Report Writing Guide

for Engineers

PAUL HAGAN AND PAM MORT

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PREFACE

This edition of the *Report Writing Guide for Engineers* (*RWG*) or *"The Blue Book"* has been fully revised and updated with the goal of enhancing the report writing skills of engineering students; a graduate attribute of the Mining Education Australia (*MEA*) program.

MEA is a collaborative development involving a number of Australian universities that aims to improve the quality of engineering education.

The *RWG* is intended to assist engineering students through the process of report writing by answering many of the *"how should I…"* type questions that invariably arise in preparing an assignment. The guide should prove useful to students when preparing reports for laboratory exercises, design projects and the research project or thesis. Importantly, it provides a common understanding of the requirements among students in project-based courses as well as group projects particularly where a team of students from different disciplines is required to produce a single report. It should also prove to be a useful resource for the student in the early stages of their professional career as a graduate engineer.

The *RWG* has two major aims, these being:

- to outline the standards and conventions of technical report writing as defined by the Australasian Institute of Mining and Metallurgy (*AusIMM*) which has specific requirements for materials that are submitted for publication as defined in the *Guide to Authors*; and
- to contribute to an improvement in the quality of students' written assignments starting from day one when they begin their studies in engineering.

Paul Hagan
UNSW Sydney
Australia

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The authors welcome any comments and suggestions for future editions. Please contact either:

- Paul Hagan, School of Mining Engineering, UNSW at p.hagan@unsw.edu.au, and/or
- Pam Mort, The Learning Centre, UNSW at p.mort@unsw.edu.au

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001: Introduction

The *MEA Report Writing Guide (RWG)* was written to assist you, the student, to write better reports. This document is not intended to constrain your creative writing talents but to inform you of what is expected when writing a technical report. These expectations reflect the norms and conventions of report writing expressed in terms of *structure*, *format* and *style.* It is argued that the earlier in your professional development you are informed of these expectations, the more likely these will become second nature and will have a positive influence in developing good writing habits.

There is a misconception held by some students on enrolling in an engineering program that the focus is solely on gaining technical knowledge and skills. It is incorrectly considered that engineering is only about gaining and applying knowledge in maths, physics and chemistry and using this to design gizmos. This unfortunately could be no further from the truth. In order to be successful in your professional career as an engineer, you also need to interact with others, hence development of communication, people and leadership skills are equally important.

In addition to design and construction, an engineer will need to communicate their design concepts and proposals with others whether it be in a business setting, with their peers, or while studying at university. There will be occasions when as an engineer you will need to convince company directors or people in a financial institution on the merits of your design to gain approval and funding for its construction; to convince your manager or a client that a plan or strategy will meet the particular needs and objectives of the organisation; or, to show the results of a cost/benefits analysis you completed of a proposed new project. Whether a proposal will be accepted depends not only on the creative effort you put into the design but also how well you present that design.

The onus is on you the writer to ensure your report is clear, accurate and precise to the reader. As will be discussed later, objectivity in the style of writing is important. Confusion and ambiguity can lead to questions about the report or perhaps to even outright rejection of the findings and recommendations. In some circumstances,

poor writing can lead to undesirable if not unsafe outcomes.

Report writing is the most common form of written communication used by engineers and scientists. Reports are a form of communication widely used in industry, whether it be in an operational, management, technical, financial or research setting. It is well suited to recording observations and analysis, to convey information and to gain consent and agreement.

To this end, proficiency in report writing is a graduate attribute in many engineering programs. Effective writing is a skill and like all skills it is something that needs to be practised and refined over time. It is often a requirement of professional organisations to include development of communication and report writing skills in engineering programs. Some advice often given to students by engineers in senior management roles is the necessity for good communication skills.

The sooner a student realises the importance to develop their skills in report writing, the sooner they can develop their potential as a successful engineer. Early adoption has the added benefit that the student will more likely be rewarded with better marks in university assignments.

Often a student's first impression of technical report writing is that it is a difficult form of writing as it is highly structured and seemingly written in an impersonal style. But as with all skills, a person will become more proficient in this skill with persistence, time and practice.

Developing this skill early in one's career will not only ensure the intended messages are well understood and appreciated but that it will prevent bad habits from being developed which can be harder to undo later. Eventually with sufficient practise, less effort will be required on *the how* to write a report with more time and effort focused on *the what*, that is on the report's content and the message intended to be conveyed.

In is recommended that your time at university be used to hone your report writing skills so that you are well on your way to mastering this form of communication by the time you graduate.

Whenever preparing an assignment, it is recommended you have on hand the RWG.

The *RWG* **outlines the report writing standards and conventions for courses in engineering programs that often form part of the assessment criteria**.

It is likely that initially you will often need to refer to the *RWG* to check on these standards and conventions but, over time, as your confidence grows this will reduce.

While many of the fundamental elements of report writing are essentially similar, you should be aware that some aspects of report writing will differ between departments, disciplines and organisations, albeit in many instances these are only minor differences. As an example, when preparing a report to your workplace supervisor on your period of industry experience you may find your employer has slightly differing requirements in report presentation. On the other hand, the employer requirements may not be formally codified and the *RWG* will make the task of report writing easier.

There are several publications on engineering and scientific writing listed in the *References* section, of which two in particular are recommended:

- *Guide to Authors* (AusIMM, 2016). Published by the Australasian Institute of Mining and Metallurgy (AusIMM), this is an example of a guideline produced by a the professional engineering society.
- *Style Manual for Authors, Editors and Printers* (Snooks and Co, 2002). This publication is the reference standard used in the government and private sectors.

These two publications are referred to in this document as the *Guide to Authors* and *Style Guide*.

A number of on-line resources are available to assist you in report writing skills such as *Write Reports in Science and Engineering* (WRiSE) at <http://learningcentre.usyd.edu.au/wrise/>.

When undertaking the final year research project in an engineering program, you should make yourself aware of the specific requirements of a thesis that will differ in some aspects from an ordinary technical report.

002: The aims of report writing

What is a report – what are its aims and its objectives?

A report is a form of written communication used in science, engineering and research organisations and throughout much of industry.

Reports are used to present information, to provide an account of an activity and, to record the results of a study or investigation. Quite often a report will state the objective of the study and include the methodology, results, analysis and evaluation, conclusions and recommendations.

Reports can also be used to present and discuss options or to present an argument intended to influence others in decision-making. How well this is done will depend on:

- the quality of the information presented in the report;
- the persuasiveness of the argument in the conclusions and recommendations; and
- the quality of the report—the look and feel in how the information is prepared and presented.

Who reads a report and why?

You will be asked to submit many reports as part of your studies at university on matters related to laboratory investigations, field studies, technical design, planning and economic evaluation. Preparation of a report is often an important element in the learning outcomes of a course. Such assignments not only aid in understanding of scientific and engineering principles but also improve your report writing skills.

As a graduate, you are likely to be asked to prepare many reports for your supervisor or manager in order to record information, an event, outline a design or engineering options of a new project or a review of a project.

One critical piece of advice that may help in preparing a report is to *direct your writing to the "average person."* Such a person may have only some general knowledge of the topic and not necessarily a technical expert in that field. For example, when preparing a report for assessment at university, students can make

the understandable but sometimes incorrect assumption that the lecturer will be an expert on all aspects of the topic and understands all the concepts and technical language presented in the report. This can lead to short-cuts being taken in communication by the student.

In industry, such an assumption may result in undesirable consequences such as an unfavourable response, an outright rejection of the report and its findings or, implementation of the wrong design leading to some catastrophic event.

It is suggested that as a student while at university you practise writing for the "average person" rather than the technical expert so you will be accomplished in this style of writing by the time you graduate.

What is expected in a report?

The structure of a report allows different forms of information to be consolidated into the one document. Such information may include:

- design drawings;
- economic analysis, calculations, models, spreadsheets;
- graphs, charts, photographs and other illustrations of equipment, mines, processes and people;
- discussion; and
- critical analysis and synthesis of information.

Although the range of information dealt with in reports and its objectives may vary, there is a familiar "look and feel" to a report. While the report could primarily be written for your supervisor, the audience could end up including your peers and those in senior management or, indeed anyone in your organisation.

There is an expectation by a reader that any essay, play, novel or report will follow certain norms in terms of *structure*, *format* and *style* which characterise that type of writing. It is important to recognise what these norms are and adhere to them.

Whatever the purpose and whoever the audience, your objective in report writing should be to recognise what these norms are and adhere to them in order to gain acceptance of the concepts, ideas and recommendations. Effective communication will contribute to acceptance of the report and importantly to the message you intend to convey. Ignoring these expectations may result in rejection.

Despite this, there is sufficient scope to be flexible and creative when preparing a report to meet the needs of different audiences and objectives.

These expectations of structure, format and style will be discussed in greater detail later in this guide.

In addition to the mechanics of communication, other aspects of a report that will influence the success in acceptance of a report include:

- clarity of thoughts;
- logical development of concepts;
- evidence and/or support for ideas presented in the report; and
- conclusions and/or outcomes of an analysis or study.

003:
The report writing process

As with so many tasks, report writing is an iterative process—especially if a high quality report is desired.

The steps in the writing process include clarification of the report's objective; undertaking the investigation or study; planning an appropriate structure that will help to achieve the objective; then drafting, editing and re-editing the report.

Clarification

In order to write a good report, the writer must have a *clear understanding of the report's objectives.* This can be as simple as clarifying answers related to the who, what, when, where, how and why of a report.

- Who is the intended audience?
- What is the topic and the objectives or aims?
- When is the report required?
- Where or which resources are available in preparing the report?
- How will the report be distributed?
- Why have you been asked to prepare the report?

Investigation

Once the objectives are clarified, you can begin the investigation. Depending on the type of report, the investigation can be conducted in a number of ways.

You may need to visit a work site, undertake discussions with a range of people, or observe some industrial processes and/or systems. All of the gathered information will need to be filtered, analysed and documented. Alternatively, a project may involve experiments to collect data that will test a hypothesis.

In each case, you will need to consider the following:

- What questions need to be answered?
- What type of information should be collected?
- Where is the information located?
- How will the information be recorded?
- How will the information be analysed and presented?

Planning

While investigating a topic, you should also be thinking about how the report will be organised. A useful activity is to create a simple outline of the report.

An outline is the order in which the headings and subheadings are listed that contain information to support the conclusions and recommendations. This will be discussed further in the chapter on *Structure*.

Creating an outline forces the writer to consider what information should be included in the report and in what sequence. An outline will evolve as the work progresses to form the basis of a report's contents page.

Drafting and editing

Writing a report usually requires writing several drafts to produce a product to a high professional standard and that the report's objectives are met. To this end, you will need to do the following.

Revise the task often

Do this by keeping the reader's needs and the report's objectives in mind, not only as the information is gathered and analysed but also as the report is being compiled.

Be selective

Do this by keeping clear notes on what information has been gathered, by whom, from where and when. Also critically comment on the veracity and usefulness of this information. Review project notes and draft copies of the report to decide what is essential and discard nonessential information.

Create a structure

Do this by developing the information at several levels: sections, paragraphs and sentences. Consider what sub-headings you might wish to have in each section. Include a summary or overview statement at the beginning of each major section as this improves readability.

Well written paragraphs generally begin with a topic sentence and develop a single idea.

Bullets points are quite often used in reports to good effect for clarity and emphasis; see the section on *Lists of information*. Tables of information and illustrations are very often included in reports as they are effective in summarising information and aid in communication and to improve understanding and comprehension.

Edit then edit again

The report should be systematically edited. This requires developed organisational skills. Some strategies that you may find useful are as follows.

- Give the draft report *"the bottom-draw treatment"* by putting aside the draft for at least 24 hours. The report can then be read with a fresh pair of eyes where errors or holes in the argument become more noticeable.
- Ask someone else for their comments on the report, preferably someone who is familiar with your field and from whom you can accept criticism.
- Use a checklist to summarise the requirements of a report. Checklists can be found in most good text books on report writing such as that by Winckel and Hart (1996). An example of a simple checklist is provided in *Appendix 6*. You may wish to add to this simple checklist and compile your own. The objectives and criteria for an assignment should also be included in the checklist.
- Observe what other report writers do well and apply this to your own writing.
- Know your shortcomings! Develop an awareness of what to look for and what to work on to improve your writing skills. Seek assistance from on-campus services such as The UNSW Learning Centre or equivalent at your home university.

The time required to properly format, draft and edit a report is frequently underestimated by students. This is unfortunate as a poorly prepared report will reflect, perhaps unfairly, on the overall quality of the project or study, undoing much of the good work and effort that may have been done in collecting the information, in the modelling and in the analysis.

004: Report structure

The structure of a report differs from other forms of writing such as an essay or novel. Whereas an essay is intended to be read from beginning to end, quite often only parts of a report may be read by different people. For instance, senior management are more likely to focus on the Summary, Conclusions and Recommendations sections to quickly understand the main points made in the report, whereas a technical person might be interested in details of the experimental design, results and analysis.

Depending on its length and purpose, a report will generally be divided into several sections; this chapter outlines the most commonly found sections found in a report.

Appendix 2 shows an example of a report illustrating how the sections fit together to tell a story as well as addressing elements of report format and style.

Title page

The purpose of the title page is to indicate to the reader the nature of the subject matter that will be covered in the report through an informative title. Other details found on the title page include:

- Name of School/Department or organisation (e.g. *UA, UNSW, UQ, WASM, Blue Mining Ltd*)
- Person to whom the report will be submitted (e.g. the lecturer/course convenor)
- Course name and code
- Title of the report
- Author (student's name and number)
- Date of submission.

The design of the title page should be simple yet functional and appropriate to the audience and task.

In addition to the formal title page, most universities require students to append an assignment coversheet. You should refer to the Course Outline/Profile as to the requirements at your institution.

*Statement of Originality

A statement or declaration affirming the originality of the work is required for most student assignments. Generally this declaration is included in the assignment coversheet or it might be incorporated into a report style template. Such as declaration is included in a thesis immediately following the title page.

The statement is a formal declaration by the author that it is their own original work and all sources of information including data, illustrations and other material contained within the work have been properly acknowledged.

Summary

The summary contains an *overview of the most important aspects of the report.* While there are a variety of titles that are used for the name of this section such as abstract, synopsis, executive summary, *the title used in most instances for a technical report is* **Summary**.

* **Note:** The section headings marked with an asterisk (*) are generally found in a thesis or other scientific publication such as a conference paper. These sections are normally NOT required in a technical report.

The summary section should be placed after the report's title page and before the table of contents. Ideally, the Summary section should be about one-half of a page in length but *no more than one page or 250 words*.

In essence, the summary has three parts. It should succinctly state:

- the objective of the study or report;
- a description of the process/method that was used in the investigation, major outcomes and results; and,
- the major conclusions and recommendations.

The term *Executive Summary* is rarely used in reports being restricted to reports on a major project or investigation such as a project feasibility study or other similar lengthy and comprehensive report. In this case, the discussion may extend over several pages.

Similarly, the term *Abstract* is not generally used in engineering reports but is more generally reserved for a thesis, journal article, conference paper or other scientific publication. Examples of a summary section together with some critical comments by a Lecturer are provided in Tables 1 and 2.

Table 1
A sample extract of a Summary section from a student's report with accompanying lecturer's comments.

Lecturer's Comments	**SUMMARY**
The structure is good because there are clear stages: • *terms of reference;* • *report aim;* • *report solution; and* • *report scope.* *Expression could be improved in two areas:* • *wordiness; and* • *cohesion.* *Do not write in the first person (I, we etc) in technical writing but rather make use of third person. The underlined words are unnecessary.* *In the third sentence, it is unclear what is meant by 'its evaluation'.* *The words in* ***bold*** *are implicitly referring to the two access alternatives. Perhaps refer directly to "the two alternatives" so it is clear what is being discussed.*	We have been assigned by the directors of Base Metals Australia to evaluate the primary access alternatives of sinking a shaft or developing a decline to access the Southern Cross ore body in the North Parkes region of NSW. In each case a secondary return ventilation shaft or decline would be required. Some of the conclusions of this report are undoubtedly applicable for its evaluation, however, this has not been considered. This report clearly identifies the advantages of utilising decline access for the purpose of employee access and ore recovery at this site. In reaching this conclusion the various technical and economic aspects of the two alternatives have been thoroughly considered. In particular the report highlights: • the economic advantage to decline access • the reduced risk associated with decline access, and • the minimal environmental impact of a decline. In both cases, excavation by drill and blast was considered the best option for mining through the surrounding country rock.

Table 2
An example of a concise Summary section.

SUMMARY

Valley Copper Mines has secured a contract with a smelter to supply up to 0.7 Mtpa of copper concentrate. The results of this technical feasibility study has found that the best haulage option for the operation is to introduce a truck haulage system. This will require a $10.69 million capital outlay with an average transport unit cost of $2.10 per tonne for the initial five year period and $1.97 per tonne thereafter for the remainder of the contract period.

