be careful. Make sure that you know which word to select. Many easily corrected errors in your written work will affect your presentation and your marks. Sometimes you can see errors more easily if you do not proof read your writing till a day or two after finishing writing. This is called 'the drawer treatment'. The Learning Centre has many resources on punctuation, grammar and spelling that you can use.

## 2. Jargon

Jargon is the technical terminology of any specialised field. Jargon is commonly used when communicating with others in your field. Communication problems can begin when jargon is used in communications aimed at a more general audience. Jargon also includes sub-technical words. These have multiple meanings in general and technical contexts. For example the word 'fast' has very different meanings in medicine (resistant to), mining (a hard stratum under poorly constructed ground) and painting (colours not affected by light, heat, or damp). A specialist dictionary is required for learning technical and sub technical vocabulary. Your lecturer can recommend a good specialist dictionary.

Aim to write for your intended audience. If your report is for your supervisor or a colleague, then the use of jargon may be both appropriate and expected. If, however, you are writing a report for a general audience or an expert from another field, jargon should be avoided and simple, clear descriptions should be used instead.

## 3. Abbreviations and Acronyms

In scientific and technical writing abbreviations and acronyms are commonly used. Abbreviations are pronounced as letters, e.g. UNSW, whereas acronyms are pronounced as words, e.g. laser. The first time you use an abbreviation or acronym, you must spell out the full term followed by the abbreviation or acronym in brackets. Subsequent use of the term is then made by its abbreviation or acronym.

e.g. *The University of New South Wales (UNSW) is situated on Anzac Parade, Kensington. The best way to travel to UNSW is by public transport.*

The use of an abbreviation is largely dictated by the number of times you are going to be using the term. If the term is only to be used three or four times, it may be better to use the full term each time. This will improve readability, especially if you are using a number of different abbreviations throughout your report.

#### 4. Can I use 'I' in technical and scientific writing?<sup>1</sup>

There is no single easy answer to this question—it depends. First we recommend that you check with your lecturer/tutor if and when you can use 'I' in your writing.

*Reasons for using 'I' include:*

- The more practised a writer is, the more latitude the writer can have in being casual or creative.
- If a writer is an accomplished engineer/scientist/professional, then as an 'expert' in their field the writer can use 'I' to give authority to their ideas.

*Reasons for not using 'I' include:*

When 'I' is used too often it can make your writing sound casual or spoken in style rather than formal and objective.

- Not using 'I' can make your writing more believable. The reader may interpret your use of 'I' to mean that you are not aware of formal writing conventions. By following conventions you show you are aware of the practices in your field. The reader may also interpret your use of 'I' to mean that you are not aware or clear about what other experts in the field have done or think, so instead you are making your own choice.
- In a student's writing using 'I' can suggest absorption with the self or that the student does not recognise that their work needs to stand up to scrutiny.

#### 5. Where possible use active voice

What is different about these two sentences?

Male guppies advertise their attractiveness by displaying their colourful patterns (**Active Voice**)

Attractiveness is advertised by male guppies by displaying their colourful patterns. (**Passive voice**)

Using active voice in your writing creates a direct and concise message, which also makes your writing easier to read. While we encourage you to use the active voice, this does not mean that you cannot use passive voice, as it can be convenient and necessary. Most writing will have a mixture of active and passive clauses depending on what word is chosen for the subject of a sentence. Look at course related texts that you consider well written to notice how and when writers use active and passive voice.

#### 6. Non-Discriminatory Language

The use of non-discriminatory language is a legal obligation for all writers. It aims for truthful reporting of the facts. You should avoid statements that suggest bias or prejudice towards any group. You should also avoid making unsupported statements about a person's age, economic class, national origin, political or religious beliefs, race or sex. For example, referring to all persons in an industry as 'he' can be inaccurate and misleading. It is best to name the profession using a non-sexist term (e.g.; police officer). (The Learning Centre has a handout 'A guide to non-discriminatory language')

##### References & Further Reading

(These books and others are located at The Learning Centre, G23, Upper Campus)

Day, R.A. *Scientific English-A Guide for Scientists and Other Professionals*. Oryx Press, 1992.

Lindsay, D. *A Guide to Scientific Writing* 2nd ed. Longman, 1995.

Eisenberg, A. *Effective Technical Communication*, 2nd ed. McGraw-Hill, 1992.

Winkle A and Hart B, *Report Writing Style Guide for Engineering Students*, 3rd ed. Faculty of Engineering, Flexible Learning Centre, University of South Australia, 1996.

Prepared by Clare Offner & Pam Mort, September 1999, 2005 © The Learning Centre, The University of New South Wales. This guide may be distributed for educational purposes and adapted with proper acknowledgement. For comments contact Pam Mort [p.mort@unsw.edu.au](mailto:p.mort@unsw.edu.au)

<sup>1</sup> We thank Dr. Will Rifkin (Science Communication Program) for clarifying the use of 'I' in academic writing and giving permission to include his advice in this brochure.