Lecturer's Comments
This summary addresses the main elements in that it briefly provides the context for the study (a new contract), the objective (best haulage option) final recommendation (truck haulage system), up-front costing ($10.69 million capital outlay) and running cost ($2.19 per tonne).

*Acknowledgments

An acknowledgment section is normally included in only in a thesis, conference paper or research report. In a thesis it usually follows the abstract and in journal and conference papers generally before the references section.

In this section the author acknowledges the people and organisations that helped and supported the project for example in providing resources and/or information. This may include the name of the organisation and any key people involved in the project. A few sentences or a short paragraph is usually all that is required.

Contents

The Contents section, or Table of Contents as it is sometimes referred to, outlines for the reader's benefit the structure of the report.

It is a listing of the section headings and subheadings together with their respective page numbers. Table 3 shows an example of the major section headings in a report.

Another purpose of the Contents section is to assist the reader to quickly locate information in a report. It is optional to use a section numbering system in small reports of less than say six pages though it is nearly always used in larger reports. If a numbering system is used then it should be consistent and reflect the hierarchical nature of the section headings and sub-headings used in the report. A decimal system is quite often used for this purpose; see the Contents section provided in the sample report in ***Appendix 2***.

As indicated in Table 3, *the Contents section is itself not included in the listing of the report contents*. However a separate list of figures, tables and abbreviations may be included. Note also the convention on page numbering involving use of Roman and Arabic numerals—see the section on ***Page numbering*** in Chapter 5.

*List of figures and tables

In major lengthy reports having many figures and/or tables, a list of the figures and tables can be included following the Contents section.

A separate list is made for each of the figures and tables. Each list usually follows on after the Contents and should use the same system of formatting. The list should include the figure (or table) number, caption and respective page number.

*List of symbols and definitions

If a report refers to special or unique names, terminology, symbols or abbreviations at several places in a report, then it may be helpful to the reader to include a list or glossary of terms. This list is usually located at the start of the report following the Contents section. The list should be sorted alphabetically and include the full or alternative form.

Table 3
An example of a Table of Contents.

CONTENTS

	Summary	*i*
1.	Introduction	1
2.	Objective	2
3.	Test Procedure	3
4.	Results	5
5.	Analysis	8
6.	Conclusions and Recommendations	9
8.	References	10
	Appendix 1: Risk assessment	11
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	Appendix 3: Equipment specifications	15
	Appendix 4: Listing of test data	18

Introduction

This is the first section in the main body of a report.

The Introduction is important as it sets out the context for the report. It should clearly define the objectives of the study, any constraints or boundaries (scope) to the study and any other relevant background information.

At this stage of the report, there should be no discussion on the findings or recommendations.

The introduction can be as short as a single paragraph or as long as several pages in longer reports. An example of an introduction is shown in Table 4.

Main sections and subsections

The structure of the main body of a report will vary depending on its purpose. For example, a report in industry might detail an investigation such as a review of ore reserves. Alternatively, a report might be prepared on the findings of a study such as alternate materials haulage systems. In other cases it might be required to report on observations and information gathered during a field trip to several mine sites detailing leading safety practices.

Each of these reports requires a different structure. The following examples show some of the different types of structures that can be used in a report.

General report

Purpose: To provide a balanced account on a topic or on an area of knowledge. The report is a record of the investigation and its outcomes.

A record of a project or study is necessary for several reasons, least of which is to ensure the work or actions are not unnecessarily repeated in the future. The study will involve gathering information from different sources, analysing this information and making a conclusion. The report is meant to be a record of the investigation and details the findings of the study.

The main body of this type of report could address:

- history of the issue or issues;
- current understanding of the issue;
- investigation process or methodology used;
- models developed to aid analysis;
- verification of these models and an analysis;
- future directions and/or solutions based on the findings of the report; and
- other impacts or aspects to consider.

TABLE 4
An example of an Introduction section in a report.

Lecturer's Comments	**INTRODUCTION**
In terms of content, this sets out the terms of reference, provides a brief background and the aim of the study. *In terms of style, the second paragraph sets out the project constraints. Statements which refer to conditions (e.g. "is 15 km","is set at 8 yrs") are usually written in the present tense. Whereas statements about actions (e.g."was given as") are best written in the past tense.* *Main criteria to be used are clearly presented. Brief description of methodology and report structure is included* *Words written within square brackets are suggested alternatives*	CCMH Engineering Pty Ltd was approached by the Aluminium Company of Australia (ACA) to conduct an analysis of the bulk haulage options between ACA No.1 Bauxite Mine and the Coolenup Refinery. The direct distance between the sites was found to be [is] 15 km and approximately 30 km by haul road. The required capacity for the materials handling system was stated as 8 Mtpa. The design life of the system is [is set at] eight years with a possible extension to 12 years. CCMH Engineering was commissioned to investigate the economic, environmental and social cost of each of two haulage options, these being truck and conveyor haulage. The final decision on which bulk haulage option was to be recommended was based on: [The final recommendations took account of:] • economic viability, • environmental considerations, • safety considerations, and • social considerations This report aims to clearly set out the detailed analysis of both haulage options. In each case, a complete transport system has been designed, costed and analysed.

Experimental report

Purpose: To describe a program of experimental work in sufficient detail that will permit the method, results and conclusions to be reviewed and, if necessary, modified and/or repeated.

Often it is expected in such instances to draw conclusions based on the results and to place these in the context of other related work. Typical section headings might include:

- theory, current knowledge setting the context;
- objectives;
- procedure/method;
- results; and
- analysis and discussion.

A report on a complex research program (for example a thesis) may involve several chapters, each containing a section on the particular procedure or method used followed by the results and a discussion on the findings.

For a detailed guide on writing *a laboratory report,* see the WRiSE site at <http://learningcentre.usyd.edu.au/wrise/civil_engineering/civil_eng_home.html>

Field trip report

Purpose: An account of activities, events and/or observations. Typical sections might include:

- site description—what the organisation does/produces, layout, staff organisation;
- description of work/activities/systems/plant;
- description of other work/activities observed;
- general comments on building, layout, technical facilities and amenities; and
- outline of industrial relations.

For a detailed guide on writing a *field visit report,* see the WRiSE site at <http://learningcentre.usyd.edu.au/wrise/mining_engineering/mining_home.html>.

Conclusions

Every report should include some concluding statements linking the original objectives with outcomes of the study. This section addresses the "so what" questions – what was found and what impact might this have on the subject.

TABLE 5
An example of a Conclusions section.

CONCLUSIONS
This report has established on the basis of cost, geotechnical issues, environmental impact, exposure to risk and being fit for purpose, that a decline development is the better option for the primary access to the proposed mine at a production rate of 1 Mtpa of ore. Further development of the mine below the 400m Level may require alternate access but this would be subject to a thorough evaluation before making a decision. *Lecturer's Comments* *The conclusions are short and to the point.* *They restate the major findings and also recommend further work or decisions that may be needed if circumstances change.*

This section could comment on the impact of the study, what was found in the analysis of test results, field trip or the organisation and, what was been learnt as a result of the study. It is in both this section and in the analysis section that you demonstrate your insight in the subject and an ability to synthesise new information. A sample conclusion is provided in Table 5.

Recommendations

The Recommendations section outlines what further work might be required to address any unresolved issues and/or alternate approaches in light of what was found in the study.

References

This section of the report contains a list of all the references that were cited in the report.

Only the *reference sources actually cited in the report* are included in the reference list. For the convenience of the reader to quickly locate a particular reference, the **list is always sorted first alphabetically by author** and then by year.

There are specific requirements as to the information that must be provided for each reference including:

- authors of the paper or work;
- year of publication;
- name of paper;
- title of publication; and
- publisher and place of publication.

To determine the type of reference, a certain protocol or structure must always be followed. In the case of the author/date system this includes:

- the order that information is presented (e.g. first the family name and then the initials of all authors followed the year of publication);
- the words and abbreviations that are used in the reference (e.g. "in" denotes a conference proceedings; and, "eds" are the names of publication editors); and
- the punctuation used (commas and full-stops) and the positioning of these in the reference.

Together these indicate the type of reference source (e.g. a book, journal article or conference paper). An example of a reference list is shown in Table 6 with further examples shown in ***Appendix 1*** and the report in ***Appendix 2***. See ***Chapter 7 Referencing*** in a report for further details on referencing.

Appendices

The Appendix section serves to provide additional or supporting information that, while not crucial to an understanding of the main facts and interpretation of results, the information may be required by the reader for verification of data.

The main body of the report should contain information that is directly relevant to the discussion. Information that indirectly supports the discussion should be included in an appendix.

As with figures and tables, there should be a link between the main body of the report and each appendix. The reader should be directed in the main body of the report to the appropriate appendix, for example "…additional data are presented in Appendix A." See the section ***Section numbering*** in ***Chapter 5*** for details on the numbering convention for appendices.

Some examples of the different types of information that can be found in an appendix include:

- list of raw or primary source data;
- detailed description of equipment and/or drawings;
- model and/or configuration/settings;
- material safety data sheets (MSDS);
- product data sheet and equipment specifications; and
- copies of questionnaires used in a survey.

TABLE 6
An example of a Reference list.

REFERENCES

Standards Australia, 2005. AS 2193-2005– Calibration and classification of force measuring systems

Barton, N, Lien, R and Lunde, J, 1974. Engineering classification of rock masses for the design of tunnel support, *Rock Mechanics*, 6(4):183-236.

Boldt, J R, 1967. *The Winning of Nickel*, pp 27-32 (Van Nostrand: New York).

Lees, M J, 1973. Experimental and computer studies of a grinding circuit, PhD thesis (unpublished), University of Queensland, Brisbane.

Stanford J and Carter P, 2009. An assessment of the impact of stylus metallurgy, in *Coal 2009: Proceedings 9th Underground Coal Operators' Conference*, University of Wollongong, 12-13 Feb, (eds: N Aziz and J Nemcik) pp 348-356 (Australasian Institute of Mining and Metallurgy: Illawarra Branch).

United States Environmental Protection Agency, 2003. Applicability of the toxicity characteristic leaching procedure to mineral processing waste, [online]. Available from: < www.epa.gov/epaoswer/other/mining/minedock/tclp.htm > [Accessed: 26 October 2004].

Withnall, I W, 1976a. Summary of mineral exploration in the Georgetown area, *Qld Govt Min J*, 77:583-589.

Withnall, I W, 1976b. Mines and mineral deposits in the Forsayth 1:100 000 sheet area, Queensland, Geol Sury Qld Rpt 91.

Lecturer's Comments
An example of a standard, journal article, book, unpublished thesis, conference paper, document from a webpage, and two reports by the same author.

005: Report format

Layout and formatting

While the layout and format of a report is a matter of personal preference there are some norms that must be observed. Formatting should make the report easy to read and be pleasing to the eye—it should not be a cause for annoyance or distraction to the reader.

Just as important, **formatting should be applied in a consistent manner** within a report. Table 7 shows some suggested format settings in a report.

Typefaces and font styles

Traditionally the text in a report will be set in a serif family of typefaces such as Times New Roman as it is considered easier to read. Section headings on the other hand are generally set in a larger font and will often use a sans serif typeface such as Arial.

Italics and bold fonts are subsets of a typeface and are used whenever special emphasis is desired for particular words in the text.

Table 7
Recommended layout for a report.

Layout option	*Setting*
Left margin	25 mm (or 30 mm, this leaves room for binding and comments)
Right margin	25 mm (or 20 mm)
Top margin	25 mm
Bottom margin	25 mm (or 20 mm)
Line spacing	1.5 lines (this allows space for comments)
Spacing between sentences	Single space following a full stop
Spacing between paragraph	6 (or 12) point
Justified text	ordinarily text need not be justified in reports but in a thesis and material for publication, left or full justified text is the norm

A common trap for novices is to overuse the various font options; it is recommended to use these options sparingly.

The **italics** font can be used to give emphasis to a phrase or an entire sentence. It can also be used to denote a quotation or the title of a publication.

A **bold** font, being more striking to the eye, is used to give added emphasis but should be restricted to only a few words at a time. Where emphasis is required for three of more words then it is suggested to use italics. Bold is also often used to denote the major section headings in a report.

Another option to give emphasis is to use CAPITALS. Aside from section headings, this is particularly useful in circumstances requiring added emphasis where a reader might otherwise misread the meaning of a sentence such as “water from outlets in this laboratory is not potable and MUST NOT be consumed.” As reading capitalised words is difficult, again this should be used sparingly.

With the development of desktop printing, underlining is now rarely used having been replaced by bold and italic fonts. It is reserved for those rare instances when you might want to alert the reader where other font styles may not be appropriate. Underlining, for example, can be particularly effective whenever part of a word needs to be emphasised, for example unrepresentative. As with capitals, underlining should be rarely used in reports.

A list of layout settings recommended for use in a report is shown in Table 8.

Many word processing software packages now include provision for style sheets. Once configured, these simplify the task of formatting

Table 8
Recommended settings for text in a report.

Format option	*Setting*	*Example*
Heading: Level 1	Start each section on new page; Line spacing: 9 pt after; Hanging 1.4 cm; Typeface: Arial or Calibri; Font: 18 pt, All caps, bold	**1 HEADING**
Heading: Level 2	Line spacing: 12 pt before and 6 pt after; Hanging 1.4 cm; Typeface: Arial or Calibri (Light); Font: 14 pt, Small caps, bold	**1.2 HEADING LEVEL**
Heading: Level 3	Line spacing: 6 pt before and 3 pt after; Hanging 1.4 cm; Typeface: same as body text; Font: 12 pt, Sentence case, bold italic	***1.2.3 Heading level***
Heading: Level 4 (rarely required)	Line spacing: 6 pt before;Typeface: same as body text; Font: 12 pt, regular	1.2.3.4 Heading level
Body text in report	Paragraph spacing: 12 pt before; Line spacing: 1.5; Typeface: Times New Roman, Cambria or Palatino (Linotype); Font: 12 pt	…use options sparingly. The italics font can be used…
Tables and Figures	Centred; Figure line spacing: 12 pt from text above a figure; Table line spacing: 12 pt below a table to following text	
Captions for Tables and Figures	Centred; Typeface: same as body text; Font: slightly smaller than body text e.g. 10 pt; Table caption 12 pt below text and 3 pt above table; Figure caption: 3 pt below figure and 12 pt from following text	
Table contents	Typeface: Arial or Calibri; Font: 9 or 10 pt; Text: right justified in left hand column, left justified/centred other columns; Values: centred or tab aligned to decimal point	
Page numbers	Typeface: same as report; Font: 10 pt; Position: top right hand corner of page	
Header	Typeface: same as report; Font: 10 pt	
Footer	Typeface: same as report; Font: 10 pt	
Reference list	Align left; Indent second and consecutive lines; Typeface: same as report; Font: same as text	

the different structural elements of a report such as typeface, font size and line spacing for section headings, paragraphs, figure captions, body text, etc. The use of style sheets can help to ensure consistent formatting throughout a report.

On a final note, combining different font styles (that is italics, bold, underlining) should be avoided.

Section numbering

A numbering system of section headings and subheadings is often used in reports. This often involves a hierarchy of headings and sub-headings used to good effect especially in larger reports. Up to three levels or divisions of headings are usually sufficient for most reports (for example "8.4.3 *Errors in data acquisition*") though up to four levels may be used in very large documents such as a thesis. Too many levels may become confusing for the reader and can be cumbersome for the writer to manage.

The words "section", "chapter", "appendix" etc in the context where referring to numbering in a report should be **treated as proper nouns**, hence the first letter of the word should always be capitalised, for example "further information can be found in Section 8.2."

Similar to the main body of a report, an appendix can be divided into sections each containing disparate information. A different numbering convention should be used to distinguish the appendices from the main body of the report, two examples being:

- Appendix A, Appendix B, Appendix C etc; and
- Appendix 1, Appendix 2, Appendix 3 etc.

As with section numbering, the numbering system of tables and figures in an appendix should be different to that used in the main body of a report. Often the table or figure number is prefaced by the number or letter of the appendix, for example "…see Figure A-1" alternatively it can be referred to as a table or figure in a particular appendix, for example "…as shown in Table 3 of Appendix 2 …"

Page numbering

The report's coversheet and title page should NOT be paginated. To distinguish between the material in the preliminary section of a report from the main body, two different numbering systems are used. The *page numbers for the preliminary sections up to and including the contents section are set in lowercase Roman numerals* (i.e. *i, ii, iii* etc).

Page numbering recommences with the start of the mainbody of the report, usually commencing with the Introduction section. Here Hindu/Arabic numerals (i.e. 1, 2, 3 etc) are used for the reminder of the report.

While in most published works and theses, page numbering in the appendix often follows on from the main body of the report, numbering of pages in an appendix is not necessary when the number of pages are fewer than say three pages.

The preferred position of the page number is in the top right hand corner and within the page header portion of the page.

Page headers and footers

Include the minimal amount of information such as a page number only in a page header.

In textbooks, the header may contain the name of the book or the chapter heading. In a report, the header can contain the abbreviated report title. In industry, the footer sometimes contains the file name for document control or the name of the organisation.

Any elaborate design for a header or footer adds little value. The main issue is this may distract the reader. If you wish to make use of headers and footers then you should ask how will the information aid in communication and is it really essential? If used, its impact can be minimised with use of a smaller font size.

In a thesis, the convention is to only insert the page number in the header and nothing in the footer.

Numbers and significant figures

There are a number of conventions with respect to the use of writing numbers in reports. These conventions are summarised in Table 9.

When stating a value in a report use either an appropriate scientific notation (e.g. 6.8×10^6) or an appropriate scaling prefix with the unit of measurement, for example M for mega- ($\times 10^6$), k for kilo- ($\times 10^3$) and m for milli- ($\times 10^{-3}$).

It is recommended practice to **insert a non-breaking space** (*Ctrl-Shift-Space*) between the value and its unit and, immediately before and after the multiplication symbol, "x". This ensures the value and unit will always appear on the same line.

For scaling factors up to and including one thousandfold, $\times 10^3$ (i.e. kilo), the first letter of the prefix symbol is set in lowercase (e.g. mm, kg) but above this value, the first letter is capitalised (e.g. Mt, GPa). However, a lowercase font is always used when the unit is written in full (e.g. megapascals, gigalitres).

Particular attention should be paid to the **number of significant figures** for each value as this implies a level of accuracy assigned to that value.

An often made mistake by students when using a spreadsheet for calculations is to simply "cut and paste" a calculated value from a spreadsheet directly into a report without considering the number of significant figures.

For example, in estimating the tonnage of ore reserves, a student's spreadsheet might estimate the mass of ore to be 1 346 578.574 t. In this value there are ten significant figures with an implied accuracy of ±0.5 kg which corresponds to a determination to within 1 m^3. This is patently unrealistic considering exploration drill holes are often tens if not hundreds of metres apart. While this value can be stated in the calculations provided in an appendix to the report, the appropriate value that should be stated in the main body of the report would be 1.35×10^6 t or 1.35 Mt.

In most instances, **three significant figures will normally suffice** when stating a value (e.g. 1.35 Mt). To give emphasis to this, when stating the quantity of ore reserves, clause 33 of the JORC Code states

> *"Ore Reserve estimates are not precise calculations. Reporting…should reflect the relative uncertainty of the estimate by rounding off to appropriately significant figures.*

The Code further states

> *"To emphasise the imprecise nature of an Ore Reserve, the final result should always be referred to as an estimate and not a calculation"* (JORC 2012).

Table 9
Conventions with the use of numbers, units and symbols.

Rule	*Example*
Use numerals when combined with units of measurement and when associated with abbreviations	4 km, 2 t, 6%, 24 trucks The 2nd and 20th samples
Spell out whole numbers from one to ten when used without a unit except in the case of a comparison involving a series of numbers, otherwise use numerals for values greater than ten	There were three ball mills in use. The flotation circuit consisted of 6 lead cells and 12 zinc cells
Spell out all numbers placed at the beginning of a sentence	Twenty-five risk values are given
Do not insert a comma or space for values between 1000 and 9999	1100, 5430 t, 9990 m
For values that exceed 10 000, insert a narrow 4 pt non-breaking space (*Ctrl-Shift-Space*) between each set of three values	11 500 kg or preferably 11 500 kg 1 228 000 tonnes (or better still 1.23 Mt)
Express fractions where possible as a decimal	2.5 s, 2.75 g
Include a non-breaking space (Ctrl-Shift-Space) between a value and its unit except in the case of a currency or temperature	22.5 Mtpa, 36.4 $\times 10^6$ bcm, \$45m, 33.1°C

Be wary of the incorrect use of uppercase and lowercase typeface in units as they can denote different scaling factors and hence different values. For example 10 MPa (i.e. 10 x 10^6 Pa) is not the same as 10 mPa (i.e. 10 x 10^{-3} Pa).

Unfortunately, many word processor packages will inadvertently alter the capitalisation of a unit unbeknown to the typist when keying in a unit. For example, when typing the unit for stress, while it might have been intended to key in say 250 MPa, the unit is "corrected" to 250 Mpa which is incorrect. While this can be annoying, it is in the end the responsibility of the report writer to ensure that both the value and its corresponding unit are correctly stated in a report.

Symbols for units of measurement

In general, all measurements should be stated in metric units based on the *International System of Units* (*SI*) and according to industry convention. There are though a few exceptions, for example imperial units are still used in some parts of industry when referring to engine power rating (hp), wheel rim size (in), air pressure (psi) and mass of gold (oz t). When dealing with gold and precious metals, the unit still in common use is Troy ounce (oz t); note the latter equals 31.1 g and is slightly larger than the more widely used avoirdupois ounce (oz) equal to 28.4 g.

When stating a quantity it should be written as the value followed by a space (preferably a **non-breaking space**, *Ctrl-Shift-Space*) and then the appropriate measurement unit (e.g. ten metres). When using numerals, the abbreviated symbol for the unit of measurement should be used rather than the name of a unit e.g. 10 m, 25 kg.

Three exceptions to this rule are the symbols for currency, percentage and temperature when no space is inserted between the value and the unit symbol, e.g. $780, 26.7%, 10°C.

The symbol for a measurement unit is set in most cases in a lower-case roman font (not italics) in order to distinguish it from a symbol for a mathematical variable where the latter is usually set in italics. The exception to this are the symbols for those units named after a person, for example "N" is the unit for force named after Sir Isaac Newton and Pa is the unit for pressure named after Blaise Pascal. When spelt out, the unit is always written in a lowercase font (e.g. one newton, 10 millipascals) except the unit for temperature when a capital is used (e.g. ten degrees Celsius). The unit symbol for litre can be written as uppercase "L" to distinguish it from the numeral "1".

The plural form is applied when the name of a unit is used (e.g. 10 newtons) but not to the symbols for a unit. Unit symbols are a special form of abbreviation that do not take full stops unless when ending a sentence.

When combining units, insert either a centre dot (·) or non-breaking space (e.g. N·m or N m). For division insert a solidus ("/" which is Unicode 2044 with spaces inserted on both sides (e.g.t / h, N / m^2) rather than the forward slash " / " or Unicode 002F). Alternatively use the negative exponent (e.g. N·m^{-2} or N m^{-2}).

Examples of some commonly used units of measurement are as follows.

- mine product output such as ore is usually reported in units of mass in either tonnes, kilo- or million tonnes (e.g. 2.45 t, 7.6 kt, 12.4 Mt). When referring to precious metals such as gold, use troy ounces when referring to ore reserves, production rate and costing (e.g. 3.6 million ounces, $290 / oz).
- overburden and other uneconomic materials excavated as part of a mining system are usually reported in volumetric units of cubic metres (e.g. 1450 m^3). Often in surface mining this is stated in terms of in situ or undisturbed material volume expressed as bank cubic metres (bcm) (e.g. 2.8 x 10^6 bcm) as opposed to blasted or bulked volume.
- material production rates are usually reported on a time basis in units of mass for mine product (e.g. ore) and units of volume for other material (e.g. 67 t / h, 34.5 Mt / yr, 7200 bcm / shift).
- bulk density of a rock is usually reported in units of tonnes per cubic metre (e.g. 2.45 t / m^3, 3.2 t / bcm).

- blast hole diameter and length of a blast hole are usually reported in millimetres and metres respectively (e.g. 215 mm, 12.5 m).
- rock strength is reported in units of stress, usually megapascals (e.g. 18.6 MPa) and, applied force or load in newtons (e.g. 132 kN).
- currency is usually stated in a report in the local currency (e.g. $5.6 million, $4.3m). Note a space was inserted in the former value but not the latter, where lowercase "m" in this case is an abbreviation for million not mega. When dealing with commodity markets and exports, or when funds are to flow to/from overseas, then other currencies are often used such as U.S. dollars and Japanese Yen. When two or more currencies are used within the same report then either a prefix should be used to distinguish between the different currencies or the three letter symbol from ISO 4217:2015 be used (e.g. A$145m or AUD145m; US$6.2m or USD6.2m; ¥3.15b or JPY3.15b; €2 400 or EUR2 400).
- when dealing with percentages, use the symbol % when combined with a numeral (e.g. 6.4%) but use the term "per cent" whenever the value is written in full for example "ten per cent of …."
- computer digital capacity or size is expressed as a bit (b) for a binary digit and byte (B) for a multiple of bits, e.g. kilobit (kb), megabyte (MB), terabyte or 10^{12} (TB).

While use of the forward slash is often used to denote unit rate it should only be used with unit symbols (e.g. 67 t/h), otherwise use the term "per" with units (e.g. kilolitres per second). One exception sometimes used in industry is the abbreviation "pa" (per annum) when reporting annualised production rates (e.g. 34.5 Mtpa).

A list of commonly used units and abbreviations can be found in Appendix 5.

For further details on numbers and units of measurement see Chapter 11 in the *Style Guide*, Chapter 14 in the *Field Geologists' Manual* (AusIMM, 2012) and International Standard ISO 80000-1:2009.

Equations and symbols for mathematical variables

Symbols for quantities generally use letters from the Latin or Greek alphabet and are set in italic type.

Equations are generally indented or centred on a page, for example:

$$y = m\,x + b \qquad 1)$$

$$x = \lambda(h + f) \qquad 2)$$

Indent left tab can be used to align the left margin of equations.

Equations should be consecutively numbered as they appear in the report, with each number placed in brackets and set using a tab against the right hand margin.

Each equation should be referred to in the text of the report by its assigned number, for example "…as shown in Equation 1."

Visual information

Aside from text, other forms of communication are often used in reports such as illustrations (or figures) including graphs and photographs and, tables of information. A graph can be used to good effect to illustrate the nature of a trend or relationship between two variables.

Figures include a range of illustrations such as graphs, technical drawings, sketches, photographs, maps and plans. Figures are intended to aid in understanding of a concept or some form of interrelationship as discussed in a report. Graphs are a means of displaying measured quantities and can be particularly useful in communication by creating a visual representation of data. Tufte (1983) stated that "excellence in statistical graphics consists of complex ideas communicated with clarity, precision, and efficiency." He further stated that graphical excellence provides the viewer with "… the greatest number of ideas in the shortest time with the least ink in the smallest space."

Tables are a means of presenting data arranged in columns and rows. The data might be quantitative, qualitative or some combination of

both. They are used when the exact values of the data are important to the discussion.

Figures and tables should be included in a report to assist in the communication process. They are used to supplement discussion in a report or reinforce a particular point, and hence, they should form an integral part of a discussion. They are not to replacement for any discussion.

Hence, **each and every figure and table in a report must be referred to in the running text** of a report **and should be referred to by the caption number of the figure or table**.

The text should explicitly highlight to the reader the particular points that are intended to be illustrated in the figure or table; that is what information is intended to be conveyed by the table or figure.

When designing visual information, ensure clear but concise caption labels are provided for each figure and table.

Any symbol or abbreviation used in a figure or table must be explained in the report. Units of measurement in tables are usually contained within brackets in the column or row headings. Explanatory notes can be added directly under the table, usually in a smaller size font.

Tables

Table 10 illustrates the following points related to the layout of a table.

- Data in the table are arranged within cells that are divided into columns and rows.
- At the top of each column is a heading label to signify the variable or factor of the cells in that column together with an appropriate unit of measurement.
- The width of each column is adjusted to suit the content in the column.
- The content in some columns is centred while in others it is right-justified. When text is inserted in the far left column of cells, the content has been left-justified.
- The table is centred on the page.
- Lines are used to differentiate headings from data in the table. The use of shading and colour should be avoided.
- The caption description is succinct and conveys the meaning of the association between the different data. Captions are usually a descriptive statement to focus the reader's attention on a particular issue evident in the table.

TABLE 10
Properties of selected minerals.

Mineral	*Formula*	*Hardness (Mohr scale)*	*Density (t/m^3)*
Argentite	Ag_2S	2 - 2.5	7.3
Galena	PbS	2.5	7.4 - 7.6
Sphalerite	ZnS	3.5 - 4	3.9 - 4.1

Source: AusIMM (2012)

When a table is inserted in a report from another source, it is preferable to re-type the information rather than copy and paste into a report. Only if a good quality copy of a table is available should it be pasted into a report. Use of a poor quality reproduction should be avoided as it can be difficult to read, defeating the purpose of inserting the table, and detracting from the overall quality of the report.

Figures and illustrations

Each illustration should be selected to ensure the intended message is clear and unambiguous.

As in the case of a table, the quality of an illustration inserted in a report is important. If the image is of poor quality then it should not be used as the information intended to be conveyed might be confused or misleading. Instead in such cases, re-draw/graph the particular illustration.

The size of the figure in the report should be such that all the essential information is clearly legible to the reader.

Colour can often be effectively used to differentiate or highlight particular points in an illustration. But this only applies if the report will be printed in colour! Colour should be used judiciously as overuse can sometimes distract the reader.

The use of grey scale and different line types (thickness, solid/broken lines etc) can often be applied to the same effect as colour.

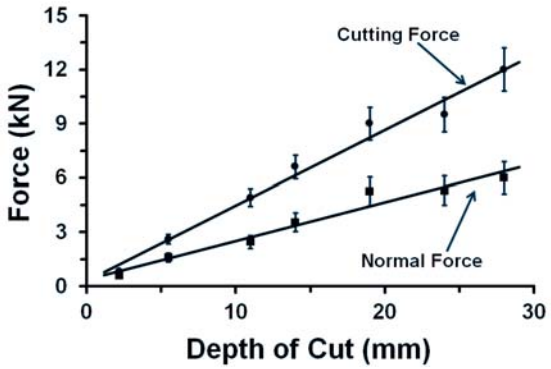

Figure 1. Variation in the forces acting on a cutting tool with depth of cut.

The graph shown in Figure 1 illustrates the following points.

- The graph is centred on the page/column.
- The independent variable is shown on the *x*-axis of the graph and the dependent variable shown on the *y*-axis.
- Both axes are labelled with units of measurement clearly indicated.
- A bold sans serif font has been used to give added emphasis to each of the axis labels. The font size is not too large as to be out of proportion with the rest of the graph.
- Values are shown on both axes to indicate scale. The upper and lower limits of the range for each axis have been selected to make full use of the graph area and to clearly show the nature of the relationship. Again a sans serif font was used for the values but without bold and is slightly smaller than the axis label.
- A sufficient number of tick marks have been placed along each axis to indicate the scale without unduly cluttering the axes.
- A line of best fit has been added to show the nature of the underlying relationship rather than a line drawn from point-to-point.
- Each of the two straight-line functions in the graph is differentiated by a label.
- As multiple measurements were made at each level of the independent variable, the average value of the dependent variable is shown together with a corresponding range indicating the magnitude of the standard deviation.

Plans and drawings

In the case of plans, maps, charts and technical drawings of equipment there is an additional set of requirements. These types of illustrations should include a scale, legend for the different symbols used in the illustration and where appropriate, a north direction indicator.

It is optional whether to enclose illustrations within a border that designates the limits of the illustration on the page.

The geological plan shown in Figure 2 includes information that is necessary to identify the location of the mine, an insert locality map; a scale; arrow indicating direction of true north; longitude and latitude; and, a legend indicating the different stratigraphic formations used in the plan.

Figure 3 is an isometric perspective of the development and excavations in an underground mine. Labels have been added to identify the different elements surrounding the stope.

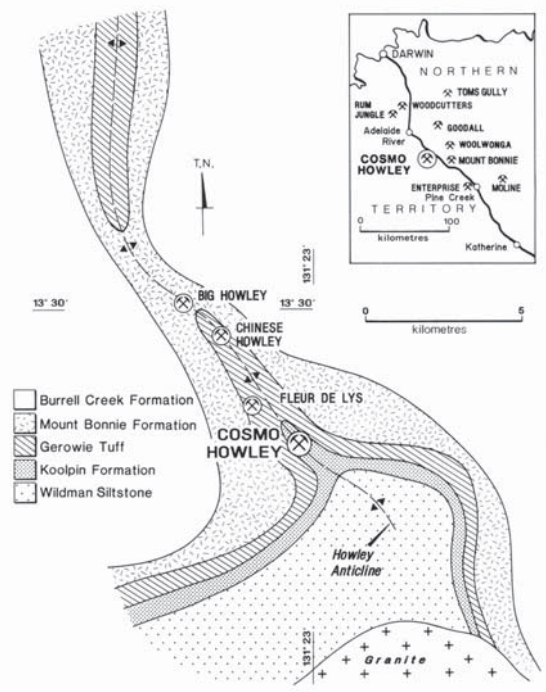

Figure 2. An example of a map or plan (Gloyne, 1993).

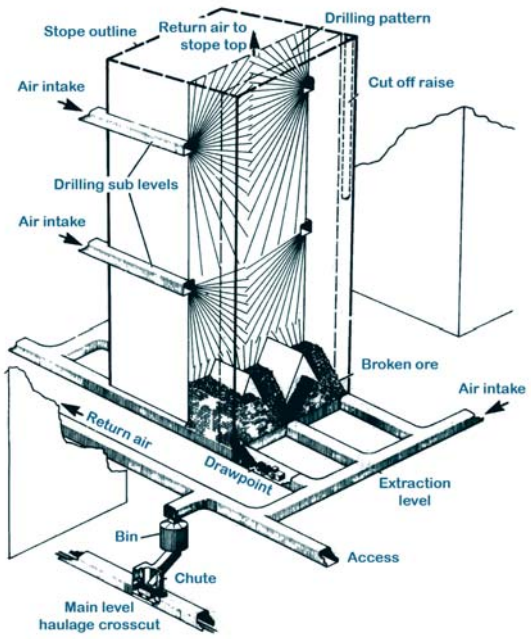

Figure 3. An example of a sketch or line drawing (after Hall, 1993).

Generally, technical drawings of equipment or their components should also include the angle of projection, the date drawn/last modified and the name of the person who drafted and/or authorised the drawing.

Large illustrations can be printed in landscape format on the page. In this case they should be placed so that the top of the illustration is aligned closest to the binding.

Even larger illustrations such as spreadsheets and mine plans can be printed on large format paper for example A3 size then folded and placed in an appendix.

Captions for figures and tables

Figures and tables should, as far as possible, be self-contained in terms of highlighting a particular point for the reader's attention. A caption plays an important part in achieving this and so **a caption must be attached to every figure and table in a report.**

The caption for a figure or table has two parts: *a number,* and *a concise summary or description*.

It is customary to consecutively number separately all figures and tables in the order that they appear in the report (e.g. Table 1, Table 2 and, Figure 1, Figure 2 etc). The description in the caption should be of sufficient detail as it concisely explains the information contained in the figure or table. The full explanation should be provided in the text of the report.

As a general rule, captions for figures and tables are centred on the page whereby:

- **captions for tables** are **placed above the table** as for example shown in Table 8; and
- **captions for figures** are **placed below the figure** as for example shown in Figure 3.

Every figure, table and equation in a report **must be referred to by its caption number** in the text of the report. Do NOT use expressions such as "…refer to the figure above…as the following figure shows…see Figure 1 below" etc. This is not only redundant but with later editing may lead to mistakes as the location of the figure/table may change relative to the text.

It is always desirable to place the figure or table in close proximity to and preferably immediately following the paragraph where it is has been referred to in the text of the report.

As with section headings, when referring to a particular figure, table or equation caption number, the label should be consider as a proper noun. Hence the first letter of figure, table and equation should be capitalised, for example "…as shown in Figure 1…the data in Table 4…the calculated value of Equation 6." In some publications, the editors may require an abbreviated form of the label to be used, however in a report the full unabbreviated word should be used.

As with values and units, it is good practice to **insert a non-breaking space** (*Ctrl-Shift-Space*) between the label (Figure, Table Equation) and the caption number.

When copying a table, figure or equation from another publication, **do NOT paste the original caption into a report**. The original caption is unlikely to be compatible with both the numbering system and formatting used in the report. Instead

key in a new caption for the table/figure/equation with the format in keeping with the rest of the report.

Acknowledgment of sources

As with the case for sentences and paragraphs, the original source of each illustration and table placed in a report must be acknowledged, no matter whether it is a direct or modified copy of a illustration, table or other material.

The following conventions are used when citing a reference.

- *Table:* the citation is placed directly under the table using an expression such as "Source: Smith (1994)." The citation is often written in a slightly smaller font say 8 or 9 point as shown in Table 10.
- *Figure:* in the case where the illustration is a copy without any changes then the reference follows immediately after the figure caption within brackets in the form "(Gloyne, 1993)" as shown in Figure 2. If changes have been made or the illustration is redrawn then add the word "after" before the citation for the original illustration, for example "(after Hall, 1993)" as shown in Figures 3.

When citing a reference source, it is preferable to always cite the original or primary source of the illustration especially if it has not been altered rather than any secondary source such as material appearing in a course learning guide.

006: Report style

Scientific and technical writing differs from literary writing in a number of ways. Primarily, the aim of technical writing is to inform the reader rather than to entertain. Hence the writing style should be simple, concise and objective.

The *Guide to Authors* recommends to "where possible, use the present tense; use of the past tense…should be kept to a minimum consistent with the context." Regarding the latter, this would be appropriate when discussing what was done and the results of a study.

It would be appropriate to use the present or future tense for example when describing the constraints to a project (present tense), detailing the general conclusions or learnings of a study (present tense) or, outlining the recommended actions to be undertaken in a project (future tense).

Objectivity — aim to be impartial

Since the primary goal of the report is to inform, emotive language should be avoided.

The student is advised to convey information as objectively as possible. For example, a literary sentence might be written as:

"The wind was blowing fiercely and the air outside was getting cooler."

Whereas a scientific or technical style would more likely be written as:

"The wind velocity was 45 kph which reduced the air temperature to 15°C."

Be concise

Being concise refers to both word selection and sentence structure.

Word selection

Use words and expressions economically. If you can use one word instead of two or three, then choose the one word. Often the single word is more precise and more suited to a written context, and a two-word phrase is usually an idiom and open to multiple interpretations. For example, use "avoid" in preference to "get around" and "investigate" in preference to "look into."

Further, while the style of report writing tends to be formal, avoid bombastic and overly extravagant language. This is often a trap for new writers.

The intent of the report might be, for example, to convey to the reader the writer's knowledge of a subject area and/or to demonstrate their ability to analyse and synthesise information; that is the emphasis should be on the content with the report being a means to convey this understanding.

Sentence structure

Avoid long sentences. Sentences with four or more clauses (or parts) can make the message or intent less apparent if not confusing to the reader. Your text will often read better if you consider making two shorter sentences rather than one long sentence. If you need to include some qualification or an example then a long sentence might be acceptable.

An example of a long sentence is:

"After consulting three manufacturers: Brown and Co, Green Ltd, and White Industries Pty Ltd, we found two types of vibration suppression devices for the driver's seat in a haul truck and both are simple in design but have inherent shortcomings."

A more concise statement might read as:

"Three manufacturers were consulted: Brown and Co, Green Ltd, and White Industries Pty Ltd. Two vibration suppression devices were identified for the driver's seat in a haul truck. Though each design is simple both have inherent shortcomings."

Similarly, avoid long paragraphs and especially one long sentence paragraphs. A simple but effective rule is that *each paragraph should only address one theme.* The theme should be introduced in the opening sentence, developed in the body of the paragraph with a concluding remark made in the final sentence.

Avoid colloquialisms

In most instances report writing requires a formal style of writing. This differs from the choice of words and patterns of speech used in everyday conversation and this should be avoided in a report. This includes expressions otherwise known as colloquialisms such as "…it can clearly be seen that…" and "…it is generally understood that…"

Do not discriminate

Discriminatory/sexist language must be avoided when talking generally about people. Nondiscriminatory language helps to avoid stereotyping, patronising and demeaning people on the basis of their gender, status or ethnicity. This point will be just as important as a professional engineer when in the workplace. Some examples of discriminatory language and the acceptable neutral terms are provided in Table 11.

First person or third person?

The strong preference is to use the third person whenever writing a technical report. This means that whenever possible, avoid speaking directly to the audience and avoid use of personal pronouns (i.e. I, me, we, us, our). This is probably the hardest aspect of report writing to master and for many people will take much practise to perfect.

The goal is to adopt a writing style that creates a formal and objective tone in a report. This is intended for several reasons. First, this writing style creates a sense that *the writer is separated*

Table 11
A list of some discriminatory terms that should be avoided and the preferred alternatives.

Instead of...	*Use in preference...*
workman	operator/employee
(to) man	staff/operate/use/work/direct
man hours	operating hours/working hours
man power	staff/workforce/personnel
men on machine	person on machine/operator on…
tradesman	maintainer/tradesperson/carpenter…
workmanship	work skill/skill/quality of output
chairman	chairperson
foreman	supervisor/superintendent
businessman	business executive/business person

from the subject matter, that the writer has objectively analysed the information. This is to minimise any perception of apparent bias or ownership that might otherwise be seen as having influenced the conclusions presented in a report.

The aim would be that on the face of an objective analysis of the information presented in the report, any reasonable person would have come to a similar conclusion.

Secondly, it is intended to separate the writer from the reader by avoiding use of emotive language that might otherwise unduly influence the reader.

Unlike what can sometimes occur in other forms of writing, *a report should focus on conveying factual information* rather than expressing personal opinion. The information should be backed up by data, analysis, modelling and reference to other supporting information.

An often used expression that is apt in this context is "the facts should speak for themselves." Be aware though that different conclusions might be reached depending on what combination of facts are presented to the reader and how they presented. To avoid the report from being seen as been biased requires all known facts to be presented unless the reasons for being selective are clearly stated.

Sometimes an awkward sentence structure can arise when writing about actions and events without referring directly to who or what was involved. In such cases choose a sentence structure that gives the most clarity and conciseness. For example consider the following three sentences:

"It was observed that the deviation was large."
(passive, person unknown)

"A large deviation was observed."
(passive, person unknown)

"The engineer observed a large deviation."
(active, person known)

The first sentence is ambiguous and wordy. The second sentence is concise but who observed the deviation? In the third sentence it is clear who did what.

If it is important for the reader to know that you or a member of the project team performed some task or holds a particular opinion, then use the first person in an active clause.

These aspects of writing style are illustrated in Tables 12 and 13.

Be clear

Avoid being unclear and ambiguous. This can happen when you do not specify what you are writing about and can even depend on how you use words such as 'it', 'this', 'thing', 'way', 'someone' etc as illustrated in the following sentence.

"Day (1983) suggested a new way to make a clear TiO_2 solution."

The word 'way' is vague and should be replaced with 'method', 'procedure', or 'technique'.

Be correct

Check your spelling, punctuation and grammar are correct. If using a spell checker, be careful which word *you* select. Many inconsistent and easily corrected errors will affect the report's overall presentation.

Proof reading of a report is essential. Often though errors or ambiguities in writing become more apparent if the draft report is left for a few days and then read. This is called 'the bottom-draw treatment' referred to in an earlier chapter.

TABLE 12
An example of a "wordy" piece of writing.

MINING METHOD

It was considered pertinent to consider the broader issues of ore extraction method before investigating the access alternatives. Indeed it would have been remiss not to do so. Without going into extensive detail, it is considered that mining could be performed utilising 4 levels, long hole drilling from above and below and open stoping (nominally 15 m by 15 m stopes) between levels…

Lecturer's Comments
Some wordy statements and phrases (shown underlined) can be eliminated. Also the first two sentences sound too formal. This is due to the use of wordy third person passive structures.

Many universities have a department assists students improve their communication skills and provides useful resources. For example, the Learning Centre at UNSW has many online resources on topics including punctuation, grammar and spelling that can be used to improve written expression.

Check for jargon

Jargon comprises technical language, terms and acronyms that are related to a particular discipline, field of study or activity. It can be used effectively when communicating with others who work within that discipline. However, problems in communication are likely to arise when jargon is used in a report that will be read by a more general audience.

Jargon can also include sub-technical words. This can lead to confusion as some words will have a different meaning depending on the context.

Different disciplines can place a entirely different meaning on the same term. For example, the word 'fast' has a specific meaning in medicine (resistant to) that is different to its use in mining (a hard stratum under poorly constructed ground) and painting (colours not affected by light, heat, or damp). To an engineer, stress and strain relate to the internal mechanics of a material subjected to a force whereas it has an entirely different meaning for a person with a medical background and to a botanist.

Always endeavour to write for your intended audience. If the report is for your supervisor or professional colleague then use of jargon might be both appropriate and expected. If, however, you are writing a report for a more general audience, jargon should be avoided and instead simple, clear descriptions should be used.

Engagement of the reader

You may have noticed that the style of writing used in this document conflicts with the earlier statements on writing style.

In this document, the writing style has been deliberately altered in some chapters. Often the style chosen though is more personal with the intention of better engaging the reader.

To illustrate how the same message can be written in different styles, consider the following three passages related to the same subject. Though the message is the same, there is a distinct difference in the level of warmth and engagement between the three versions.

TABLE 13
An example of a "clear" piece of writing.

Lecturer's Comments	**RISK MANAGEMENT PLAN**
This section of text is easy to read. Each point is expressed simply and clearly. Other strengths in the text include: • *the points follow the Parallel Rule;* • *the points are logically sequenced; and* • *the sentences are clear and concise.*	The specific objectives of the plan are as follows. a) To provide a framework for management to address major risks associated with both options as determined by previous risk reviews. The Risk Management Plan will therefore include: • the key areas to be addressed; • the actions to address the key risk areas; • the roles and responsibilities within relevant organisations; and • the means for monitoring and review of the actions. b) To provide a document that has practical value to persons involved in its implementation and is suitable as an introduction to the driving of a decline. c) To provide the initial basis for The Risk Management Plan, for which detailed content can be updated to accommodate any future requirements arising from changing circumstances or improved knowledge. In other words, the document is intended to be 'live' and reflect changes when needed.

Current report style:

"This document has been prepared to help you, the student, to write better reports. It is not intended to constrain your creative talents but to outline the accepted norms and standards of structure, format and style used in technical report writing."

A technical report style:

"This document has been prepared to help the student to write better reports. It is not intended to constrain the student's creative talents but to outline the accepted norms and standards of structure, format and style used in technical report writing."

An alternate technical report style:

"This document is intended to improve the quality of report writing; in so doing it is not intended to constrain creative talent. The document outlines the structure, format and style used in technical writing."

Lists of information

Reports frequently use lists to clarify and/or to emphasise information. They are also used to succinctly summarise information. There are several ways to form a list in a report; three of the more common forms are featured.

The first form is as a continuous sentence. In this case, each item in the list begins with a lower case letter and ends with appropriate punctuation as shown in the following example.

A Ross chain feeder was chosen because
- previous experience was satisfactory,
- evacuating costs were less, and
- an over-type feeder required less maintenance.

The second form of a list is a collection of individual sentences. The opening sentence ends with a colon and each subsequent line finishes with a semi-colon as shown in the following example.

The trucks had three distinct features, these being:
- the tipping wheels are projected;
- the doors are rigidly attached to the suspension arms; and
- the suspension arms are anchored to the chassis.

The third form of list is an inventory. Here each item in the list begins on a new line with a lower case letter with no punctuation until the end.

The equipment required for efficient operation is listed below.
- wide throat 200 mm idler blocks
- 12 V sealed beam lights
- screens to protect the operator.

There should be a logical order to the sequence of items in the list. This could be moving from general to specific, most important to least important, largest to smallest component, and so on. A numbered list is useful if a sequence or series of steps applies to the points in the list.

Parallel rule

To ensure lists and bullet points score well on the readability index then consider applying the *Parallel Rule.*

The Parallel Rule involves using a similar grammatical pattern in making a list. The writer begins each new item in the list in a similar manner. In Table 13, points a), b) and c) each begin with 'To provide …' The bullet points under point a) also share a similar grammatical pattern each beginning with a definite noun '*the* key, *the* actions, *the* roles' and so forth.

Spelling of technical terms

As with many professions, a range of specialist terminology has evolved over time. For example, the terms used to describe the different means of accessing an underground operation include an adit, shaft, drift and decline while a layperson might just use the term tunnel.

Unfortunately for new entrants to an industry use of some terms can differ between different sectors in an industry. For example, the overhead surface in an underground excavation is termed "roof" in coal mining whereas "backs" is used in hard rock mining. Aside from different mining sectors, terms can vary geographically, for example to undertake mineral exploratory activities in New South Wales, an Exploration Lease is required whereas in Queensland, an Exploration Permit is needed. Again, it is important to select the correct term appropriate to the context and the audience.

The internet can provide links to many technical dictionaries, glossaries and other resources that can explain many of these terms.

Appendix 4 contains examples of the correct spelling and hyphenation of many technical terms used in the mining industry; for example terms such as ore body or orebody, in situ or in situ, cutoff grade or cut-off grade; in each case the latter is the recommended spelling according to the *Guide to Authors*.

Shortened words and phrases – abbreviations and acronyms

In general, abbreviated forms of words and phrases such as NPV and W.A. are often used in formal report writing. However use of grammatical contractions such as don't, can't and it's are discouraged in reports as these are 'spoken forms' of expression. In formal writing as required at university and in many workplaces, non-abbreviated forms of expression should instead be used (e.g. does not, cannot, it is).

Abbreviations consist of the first few letters of a word but without use of the last letter in the word. While abbreviations are usually terminated by a full stop/period, the *Guide to Authors* recommends following modern convention by using minimal punctuation, for example Co (Company), min (minimum) and Vic (Victoria). Note if the abbreviation ends the sentence as in the last sentence (Vic) then a single full stop is still applied as usual.

Contractions like abbreviations are a shortened form of a word but consist of the first and final letters of a word and do not require a full stop, for example Ltd (Limited), Rd (Road), Qld (Queensland).

Phrases that are referred to more than once in a report can also be shortened. One method of shortening, called an ***acronym***, consists of the first letter of each word formed so that *the shortening is pronounced as a word* such as JORC (Joint Ore Reserves Committee) and ACARP (Australian Coal Association Research Program).

An alternate form of shortening of a word or phrase is called an ***initialism.*** The convention is that whenever an initialism is used for the first time in a report then *the word or phrase name must be written in full followed immediately by the shortened form enclosed within brackets*. Subsequently, only the abbreviated form is used in a report. Ordinarily each letter in an initialism is capitalised. Unlike an acronym, *each letter is pronounced separately* such as EIS (environmental impact statement), IRR (internal rate of return) NPV (net present value) and UNSW (University of New South Wales). An example of an initialism in a report is illustrated in the following sentence.

> *"…the mine uses load haul dump (LHD) equipment underground for materials haulage…The mine haulage fleet consists of ten LHDs…"*

Symbols are another category of the shortened form of words and concepts that include for example "&" and "@." Except for units of measurement, there use is largely discouraged in the text of a report, however they can be used where space is limited such as in the column headings in a table. See the section *Symbols for units of measurement* in Chapter 5 for further details on symbols and measurement.

There are other shortened forms of a word or phrase that do not follow any of the usual conventions but are in common use in certain industry sectors. For example the term "ytd" is similar to an initialism but it is not necessarily capitalised. This term is pronounced as year-to-date rather than each letter read out separately as would be the case of an initialism. These terms should be treated as a symbol and not used in the running text of a report but restricted to use in tables.

Another category includes the shortened form of Latin words and phrases. This includes for example:

- c. (*circa* – about or approximately);
- cf. (*confer* – compare);
- e.g. (*exempli gratia* – for example);
- etc. (*et ceteria* – and so forth, and so on);
- i.e. (*id est* – that is);
- v. or vs (*versus* – against); and
- viz. (*videlicet* – namely).

The use of this category of the shortened form is again discouraged in the running text of a formal report. But as with symbols they are acceptable where space is limited as in tables or when enclosed within brackets (e.g. the many examples provided in this document).

Regarding punctuation, when using abbreviations, the *Guide to Authors* recommends using minimal punctuation except to indicate the end of a sentence.

For further detailed discussion on capitalisation, plural and possessive forms, punctuation and other categories of the shortened form such as time and geographical features, see Chapter 10 in the *Style Guide.*

Appendix 5 contains a list of some commonly used abbreviations in the mining industry.

Punctuation

Minimal use of punctuation is often preferred and has become the norm in report writing. Understanding when and how to use punctuation helps you express ideas clearly. Some examples of the correct use of punctuation are provided in Table 14.

TABLE 14
Punctuation conventions.

Name	*Symbol*	*Function*	*Examples*
Full stop	.	To mark the end of a sentence.	The overburden is comprised of soft shale with a strength of 25 MPa.
Colon	:	To introduce a list. Begin the list on a new line with a bullet point for each item in the list and a semi-colon at the end of each line.	Worksite inductions are important for three reasons: • in an emergency …; • a fire would…; and • newly 'inducted' workers…
Comma	,	Separates information into readable units. Such uses include • after introductory phrases • around relative clauses giving extra information • between separate items listed in a sentence.	The Eocene coals, which formed in an extensional structural setting under a transgressive depositional environment, are characterised by higher levels of ash and sulphur, and by generally thin or intermediate seam thickness, typically four to six metres in the economic deposits. (Friederich, Langford and Moore, 1999)
Apostrophe	'	Used to indicate ownership (whose) with nouns.	• the miner's hat can be found… • ABC Ltd's safety officer has…
Quotation marks	"…"	Indicates that the words enclosed in the quotations are from another source and are quoted exactly as in the original source.	Brake and Bates (1999) believe that these seams "may have resulted from the domed typography".
Hyphen	-	Joins two words to create a single idea. Used when the spelling of two joined words would be awkward or obscure the meaning. Use only when necessary.	• free-settling particle • liquid-solid separation • sink-float system

007: Referencing in a report

When must material be referenced?

Whenever information or other material placed in a report was obtained either directly or indirectly from a textbook, journal, conference paper, another report or any other source then sufficient details must be provided to allow someone, if required, to locate and confirm the authenticity of that material.

This requirement encompasses *all types of information* whether it is a direct quotation, paraphrased or summarised information; a sketch, plan and other types of illustration; or, numerical data and tables.

Why must I reference material?

Referencing is the general term used to describe the process of providing the source information. It is usually done in a systematic manner and is intended to acknowledge the origin of the material used in the report.

Importantly, this should be viewed in a positive sense by students, as *referencing provides a mechanism to demonstrate the student has undertaken research* on a particular topic which is often one of the objectives of an assignment.

On the other hand, if a student does not acknowledge the source of material in a report or other student assignment then the implication is that it is the student's own original material.

This latter situation if found to be incorrect in that it is not the student's own work then this is termed plagiarism. This is a serious form of academic misconduct that can result in severe consequences for the student.

What is plagiarism?

Plagiarism is defined as

> *"…using the words or ideas of others and passing them off as your own"* (UNSW, 2017a)

Some examples of plagiarism include copying, inappropriate paraphrasing, collusion, inappropriate citation and self-plagiarism (UNSW, 2017a).

> *"Plagiarism is a type of intellectual theft… (it) can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. Consequently, whenever you use the words or ideas of another person in your work, you must acknowledge where they came from." (UNSW, 2017b)*

Acknowledging the work of others is a practise that you are expected to follow while at university and, to continue to follow this in your professional career. Referencing is a part of good ethical behaviour in respecting the moral rights of ownership by others of their intellectual property.

Student code of conduct

Each university has an expectation of student behaviour often defined in a policy statement. For example, at UNSW this behaviour is defined in the *Student Code of Conduct* (UNSW, 2017c). It is expanded in the document titled *Ethical Use of Scholarly Material* (UNSW, 2017d) that states in part:

> *"Students must observe academic conventions in the ethical use of the materials of others. Maintaining standards in scholarship requires a commitment to scholarly values. Among such values is the adherence to ethical behaviour.*
>
> *Many aspects of ethical behaviour come together in the process of research and, in particular, in the use of scholarly materials. In the interests of maintaining high standards in scholarship and research, the University reminds students that when they are completing assignments, conducting research and writing theses, they are ethically bound to:*
>
> - *Cite the published source, to acknowledge the originator of substantial ideas upon which they are building their work, and to acknowledge quotations by the use of quotation marks*
> - *Refer to, or use unpublished scholarly materials only with the appropriate consent, and to acknowledge the source of the materials if that consent is given*
> - *Refrain from plagiarism with its multiple facets…* (UNSW, 2017c)

Further information on plagiarism

Every university has similar codes of conduct that can be accessible on the university website. For example, students enrolled at *Curtin University*, can find links to relevant information on plagiarism at:

> Academic integrity at <http://academicintegrity.curtin.edu.au/index.cfm>

Students enrolled at *UA* will find relevant information at:

> Academic honesty policy at <https://www.adelaide.edu.au/policies/230>

While students enrolled at *UQ* will find relevant information at their university at:

> Academic integrity and student conduct at <https://my.uq.edu.au/information-and-services/manage-my-program/student-integrity-and-conduct/academic-integrity-and-student-conduct>

Which sources of information provide good reference material?

While students are encouraged to seek out information from various sources, not all information sources necessarily provide reliable or independently verified information.

As a student, you must be discerning in your choice of information sources used in a report. You should avoid selecting the first or most easily accessible piece of information that readily comes to hand such as material on the internet.

Identifying sources is only part of the process of information gathering, you must also assess the reliability of the source.

You need to develop the skills necessary to *identify which are likely to the more reliable information sources*, much of which comes with experience. The objective being to identify those sources where the information has undergone a process of independent verification preferably by an appropriately qualified person(s).

In order to assist you in this task, a five star rating scheme has been developed ranging from **5 Stars** for *the most reliable information sources* to **1 Star** being the *least likely reliable sources*. Underpinning each category in the star

rating is a set of criteria with examples provided. You are cautioned against blindly following the scheme as by necessity some generalisations have been made which might not apply in every circumstance.

What is more important is that the you understand there are *differences in the reliability of information* and in the end you must apply their own judgement to determine which are the most appropriate sources to obtain reference material for use in a report.

Five stars rating

By definition the top rating category is reserved for those sources of information that are usually found to be the most reliable. These sources will have well developed systems in place to ensure the information provided has been reviewed, the methods used to obtain the results are transparent and there is a lack of any undue influence on the conclusions and outcomes and, all this has been independently verified.

Within this category are the scholarly journals. These will have an established independent peer review process in place to critically review material before its publication; independent here meaning independent of the author.

Some examples of such journals include *Nature, International Journal of Rock Mechanics and Mining Sciences, AusIMM Bulletin, CIM Bulletin, Mining Engineering* (published by the Society of Mining Engineers, SME), *International Journal of Mining and Mineral Engineering* and *Journal of Rock Engineering.*

The same level of reliability can often be attributed to books distributed by commercial publishers. These too will generally have well established review and editorial processes in place. This category includes the most reliable sources of information for use as reference material in reports and assignments. Because of this association, the information is generally regarded as being authoritative and the publications termed refereed journals and books.

Four stars rating

Next rung on the rating's ladder is information provided in published conference proceedings which are organised by professional bodies and learned societies. These conferences will have a panel of independent reviewers who are usually specialist in their field that examine each work before it is published in the proceedings. Hence the term refereed conference proceeding is used.

To ensure transparency, the names of the reviewers are usually listed in the proceedings. Examples of such conferences are those organised by or under the auspices of the *AusIMM, SME, International Society of Rock Mechanics* (ISRM) as well as universities and the specialist conference organisers such as the *Application of Computers and Operations Research in the Mineral Industry* (APCOM) and, *Mine Planning and Equipment Selection* (MPES).

Also included in this category are universities, research and other similar organisations. Often the information from these organisations is published in journals, conference proceedings and/or books but it can also be made available directly by the organisation in the form of reports of investigations or project reports. Usually these organisations will have established internal review processes involving relevant professionals to vet the information before it is released. This material is often available to the public and can be found in major libraries. Here there is an onus on the organisation to ensure the information made available is reliable and credible as it can reflect on the reputation of the organisation.

Examples of these information sources are reports by the Australian Coal Association Research Program (ACARP), the Minerals and Energy Research Institute of Western Australia (MERIWA), CSIRO, as well as governmental departments, authorities and institutions. This also includes university theses (Honours, Masters and PhD).

Three stars rating

This category is reserved for those sources which either have not been independently reviewed;

or, lack transparency about the veracity of the information.

These factors could be due to commercial, strategic or marketing considerations.

But again this is balanced by the potential negative impact on the organisation's reputation. As well, the information released into the public domain can be subject in some instances to scrutiny by regulatory bodies. Hence for the most part the information should be reliable and can often be used as reference material but care should be exercised when using it.

This category includes trade journals and magazines which can include advertising material. These are usually only reviewed by the magazine editor who may not be an expert on the topic. The category also includes publications from companies and non-refereed journals and on-line journals. Examples include company annual reports and internal reports. *While often useful the information needs to be cross-checked. Citing additional, preferably higher ranked, sources is recommended.*

Two stars rating

This category includes sources containing what appears to be technical writing including papers and reports but where there is no apparent system of independent review of the information. The implication being some or all of the information may or may not be correct.

Typically this will include sources on the internet belonging to an individual or unincorporated organisation. It also includes unpublished papers or reports and, papers from conferences that have not been peer reviewed.

Since there can be a question as to whether the information has been independently verified, its reliability for use in reports and assignments is questionable. These sources are not generally recommended to be used as principle sources but if they are used then **the information should not be used in isolation** but preferably supported by citing in combination with other more authoritative, higher ranked sources.

One star rating

The final ratings category includes open or collaborative sources of information prevalent on the internet such as Wikipedia and social media. More often than not the processes of verification are not always stringently applied if they exist at all. Hence the information can be unreliable or perhaps misleading. While these sources might be useful in providing background information they should not be cited in a report.

This category also includes sources that cannot be attributed to either an individual, group or organisation and where no details are provided about where or how the information was obtained. An example of this might be a web page which has no affiliation to a company/ organisation and/or no contacts and/or contains links to advertising material.

As the information may be incorrect, plagiarised and/or poorly written, these are the least reliable sources and **must not be used as reference sources** in a report.

Implications for students

Before the advent of the internet, the range of reliable information sources was usually limited to books, journals and conference proceedings making the process of filtering information fairly straightforward even though getting access to the information was often very time consuming.

Now as information is more readily accessible on the internet and search engines can quickly point to related information using keywords, the process of gathering information has been greatly simplified. In fact it could be said the pendulum has swung so far to the other extreme and that perhaps there is now a state of information overload with a huge variety of potential reference sources available some often being a rehash of the same information but which also includes less reliable information.

So much so that you must now spend a large period of time filtering out unreliable sources and distilling the relevant elements for your report.

In summary, when preparing a report you must:

- be discerning in your choice of information sources and recognise that not all sources are equally reliable.
- select only those highly ranked and reliable sources of information for use as reference material in your report.

How should I reference material in a report?

The most common method used in science and engineering publications to acknowledge the source of material is the **author-date system** or the Harvard system, though the former term is favoured.

There are many variants of this system in use each exhibiting minor differences. Many of these have been developed by professional societies, institutions and publishing houses.

One variant recommend for use in *MEA* courses is based on the *AusIMM* system as detailed in the *Guide to Authors*. The student should confirm which system is recommended for use in their studies.

What information must be provided when referencing?

As with many referencing systems, there are two parts to the system. The first is the in-text citation of the reference source contained in the body of the report—the author and year. This citation provides a link to the full bibliographic details of the publication listed in the references section at the end of the report.

Citation in the body of a report

A citation consisting of the family name of the author or authors and the year of publication placed near to where the material is used in the report.

Depending on the structure of the sentence, the names of the author(s) may or may not be enclosed within round brackets while the year is always placed within brackets. Some examples of the author-date referencing system in a report are as follows.

- Single author
  "Following analysis of the results of the core cuttability test work, Roxborough (1988) found a correlation between..."
- Single author - alternate
  "…a reasonable prediction as to the performance of a roadheader machine (Roxborough, 1988)."
- Up to and including three authors
  "…Rogers, Jones and Hart (1978) confirmed the inverse relation between…"
  Note: the names of all three authors are included in the citation.
- More than three authors
  "…when making measurements with the Schmidt Hammer (Golder *et al*, 1982)."
  Note: only the name of the first author is stated followed by the term *et al* in the citation. See the later section titled ***Multiple Authors*** for further details.
- Multiple sources of information
  "…the forces in cutting vary with penetration (Roxborough and Phillips, 1974; Bilgen, 2003; Hood, 2003)."
  Note: each citation is separated by a semicolon and sorted by year then name.
- Author and page numbers
  "Following analysis of the results of the core cuttability testwork, Roxborough (1988, p 24) reported…"
  "…in taking measurements with the Schmidt Hammer (Golder *et al*, 1982, pp 45-47)."
  The latter form of in-text citation is used when it is necessary to highlight a particular section in the reference source.

Publication details in references list

The second part of the referencing system is the full bibliographic or publication details of the reference source. These details are listed within the references section of a report. In order to make it easy for the reader to find a particular reference, **the reference list is always sorted first alphabetically by author** and then by year of publication; see the section on ***References*** in Chapter 4.

Using some of these examples of in-text citations, the corresponding full bibliographic details as they would appear in the references section of a report would be:

Golder, A B, Outter, S, Edwards, R, Williams, B and Foulter, D, 1972. *Rock Properties and Their Characterisation*, 684 p (Pelican Books: London).

Rogers, F, Jones, K L and Hart, S M, 1978. A study of factors impacting on rockbolt anchorage, *Int. J. Rock Mech. Min. Sci. and Geomech. Abstr.* 16(3):21-27.

Roxborough, F F, 1988. The cuttability of rock in the Sydney Region, in *Proceedings Tunnelling Australia*, pp 34-42 (The Australasian Institute of Mining and Metallurgy: Melbourne).

These reference sources are examples of a book, journal article and conference paper respectively, the latter usually published in the proceedings of a conference.

What must be included in a references list?

A reference list

The list must only contain details of reference **sources that have been cited in the report**. If no citation is stated in the body of the report then it is not a reference.

The bibliographic details must include the names of all authors hence the term ***et al* should not be used in a reference list**. Hyperlinks to publication details that are usually evident by the words being underlined or in a different colour font must be removed. To remove a hyperlink from a reference list, first highlight the hyperlink then right-click and select *Remove Hyperlink* from the list of available options.

A bibliography

Occasionally, an assignment might require the student to include a list of readings or other information sources that may have been referred to when preparing an assignment. These readings though may not have actually been cited in the assignment. In this case, the publication details should appear in a separate section headed Bibliography.

A bibliography is not a substitute for a reference list. It is not found in technical reports and would only be included in student engineering assignments when specifically required.

Primary and secondary reference sources

The primary source is the original or earliest dated source in which the particular piece of information under discussion was first published. It is always **preferable to cite the primary reference source** in a report.

In some instances, the citation in a document may point to an earlier work by the same or different author containing the information, this is called a secondary source.

While it is preferable to find and confirm this information in the primary source, it might not always be possible such as in the case where the original publication is now out of print or no longer publicly available or, where the information is written in another language.

The following are two examples of citing a secondary source in a report.

"…acoustic emissions are generated in a material when it is subjected to stress (Kaiser, cited in Hardy 1981)…"

"Kaiser (cited in Hardy 1981) stated that acoustic emissions are generated in a material when subjected to stress…"

The corresponding bibliographic details in the references section would contain details of the secondary author, for example

Hardy, H R Jr, 1981. Application of acoustic emission techniques to rock and rock structures: a state-of-the-art review, in Acoustic Emissions, in *Geotechnical Practice*, STP 750, pp 4-92 (ASTM).

Some examples of referencing

Two examples of in-text referencing are provided in Table 14. The paragraph that includes a reference to the work of Brake and Bates published in 1999 is an example of a *direct quotation* with words from the referenced material enclosed within quotation marks. While

the paragraph referring to work on Eocene coals is an example of *paraphrasing.*

Even when you summarise ideas or concepts from another source in your own words (i.e. paraphrases) you are still required to reference the source. Two examples of how to reference paraphrased information include:

"Keilblock *et al* (1998) simulated an ERS door being opened 30 times…"

"The oldest known sediments with reliable dates are of middle Eocene age (Hutchison, 1996)."

The following sections provide examples of referencing different types of information that can sometimes be found in reports. You should note the order and formatting in which the publication details are presented including font styles and, use and positioning of punctuation marks. These must be followed verbatim.

Further examples on referencing are provided in ***Appendix 1*** as well as in the references section of the sample report shown in ***Appendix 2*** and the Conference Paper shown in ***Appendix 3***.

An extensive discussion of the author-date system together with numerous examples for different media can be found in Chapter 12 *Methods of Citation* of the *Style Manual*.

Multiple authors

If a reference source has **fewer than four authors** (i.e. three or less authors) then the names of **ALL authors must be stated** in the in-text citation. An example of a citation having three authors is:

"Lawrence, Smith and Jones (1988) found the major parameters…"

In instances when there are **four or more authors** then the term ***et al* is used** in the in-text citation. It is *never used in the Reference list*. This is a Latin phrase meaning "and others." The term is used immediately following the name of the reference's first author. Regarding punctuation, the *Guide to Authors* in keeping with modern convention of using minimal punctuation recommends et al should not be followed by a full stop. Two examples of a citation having four or more authors are:

"Mining dilution can vary significantly between mining systems (Gordon *et al*, 1995)."

"In the paper, James *et al* (1995) noted…"

The publication details contained in the references section must **include the names of ALL authors**.

In instances where two or more authors of the same name are cited in a report then the author's initials are included, for example:

"The oldest known sediments in the Sydney Basin with reliable dates are of middle Eocene age (Hutchison, K R, 1996)."

Multiple reference sources

In some instances it might be required to note more than one reference source to support an argument, concept, issue etc. Citing multiple reference sources is useful particularly if the issue might be contentious and/or references of low ratings are used. In this case all the references should be enclosed within the one set of round brackets, each one separated by a semicolon, for example:

"…analysis of water samples indicated high levels of dissolved metals (Joghson, 1990; Neval and Smith, 1996; Williams *et al*, 2001)."

Multiple publications by an author in the same year

Whenever two or more references are attributable to the same author published in the same year then to distinguish each citation, a lowercase letter is added following the year of publication, with each year separated by a comma for example:

"Haas (1981a, 1981b) has shown…"

The order of the letters is determined by the alphabetical order of the titles in the reference listing.

Details in the references section would be:

Haas, C J, 1981a. Analysis of rockbolting to prevent shear movement, in *Symposium on Rock Bolting*, Brisbane, pp 156-162

(The Australasian Institute of Mining and Metallurgy).

Hass, C J, 1981b. Shear resistance of rockbolts, *Mining Engineering Transactions*, 260:32-41.

Long author names

Sometimes the name of an author can be long especially if it is the name of an organisation. In such cases, the naming convention for abbreviations as discussed in Chapter 6 can be used, for example:

"…one of the high priority research areas identified by the Australian Research Council in 2010 was… (ARC, 2010)."

The reference list must contain the publication details following the full name of the organisation not its abbreviated form. But the abbreviated form as used in the in-text citation should be included at the start of the reference list with a cross-link to the full author name, for example:

ARC—see Australian Research Council

Apple, J, 1998. Analysis of rockbolting, *Journal of Mining Engineering,* 23(4):45-67.

Australian Research Council, 2010. Research priorities, [online]. Available from: <www.arc.com.au> [Accessed: 24 March 2011].

Discussion or interview

Sometimes the only available source of information might be an interview, meeting or telephone call etc. It is preferable not to use this as a reference source as the source or information can prove difficult to corroborate. Where no other sources are available, it may be necessary for example when it is a unique observation though it is preferable instead to quote other reference sources. This type of source is termed Personal Communication. Before being used in a report it is important permission has been granted by the relevant person(s) to cite them as a reference source.

Two examples of citing personal communication in a report include:

"Discussion with G Andrews (18 October 2016, personal communication) confirmed …"

"..roof failure would often extend up to a sandstone parting (S A Smith, 4 June 2017, personal communication)."

In this case, the person's title and initials are included in the in-text citation. The source is not included in the reference list though some variants of the author-date system allow personal communications to be included in the list.

Information from a website

When information is obtained from the internet then the bibliographic details must include the name of the document, the address of the website and the date when the information was accessed.

Generally only the *Uniform Resource Locator* (URL) for the site home page of the reference source need be included. Do not include the search result URL (as provided by Google) as it is not the address of the actual source and the search address can often be quite long.

If the URL of the information being cited is reasonably short, that is less than one line, then the full URL may be included. Some alternate methods of referencing information from websites are as follows.

Preferred

McCarthy, P L, 2002. Feasibility studies and economic models for deep mines [online]. Available from: <www.amcconsultants.com.au> [Accessed: 6 December 2006].

Allowable

McCarthy, P L, 2002. Feasibility studies and economic models for deep mines [online]. Available from: <www.amcconsultants.com.au/library/browse.asp> [Accessed: 6 December 2006].

See Appendix 1 for further examples of referencing information from electronic sources.

Printed vs on-line material

In situations where published information is also made available on the internet such as a journal article or conference paper, it is preferable to provide the details of the original publication in the normal manner in addition to the internet address. Stating only the internet address of the journal article is not acceptable especially if the

internet site is only available through a service provider such as a university library as general access can be restricted.

Preferred

Alehossein, H and Hood, M, 1999. An application of linearised dimensional analysis to rock cutting. *Int. J. Rock Mech. Min. Sci. and Geomech. Abstr.* 36(5):701-709.

Alternate

Alehossein, H and Hood, M, 1999. An application of linearised dimensional analysis to rock cutting. *Int. J. Rock Mech. Min. Sci. and Geomech. Abstr.* 36(5):701-709, [online]. Available from: <www.sciencedirect.com/science> [Accessed: 14 May 2011].

Not acceptable

Alehossein, H and Hood, M, 1999. An application of linearised dimensional analysis to rock cutting [online]. Available from: <http://sirius.library.unsw.edu.au:9003/sfx_local?sid=metalib:SCIDI4&id=doi:&genre=&isbn=&issn=13651609&date=1999&volume=36&issue=5&spage=701&epage=709&aulast=Alehossein&aufirst=H&auinit=&title=International%20Journal%20of%20Rock%20Mechanics%20and%20Mining%20Sciences&atitle=An%20application%20of%20linearised%20dimensional%20analysis%20to%20rock%20cutting&sici> [Accessed: 14 May 2011].

Information from data storage media

When information is obtained from a document stored on a CD/DVD-ROM, USB flash drive or other electronic media rather than a hardcopy publication then it is listed in a manner similar to a conference proceeding, for example:

Kerr, P, 2002. Decline haulage at Kanowna Belle Gold Mines, in *Proceedings 8th AusIMM Underground Operators' Conference* [CD-ROM], pp 285-292 (The Australasian Institute of Mining and Metallurgy).

Lecture, seminar or workshop

When referencing information provided in a lecture or presentation then state the name of the person who gave the lecture and the year in the usual manner in the running text of the report. The listing in the references section should include the name of the lecture, the venue where the lecture was delivered and the date of the lecture. Two examples of this type of information source are:

Laurence, D, 2008. Challenges and opportunities for sustainable mining practices in the Asia-Pacific Region. 11th Kenneth Finlay Memorial Lecture delivered at Law Library, UNSW Sydney, 23 October.

Kerr, C, 2006. Approaches to mine planning. Presentation to UNSW students at Perilya Broken Hill, 12 August.

When quoting information, tables or figures from a transcript of a lecture then reference the source material in the usual manner.

Legislation

The convention when referring to legislation and Acts of parliament for the first time in a report is to use the short title of a legislation together with the year written in italics. The name of the legislation is followed by the jurisdiction in brackets, for example:

"…the use of stop orders by the responsible Minister are outlined in the Work Health and Safety (Mines and Petroleum Sites) Act 2013 (NSW) s. 53(1)(a)"

"…requirements regarding safety requirements are detailed in Work Health and Safety (Mines and Petroleum Sites) Act 2013 (NSW)…"

Subsequent reference to the legislation is set in Roman font.

NSW Department of Industry, 2015. Work Health and Safety (Mines and Petroleum Sites) Act 2013 No 54

Missing or unknown date

When the publication date is not known then the expression n.d. (no date) is used in place of the year in both the in-text citation and the reference list.

"Johnson (n.d.) further developed the principles..."

Johnson, L, n.d. *The Principles of Mine Ventilation*, 228 p (World Books: New York).

If a reference source has been accepted for publication but the date of publication is unknown then the following forms can be used.

"Johnson (in press) further developed the principles..." or

"..based on developed principles (Johnson, in press)"

If a reference source is unpublished then the following form can be used.

"Johnson (unpub.) further developed the principles..." or

"..based on developed principles (Johnson, unpub.)"

Missing or unknown author

An author can be an individual, grouping of individuals, company, organisation, department, or institution.

In the case where the author is not a real person but for example a company then use the name of the company in place of the author in the in-text citation and reference list. Two examples of this are:

Perilya Ltd, 2010a. Increase in Broken Hill mineral resources and ore reserves [online]. Available from: <www.perilya.com.au> [Accessed: 3 April, 2011].

Perilya Ltd, 2010b. Perilya Limited investor and analysis presentation [online]. Available from: <www.perilya.com.au> [Accessed: 3 April, 2011].

If the author cannot be identified then treat the source with extreme caution. This is particularly the case for websites as the information may have been created to attract advertising or for other purposes and, consequently the information may not be correct, accurate, true or verifiable etc. As mentioned earlier in this chapter, the objective when undertaking research as part of an assignment and/or report is to find and use information obtained from credible sources.

The student must decide whether the information is credible, valid and/or relevant before using it as reference source in a report. If you have cross-checked and verified the source is credible but there is no obvious author then use the title of the document or web page in place of the author followed by the year and other publication details.

Managing references

Various software tools such as *EndNote*, *RefWorks* and *Zotero* are available that track, insert and manage in-text citations, create a reference list, and automatically the citatons and lists in a report. These tools assist in making the process of managing references easier especially in large documents such as a thesis. Care though still needs to be exercised to ensure the correct use of references and the quality of the presentation.

Summary

The source of all information used in a report must always be acknowledged. Not all sources are equally reliable and an assessment must be of the veracity of the source and hence of the information.

Referencing sources is necessary whether the information is a direct quotation or is paraphrased. In addition to text it includes tables, illustrations and any other material created by others. Within engineering, the system used for referencing is termed the author-date system.

The name of the author(s) together with the year of publication should be cited in the body of the report next to where the information is used with the full publication details of the source material placed in the references section of the report. The list of references must by sorted alphabetically by author and year.

008: References

AusIMM, 2011. *Field Geologists' Manual*, Monogram No. 9, 5th ed, 480 p (Australasian Institute of Mining and Metallurgy: Melbourne).

AusIMM, 2016. *Guide to Authors* [online]. Available from: <http://www.ausimm.com.au/content/docs/ausimm_guide_to_authors.pdf> [Accessed: 10 December 2017].

Gloyne, M, 1993. Gold ore mining by Dominion Mining Limited at Cosmo Howley, NT, in *Mining and Metallurgical Practices in Australasia* (ed: J T Woodcock), v2, pp 823-827 (Australasian Institute of Mining and Metallurgy: Melbourne).

Hall, B E, 1993. Copper ore mining at Mount Isa Mines Limited, Mount Isa, Qld, in *Mining and Metallurgical Practices in Australasia* (ed: J T Woodcock), v1, pp 612-617 (The Australasian Institute of Mining and Metallurgy: Melbourne).

International Standards Organisation, 2015. ISO 4217-2015 – Codes for the representation of currencies.

International Standards Organisation 2009. ISO 80000-1, 2009 – Quantities and units. Part 1: General.

JORC, 2012. Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code) [online]. Available from: <http://www.jorc.org> (The Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia) [Accessed: 10 December 2017].

Snooks and Co, 2002. *Style Manual for Authors, Editors and Printers*, 550 p (John Wiley and Sons: Brisbane).

Tufte, E R, 1983. *The Visual Display of Quantitative Information*, 197 p (Graphic Press: Chesire, Connecticut).

UNSW, 2010. Harvard referencing for electronic sources [online]. Available from: <https://student.unsw.edu.au/harvard-referencing-electronic-sources> [Accessed: 10 December 2017].

UNSW, 2017a. Academic integrity and plagarism [online]. Available form: <https://student.unsw.edu.au/plagiarism> [Accessed 10 December 2017].

UNSW 2017b. What is plagiarism? [online] Available form: <https://student.unsw.edu.au/what-plagiarism> [Accessed 10 December 2017].

UNSW, 2017c Student conduct [online]. Available from: <https://student.unsw.edu.au/conduct> [Accessed: 12 December 2017].

UNSW, 2017d. Ethical use of scholarly materials [online]. Available from: <https://my.unsw.edu.au/student/atoz/Ethical.html> [Accessed: 12 December 2017].

Winckel, A and Hart, B, 1996. *Report Writing Style Guide for Engineering Students*, 44 p (Faculty of Engineering: University of South Australia).

Other useful references

Berry, R, 2000. *The Research Project: How to Write It*, 119 p (Routledge: London).

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

Day, R A, 1995. *How to Write and Publish a Scientific Paper*, 223 p (Cambridge University Press).

Elphinstone, L and Schweitzer, R, 1998. *How To Get a Research Degree*, 134 p (Allen and Unwin: Sydney).

Evans, D and Gruba, P, 2002. *How to Write a Better Thesis*, 187 p (Melbourne University Press).

Lannon, J, 2003. *Technical Communication*, 788 p (Longman: New York).

Laura, J G and Lannon, J M, 2004. *A Concise Guide to Technical Communication*, 352 p (Pearson Longman).

Levine, S J, 1998. Writing and Presenting Your Thesis or Dissertation [online]. Available from: <www.learnerassociates.net/dissthes> [Accessed: 10 December 2017].

Lindsay, D, 1995. *A Guide to Scientific Writing*, (Longman: Melbourne).

Murray, R, 2005. *Writing for Academic Journals*, 223 p (Open University Press).

Pentz, M and Shott, M, 1994. *Handling Experimental Data*, 95 p (Open University Press).

Silyn-Roberts, H, 2000. *Writing for Science and Engineering: Papers*, Presentations and Reports, (Butterworth Heinemann: Oxford).

Swales, J and Freak, C, 2000. *English in Today's Research World*, (University of Michigan Press).

Appendix 1

Examples of referencing various types of information sources

Listing of reference types

Information obtained from hardcopy sources

Article in a journal	A1
Paper in a conference proceedings	A2
Paper presented at conference but not published	A3
Book	A4
Chapter or paper by an author in a book edited or compiled by others	A5
Author with two publications in the same year	A6
Thesis	A7
Map or plan	A8
Article in a magazine, newspaper or other periodical	A9
Public lecture, seminar or workshop	A10
Printed material with a restricted or intermittent circulation	A11
Patent and patent application	A12
Material accepted for publication but not as yet published	A13
Manuscript in preparation	A14

Information obtained from electronic media sources

Paper available on an on-line journal	E1
Document available from a website	E2
Information from a website	E3
Paper presented at a conference or workshop but not published	E4
Document stored on data storage media – a CD/DVD, USB flash drive	E5
JORC Code	E6
Electronic book	E7
Online press release	E8
Film, video, television or radio program	E9
Online video	E10
Podcast	E11
Online illustration	E12

The five star rating scheme referred to in Chapter 7 has been included in this list where appropriate. Caution should be exercised as the rating applies to the generalised case and may not be applicable in all circumstances.

In the following list of information sources, reference is made to TCC and SCC which refer to differences in the capitalisation of words whereby:

- **TCC**–*Title Case Capitalisation*: applies to the *title of a book, journal and conference proceeding* where most words of the title are capitalised and is usually set in italic font.
- **SCC**–*Sentence Case Capitalisation*: applies to the *name of a journal article, conference paper or other document* where only the first word of the name is capitalised.

In the case of SCC, the usual convention for capitalisation should be applied such as capitalise of proper nouns.

Information obtained from hardcopy sources

A1. Article in a journal

refereed ☆☆☆☆☆
non-refereed ☆☆☆

Reference syntax:

1, 2, 3. 4, *5,* 6(7):8.

1. Family name of all author(s);
2. Initials of author(s);
3. Year the article was published;
4. Name of the article (**SCC**);
5. Title of journal (**TCC,** *in italics);*
6. Volume or issue number;
7. Sequence number within the particular volume (number is enclosed in brackets);
8. Page numbers of the article in the journal.

Examples:

Anon, 1959. Novel process tools win first job, *Chem Eng,* 66(14):84.

Barton, N, Lien, R and Lunde, J, 1974. Engineering classification of rock masses for the design of tunnel support, *Rock Mechanics*, 6(4):183-236.

Carswell, J T and Schofield, N A, 1993. Estimation of high grade copper stope grades at Cobar Mines, Cobar NSW, *The AusIMM Proceedings,* 298(2):19-32.

Edwards, A B, 1955. The composition of the Peko copper orebody, Tennant Creek, *Proc Australas Inst Min Metall,* 175:55-82.

George, P, 1954. The oxidation of ferrous perchlorate by molecular oxygen, *Journal of the Chemical Society*,1954:4349-4359.

A2. Paper in a conference proceedings

refereed ☆☆☆☆
non-refereed ☆☆☆

Reference syntax:

1, 2, 3. 4, *5,* 6 (7: 8 9) 10 (11:12).

1. Family name of all author(s);
2. Initials of the author(s);
3. Year that the conference was held;
4. Name of paper (**SCC**);
5. "in *Proceedings of*" followed by the title of the conference proceedings (**TCC**, *in italics*);
6. City and country in which the conference was held;
7. "ed:";
8. Initials of the editor(s);
9. Names of the editor(s);
10. Pages of the paper in the proceedings (pp x-y);
11. Publisher of the proceedings;
12. City where the publisher is based.

Examples:

Bjurstrom, S, 1974. Shear strength of hard rock joints reinforced by grouted bolts, in *Proceedings of the Third International Congress on Rock Mechanics*, Denver, Colorado, pp 98-105 (National Academy of Science: Washington).

Readett, D J, Quast, K B, Newell, R, Hill, S F and Ketteridge, I B, 1987. Modelling the leaching of NaCl from Bowmans lignite, in *Proceedings Research and Development in Extractive Metallurgy 1987*, pp 273-277 (The Australasian Institute of Mining and Metallurgy: Melbourne).

Steane, R A and Hinckfuss, D A, 1978. Selection and performance of large diameter ball mills at Bougainville Copper Ltd, Papua New Guinea, in *Proceedings Eleventh Commonwealth Mining and Metallurgical Congress,* Hong Kong (ed: M J Jones) pp 577-584 (Institution of Mining and Metallurgy: London).

Stanford J and Carter P, 2009. An assessment of the impact of stylus metallurgy on the Cerchar Abrasiveness Index, in *Coal 2009: Proceedings 9th Underground Coal Operators' Conference*, University of Wollongong, 12-13 Feb, (eds: N Aziz and J Nemcik) pp 348-356 (Australasian Institute of Mining and Metallurgy: Illawarra Branch).

A3. Paper presented at conference but not published ☆☆

Reference syntax:

1, 2, 3. 4, 5 *6,* 7 8.

1. Family name of all author(s);
2. Initials of the author(s);
3. Year that the conference was held;
4. Name of paper (**SCC**);
5. "paper presented to";
6. Title of the conference (**TCC**, NOT in italics);
7. City and country in which the conference was held;
8. date of conference.

Example:

Suzuki, R, 1982. Workers' attitudes toward computer innovation and organisation culture: the case in Japan, paper presented to 10th World Congress of Sociology, Mexico City, 16-21 August.

A4. Book ☆☆☆☆☆

Reference syntax:

1, 2, 3. *4,* 5 (6: 7).

1. Family name of all author(s);
2. Initials of the author(s);
3. Year the book was published;
4. Title of the book *(***TCC***, in italics);*
5. Number of pages in book (x p) or, pages in the book where the information came from (pp x-y);
6. Publisher of the book;
7. City where the publisher is based.

Examples:

Boldt, J R, 1967. *The Winning of Nickel*, pp 27-32 (Van Nostrand: New York).

National Coal Board, 1975. *Subsidence Engineers Handbook*, 401 p (National Coal Board: London).

A5. Chapter or paper by an author in a book edited or compiled by others ☆☆☆☆☆

Reference syntax:

1, 2, 3. 4, 5 *6* (7: 8 9), 10 (11: 12).

1. Family name of the chapter or paper author(s);
2. Initials of the author(s);
3. Year that the compilation was published;
4. Name of the chapter or paper (**SCC**);
5. "in"
6. Title of the book or compilation (**TCC**, *in italics*);

7. "ed:";
8. Initials of the book or compilation editor;
9. Family name of the book or compilation editor;
10. Pages in the book or compilation where the information came from;
11. Publisher of the book or publication;
12. City where the publisher is based.

Examples:

Anderson, L E, 1980. Copper ore concentration at Kanmantoo, in *Mining and Metallurgical Practices in Australasia* (ed: J T Woodcock), pp 314-315 (The Australasian Institute of Mining and Metallurgy: Melbourne).

Paterson, M S, 1978. Experimental rock deformation, in *The Brittle Field, Minerals and Rocks 13*, pp 42-50 (Springer-Verlag: Berlin).

A6. An author with two publications in the same year

The precise form is dependent on the type of source however a suffix is added to the year of publication consisting of a lower case letter to differentiate between publications. The corresponding suffix is used in the in-text citation.

Examples:

Withnall, I W, 1976a. Summary of mineral exploration in the Georgetown area, *Qld Govt Min J*, 77:583-589.

Withnall, I W, 1976b. Mines and mineral deposits in the Forsayth 1:100 000 sheet area, Queensland, Geol Sury Qld Rpt 91.

A7. Thesis ☆☆☆☆

Reference syntax:

1, 2, 3. 4, 5 (6), 7, 8.

1. Family name of the author;
2. Initials of the author;
3. Year that thesis was completed;
4. Title of thesis (**SCC**);
5. Type of thesis: Honours, Masters or PhD;
6. Published or unpublished – usually the latter;
7. Name of the awarding institution;
8. City of this institution.

Example:

Lees, M J, 1973. Experimental and computer studies of a grinding circuit, PhD thesis (unpublished), University of Queensland, Brisbane.

A8. Map or plan ☆☆☆☆

Reference syntax:

1, 2, 3. *4,* 5 – 6 7, 8.

1. Family name of author(s);
2. Initials of the author(s);
3. Date map was drafted;
4. Region of the map (in italics) (**TCC**);
5. State/province the region is located;
6. Scale of the map;
7. What the map is showing;
8. Publisher of the map.

Example:

Pirajno, F and Occhipinti, S, 1996. *Btyah, WA — 1:250 000 Geological Series,* Western Australian Geological Survey.

A9. Article in a magazine, newspaper or other periodical ☆☆☆

Reference syntax:

1, 2, 3. 4, *5,* 6(7):8.

1. Family name of the author(s);
2. Initials of the author(s);
3. Year the article was published;
4. Name of article (**SCC**);
5. Title of journal, magazine, newspaper or other periodical (**TCC**, in italics);
6. Volume or issue number/date of publication. This could be the month for a monthly publication or the year for an annual publication;
7. Sequence number within the particular volume (enclosed in brackets);
8. Page numbers of the article in publication.

Examples:

Leadbetter, C, 2002. Why globalisation is a good thing, *The Times*, 26 June, p 6.

Tasker, S-J, 2011. Industry fears skills crisis, *The Australian*, 12 May, p 22.

A10. Public lecture, seminar or workshop ☆☆

Reference syntax:

1, 2, 3. 4, 5 6, 7, 8, 9.

1. Family name of the presenter;
2. Initials of the presenter;
3. Year that the presentation was given;
4. Title of the lecture (**SCC**);
5. Subject or reason for the lecture;
6. "delivered at";
7. Venue where the lecture was delivered;

8. Name of the institution;
9. Date of the presentation.

Example:

Laurence, D, 2008. Challenges and opportunities for sustainable mining practices in the Asia-Pacific Region. 11th Annual Kenneth Finlay Memorial Lecture, delivered at Law Library, UNSW Sydney, 23 October.

A11. Printed material with a restricted or intermittent circulation

Generally the same reference syntax is used whatever the source but it does not contain any italicised component and whenever possible it contains the document number at the end of the reference.

Examples:

AMIC—see Australian Mining Industry Council.

Australian Standard, 2005. AS 2193 – Calibration and classification of force measuring systems.

Australia Mining Industry Council, 1988. Mining and the return of the living environment, 36 p.

British Standards Institute, 1989. BS 8081 – British standard code of practice for ground anchorages.

Brunther, D, and White, S, 2004. Anchorage and failure mechanisms of fully encapsulated rockbolts – Stage 2, AMIC report C10022.

BSI—see British Standards Institute.

BHP Billiton, 2007. Sustainability Report, Summary Report 2007, 24 p.

Came, J E, 1911. The tin mining industry and the distribution of tin ores in New South Wales, NSW Department of Mines, Sydney, Mineral Resources Rpt No 14.

Department of Resources, Energy and Tourism, 2009. Airborne contaminants, noise and vibration. Leading Practice Sustainable Development Program for the Mining Industry, October, 97 p (Commonwealth of Australia).

Hamersley Iron Pty Ltd, 1996. Resources technology operations, 51 p.

Newcrest Mining Ltd, n.d. Cadia Valley Operations.

Panek, L, 1956. Principles of reinforcing bedded mine roof with bolts, USBM RI 5156

A12. Patent or Patent application ☆☆☆

Reference syntax:

1, 2, (3), 4. 5, 6 7.

1. Family name of the author;
2. Initials of the author;
3. Company that will own the patent;
4. Date that the patent was lodged;
5. Name of the patented work *(***SCC***);*
6. Name of the panel providing the patent (**TCC,** *in italics*);
7. Patent number.

Examples:

Canterford, J H, (M K Canterford), 2004. Recovery of nickel, *International Patent Application* 04/00123.

Marsden, J 0 and Brewer, R E (Phelps Dodge Corp), 2004. Pressure leaching of copper concentrates, *Australian Patent Application* 02/12651.

A13. Material accepted for publication but not as yet published ☆☆

Use similar syntax as for a published reference source except substitute the expression “in press” in place of the year of publication.

Example:

Warren, I H, in press. The generation of sulfuric acid from pyrite by pressure leaching, *Australian Journal of Science*.

A14. Manuscript in preparation ☆☆

Reference syntax:

1, 2 (3). 4. 5. 6.

1. Family name of manuscript author(s);
2. Initials of the author(s);
3. “in prep”;
4. Title of the manuscript (**SCC**);
5. Name of the supporting institution;
6. City in which this institution is located.

Example:

Niclaus, S (in prep). Applying chaos theory to long-distance delivery services. Horizon Research Station. North Pole.

Information obtained from electronic media sources

E1. Paper available from an on-line journal

refereed ☆☆☆☆☆
non-refereed ☆☆☆

Reference syntax:

1, 2, 3. 4 [5], *6.* 7, 8, 9, 10: <11> [12].

1. Family name of author/editor(s);
2. Initials of author/editor(s);
3. Year website information last updated;
4. Name of article or paper (**SCC**);
5. "online";
6. Title of the journal *(***TCC***, in italics);*
7. Edition;
8. Place of publication;
9. Publisher;
10. "Available from";
11. URL of website - homepage or, full address if of an appropriate length;
12. Date website was accessed.

Examples:

Feit, G N, Malinnikova , O N, Zykov, V S and Rudakov, V A, 2002. Prediction of rockburst and sudden outburst hazard on the basis of estimate of rock-mass energy [online], *Journal of Mining Science*, 38(1):61-63. Available from: < www.kluweronline.com > [Accessed: 27 October 2004].

Morris, A, 2004. Is this racism? Representations of South Africa in the Sydney Morning Herald since the inauguration of Thabo Mbeki as president, *Australian Humanities Review,* 33:August-October. Available from: < www.lib.latrobe.edu.au > [Accessed: 11 May 2007].

E2. Document available on a website

Reference syntax:

1, 2, 3. 4 [5]. 6 <7> [8].

1. Author(s) of website/organisation name;
2. Initials of author/editor(s);
3. Year website information last updated;
4. Name of document (**SCC**).
5. "online"
6. "Available from";
7. URL of website – homepage or, full address if of an appropriate length;
8. Date website was accessed.

Examples:

Australian Coal Association Research Program, 2010. Research priorities [online]. Available from: < www.acarp.com.au/Downloads/ACARPResearchPrioritiesNewsletter.pdf > [Accessed: 24 March 2011].

United States Environmental Protection Agency, 2003. Applicability of the toxicity characteristic leaching procedure to mineral processing waste, [online]. Available from: < www.epa.gov/epaoswer/other/mining/minedock/tclp.htm > [Accessed: 26 October 2004].

E3. Information from a website

Reference syntax:

1, 2, 3. 4 [5]. 6 <7> [8].

1. Author(s) of website/organisation name
2. Initials of author/editor(s);
3. Year website information last updated;
4. Name of page viewed (**SCC**);
5. "online";
6. "Available from";
7. URL of website - homepage or, full address if of an appropriate length;
8. Date website was accessed.

Examples:

Geoscience Australia, 2006. Department of Industry, Tourism and Resources, Canberra [online]. Available from: < www.australianminesatlas.gov.au/ > [Accessed: 12 December 2006]

International Narcotics Control Board, 1999. United Nations, Vienna [online]. Available from: < www.incb.org > [Accessed: 1 October 2009].

E4. Paper presented at a conference or workshop but not published

☆☆

Reference syntax:

1, 2, 3. 4, 5 6, 7, 8.

1. Family name of the presenter of the paper;
2. Initials of presenter of the paper;
3. Year presentation was given;
4. Name of the paper (**SCC**);
5. "paper presented to"
6. Title of the conference;
7. City where the conference was held;
8. Date(s) of the conference.

Example:

Suzuki, R, 1982. Workers' attitudes toward computer innovation and organization culture: the case in Japan, paper presented to 10th World Congress of Sociology, Mexico City, 16 - 21 August [online]. Available from: < www.incb.org > [Accessed: 1 October 2009].

E5. Document on data storage media including CD/DVD ROM, USB flash drive

This will follow the syntax for the corresponding hardcopy source except the term "[CD ROM]," "[DVD ROM]" or "[USB]" is inserted after the title.

Example:

Brathwaite, R L, and Faure, K, 2004. The Sams Creek peralkaline granite hosted gold deposit, Northwest Nelson, New Zealand – a new variant on alkaline intrusion-related gold deposits, in Proceedings PACRIM 2004 [CD ROM], pp 127-133 (The Australasian Institute of Mining and Metallurgy: Melbourne).

E6. JORC Code

The *Guide to Authors* stipulates a standard form when referring to certain industry codes.

Example:

JORC, 2004. Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code) [online]. Available from: < www.jorc.org > (The Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia) [Accessed: 18 May 2010].

E7. Electronic book

Reference syntax:

1, 2, 3. 4, 5 (6: 7). 8: <9> [10 11].

1. Family name of the author/editor(s);
2. Initials of the author/editor(s);
3. Date book published;
4. Title of the book *(***TCC***, in italics);*
5. Pages cited in book;
6. Publisher of book;
7. City where publisher is located;
8. "Available from";
9. URL where the book was made available;
10. "Accessed";
11. Date book was viewed on-line.

Example:

Lloyd, C B (ed.), 2005. *Growing up Global: The Changing Transitions to Adulthood in Developing Countries*, 262 p (The National Academic Press: Washington). Available from: < www.nap.edu/books/11174/html/index.html > [Accessed: 5 May 2007].

E8. Online press release

Reference syntax:

1, 2, 3. *4*, 5. 6: <7> [8 9].

1. Family name of author/speaker/organisation;
2. Initials of author/speaker;
3. Date of the press release;
4. Title of the press release (**SCC**, in italics);
5. "media release";
6. "Available from";
7. URL where the press release was publicised;
8. "Accessed";
9. Date press release was accessed.

Example:

Howard, J W, 2007. *Welfare payments reform*, media release [online]. Available from: < www.pm.gov.au/media/Release/2007/Media_Release24432.cfm > [Accessed: 25 July 2007].

E9. Film, video, television or radio program

Reference syntax:

1, 2. 3, 4, 5, 6, 7.

1. Name of the program or film;
2. Year recorded/broadcast/released;
3. Title of the story *(***TCC***, in italics);*
4. Type/format of media;
5. Name of media organisation/distributor;
6. City or country where organisation is based;
7. Date of recording.

Examples:

Four Corners, 2001. *Going Backwards,* television program, Australian Broadcasting Corporation, Sydney, 9 July.

My Brilliant Career, 1979. Motion picture, New South Wales Film Corporation, distributed by Australian Video, Australia.

E10. Online video

Reference syntax:

1, 2. 3, 4. 5: <6> [7: 8].

1. Name of the host show/program/film;
2. Year video made;
3. Title of the video *(***SCC,** *in italics);*
4. "online video";
5. "Available from";
6. URL where the video is hosted;
7. "Accessed";
8. Date video was viewed on-line.

Examples:

The Overlander, 2007. *Overlander.tv: Aboriginal tent embassy, Canberra*, online video. Available from: < www.youtube.com/watch?v=abMIHjO2nh4 > [Accessed: 31 July 2007].

The Cabinet of Dr. Caligari, 1991. *The Cabinet of Dr. Caligari*, online video. Available from: < http://video.google.com.au/videoplay?docid=-411719693227284081 > [Accessed: 20 June 2007].

E11. Podcast

Reference syntax:

1, 2. *3*, 4, 5, 6. 7: <8> [9: 10].

1. Organisation;
2. Year produced/made;
3. Name of podcast *(***SCC***, in italics);*
4. Publisher;
5. Date of podcast;
6. "podcast";
7. "Available from";
8. URL where the podcast is available;
9. "Accessed";
10. Date podcast was accessed.

Examples:

Late Night Live, 2013. *Traditional societies and what we can learn from them.* ABC Radio National, 23 March [podcast]. Available from: < www.abc.net.au/radionational/programs/latenightlive/ > [Accessed: 19 February 2013].

CSIRO, 2010. *Gold mining without a mine*, 1 Febuary [podcast]. Available from < www.csiro.au/multimedia/Gold-mining-without-a-mine.html > [Accessed: 11 July 2010].

E12. Online illustration

Reference syntax:

1, 2, 3. 4, 5, 6. 7: <8> [9: 10].

1. Family name of author;
2. Initials of Author;
3. Year image was produced;
4. Name of image or a description *(***SCC***, in italics);*
5. Format and any details;
6. Name and place of sponsor;
7. "Available from";
8. URL where the image is hosted;
9. "Accessed";
10. Date image was viewed.

Example:

Firth, J, 1968. *From the rich man's table,* political cartoon by John Firth, Old Parliament House, Canberra. Available from: < www.oph.gov.au/frith/theherald-01.html > [Accessed: 11 May 2007].

Khafre pyramid from Khufu's quarry, 2007. *Khafre pyramid from Khufu's quarry*, digital photograph, Ancient Egypt Research Associates. Available from: < www.aeraweb.org/khufu_quarry.asp > [Accessed: 2 August 2007].

Map of the Parish of Maroota, n.d. *Map of the Parish of Maroota, Country of Cumberland, District of Windsor 1840-1849*, digital image of cartographic material, National Library of Australia. Available from: < http://nla.gov.au/nla.map-f829 > [Accessed: 13 April 2007].

Notes

- An author of a website includes an individual, group of individuals, company, organisation, department and institution etc.
- If a website does not state when it was created or last updated then the abbreviation n.d. (no date) can be substituted for the year of publication.
- If you have cross-checked and verified the source is reliable but there is no obvious author then use the title of the document or webpage in place of the author followed by the year and other publication details as per the required syntax.
- Generally only the Uniform Resource Locator (URL) for the site home page of the reference source needs to be included. If the page URL of the information being cited is reasonably short, that is less than one line, then the full URL may be included.

adapted from Appendix 3 in *Guide to Authors* (AusIMM, 2016), *Style Guide* (Snooks and Co, 2002) and *Harvard Referencing for Electronic Sources* (UNSW, 2010).

Appendix 2

An example of a technical report

This Appendix contains an example of a technical report that reflects the standards outlined in this document. Note: this is an amended copy of the report with extracts that have been altered to illustrate the various elements of *Structure*, *Format* and *Style* in a report.

The first part of the Summary states the context of the project, *the why*, [see *RWG* §4 – *Summary*] Note: the symbol, §, is used in these notes to denote section number in *RWG*

SUMMARY

In all pages before the Introduction section use *roman* numerals are used in page numbering [see *RWG* §5 – *Page Numbering*]

The results and conclusions of this research project are based on experiments undertaken using a laboratory-scale, single shear rock re-enforcement test facility that was designed, constructed and commissioned in the School of Mining Engineering at the University of New South Wales (UNSW).

Note term is first written in full followed by its abbreviation enclosed within brackets [*RWG* §6 – *Abbreviations & Acronyms*]

The test faci derstanding of the behaviour of rock reinforcement elements when subjected to shear in order to better manage shear loading conditions and thereby contribute to better design and application of these elements in underground mine environments. To this end the project examined the effect of a number of parameters on the performance of reinforcement elements

…the second paragraph states *the aims and scope* of the project or study

The results indicate the rock environment behaves as a system as the i various reinforcement elements was markedly different to the observed behaviour of individual elements when tested in isolation.

…and finally, a summary of *the key results, findings and recommendations* are presented

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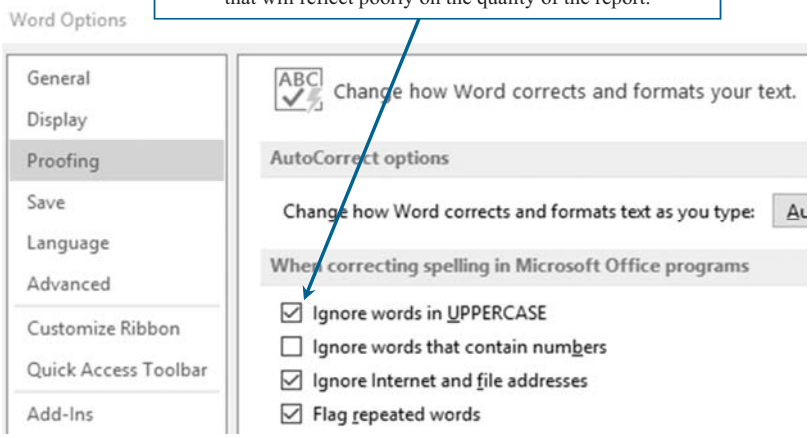
APPENDIX

Summary and Content pages are in Roman numerals. Page numbers are re-started from Introduction section in Arabic numerals.
[*RWG* §5 – *Page Numbering*]

A typical layout for a Contents page illustrating the structure and hierarchy used in the report. Note the use of different fonts and capitalisation together with indenting to differentiate the different heading levels.
[*RWG* §4 – *Contents*]

Be aware that the default setting for spell checking in some word processing software is set to "Ignore words in UPPERCASE".
It is advised to **deselect this in the Options**.
This can be particularly embarrassing when the spell checker does not detect an error in the title on the cover sheet, an error that will reflect poorly on the quality of the report.



Page numbering re-commences at the start of main body of report in the Introduction section with *Arabic* numerals [*RWG* §5 – *Page Numbering*]

1 INTRODUCTION

Briefly outline in the Introduction section the context for the study/project [*RWG* §4 – *Introduction*]

Rock[illegible]nnelling and civil industries particularly with the use of rockbolts as the primary means to support the rockmass (Gerdeen *et al*, 1977). New applications and innovations of rock reinforcement have continued to appear on the market and are regularly trialled and used in Australia and the rest of the world. Within Australian underground coal mines, rockbolts are most often used as a reinforcing element in primary roof and rib support.

Note the use of spaces in values, scaling and *SI* units [*RWG* §5 – *Numbers and use of significant figures*; *RWG* §5 – *Symbols for units of measurement;* and, *RWG* Table 9]

A typical Australian underground coal longwall mine producing around 3 Mtpa uses between 4000 and 6000 rockbolts per month, which equates to a total cost of approximately A$150 000 per month for rockbolts, plates, resin and accessories (Gardner, 1998a).

A research project based on experiments using a laboratory-scale, single shear rock reinforcement test facility was undertaken in the School of Mining Engineering.

Note the form of citation for single and multiple authors and for multiple publications [*RWG* §7 – *Referencing;* and *RWG Appendix 1 Examples of referencing*]

1.1 RESEARCH OBJECTIVES

The objectives of the research project were to:

Clear and succinct statement of project objectives

- define current understanding of reinforcement elements when subjected to shear;
- design and develop an appropriate test facility; and
- conduct a series of controlled laboratory experiments to study the effects of:
  - the geomechanical properties of rock;
  - element pre-tensioning; and
  - applied loading rate

  on the performance of reinforcement elements in both direct shear resistance and indirect shear resistance with axial clamping.

1.1.1 Ground anchors

Ground anchors are more often used in civil engineering than in mining. They are used to transmit a tensile load to a load bearing stratum. A ground anchor such as that shown in

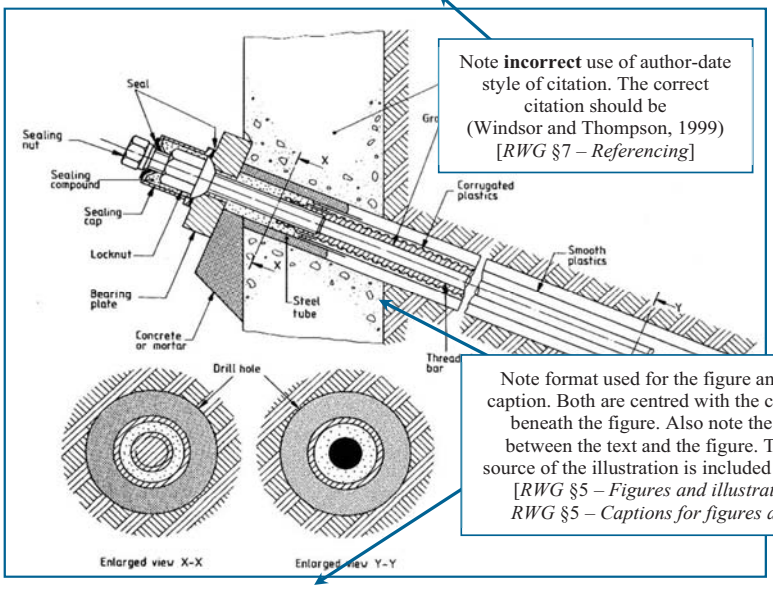
Note the link to Figure 1 is embedded in the sentence – it is not tacked on as an afterthought at the end of the sentence nor enclosed in brackets [*RWG* §5 – *Captions for figures and tables]*

2

Figure 1 typically consists of three components these being an anchor head, free anchor length and fixed anchor. Ground anchors are generally 15 m or more in length. They tend to have a large cross-sectional area so as to provi pport the often substantial mass of unstable material. Ground anchors can be grouped into two broad categories based on their primary modes of action either high axial capacity elements or high shear capacity elements (C Windsor & R Thompson 1999).

Note the text is fully justified (both left and right margins) [*RWG* §5 – *Table 8*]

Note **incorrect** use of author-date style of citation. The correct citation should be (Windsor and Thompson, 1999) [*RWG* §7 – *Referencing*]



Note format used for the figure and the figure caption. Both are centred with the caption placed beneath the figure. Also note the link made between the text and the figure. The original source of the illustration is included in the caption [*RWG* §5 – *Figures and illustrations;* and, *RWG* §5 – *Captions for figures and tables*]

Figure 1. Typical components of a ground anchor (British Standards Institute, 1989).

High axial capacity elements are in the majority with around 90% of all ground anchors. They include an array of long individual elements that are orientated for a sta and discretely coupled over a fairly long anchorage length at the far end (bond length). At the collar of this reinforcing element, the ground anchor is secured to the rock mass face using an external mechanical fixture (free length). The free length is….

Note as well as text, all other material such as an illustration must be referenced

While the section on ground anchors (§1.1.1) provides important background information on what a ground anchor is, how it functions and where it is used, the introduction should also present a problem statement so the objectives of the report are justified.
What is the problem with ground anchors that leads to the need for further research?
It is also a good idea to end the introduction with an outline of the report. Usually this is just a few sentences explaining how the report is organised.

This section justifies the choice of sample, describes the sample preparation, and gives the general conditions of the experiments.

3

2 CONCRETE CASTING

2.1 INTRODUCTION

An example of a concise introduction to a new section. This section outlines the methods or 'what the researchers did.'

The importance of the surrounding rockmass is critical in analysing the performance of a reinforcing element under a shear load. The test program used concrete to simulate the surrounding rockmass having similar levels of strength, static modulus of elasticity and Poisson's ratio but equally important it is a homogeneous material and an unlimited number of samples can be provided.

2.2 CONCRETE

The ability for cement to flow when mixed with aggregate and water makes it ideal for casting before hardening to form a stone-like material.

The test procedure used only fully cured concrete to ensure consistency in the material properties; these included measurement of compressive strength, static modulus of elasticity and Poisson's ratio.

During casting of the concrete into the steel formwork, we prepared concrete test cylindrical specimens having dimensions of 100 mm diameter by 200 mm high as shown in Figure 2 to determine the properties of the concrete.

Whenever possible avoid using 'we' or other personal pronouns as this diminishes the desired sense of objectivity.
An alternate might be…"During casting of the concrete into the steel formwork, cylindrical test specimens were prepared…"
[*RWG* §7 – *Referencing*]

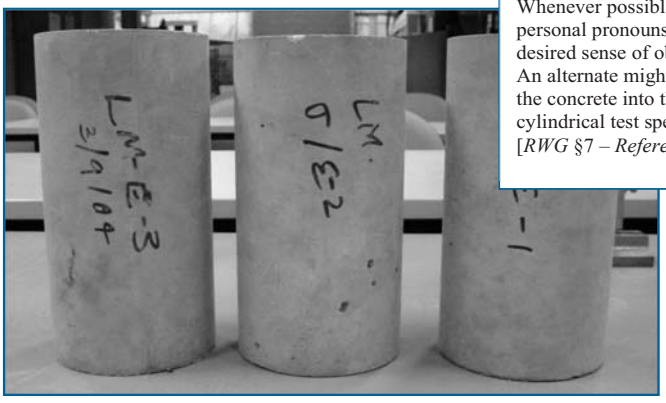


Figure 2. Concrete cylindrical specimens prior to testing.

In this section, the analysis and testing of the sample is documented. Important equations that were used are provided, results are summarized in tables and brief statements of key results are presented. 4

3 PROPERTIES OF TEST MATERIALS

The Static Modulus of Elasticity (E) and Poisson's Ratio (ν) were determined in accordance with ATSM C469. The Standard specifies Young's Modulus and Poisson's Ratio of Portland cement concrete be determined under longitudinal loading conditions using the chord modulus to define elasticity. For normal weight concrete, E ranges between 14 and 41 GPa.

The Static Modulus of Elasticity can be calculated using Equation 1.

$$E = \frac{\sigma_2 - \sigma_1}{\epsilon_2 - 0.00005} \qquad 1)$$

Note: format for an equation
[*RWG* §5 – *Equations*]

where:

E : chord modulus of elasticity

σ_1 : stress corresponding to a longitudinal strain

σ_2 : stress corresponding to 40% of the estimated ultimate load

ε_2: longitudinal strain corresponding to the σ_2 stress

Results of the concrete cylinder compression test are summ
in Table 1.

Note the format for data contained in the table and the link between the text and table. The caption is placed above the table
[*RWG* §5 – *Tables;* and
RWG §5 – *Captions for figures and tables captions*]

Table 1
Results of concrete cylinder compression test.

Sample No.	*P1*	*P2*	*P3*	*P4*	*mean*
Core diameter (mm)	100.2	100.2	100.3	100.1	100.2
Maximum load (Kn)	514.9	561.6	495.7	489.9	518.7
Strength (Mpa)	65.3	71.2	62.8	62.3	65.9

The strength of the concrete exceeded 60 MPa with an average strength of 65.9 MPa…

Exercise caution when typing units.
Ensure you use upper and lower case correctly.
Be particularly careful as the case can be inadvertently "corrected/altered" by word processing software to the wrong case as in this instance.
In this instance, the units should be **kN** and **MPa**.
[*RWG* §5 – *Symbols for units of measure*]

5

4 TEST RESULTS

Figure 3 shows the variation in stress with ram displacement of sample P_1 during testing using a Schenk Test Machine. The graph indicates a constant stiffness up to the point of failure and significant residual strength in the post-failure region

While tables present values, graphs help to show any trends in the data. [*RWG* §5 – *Figures and illustrations;* and, *RWG* §5 – *Captions for figure and tables*]

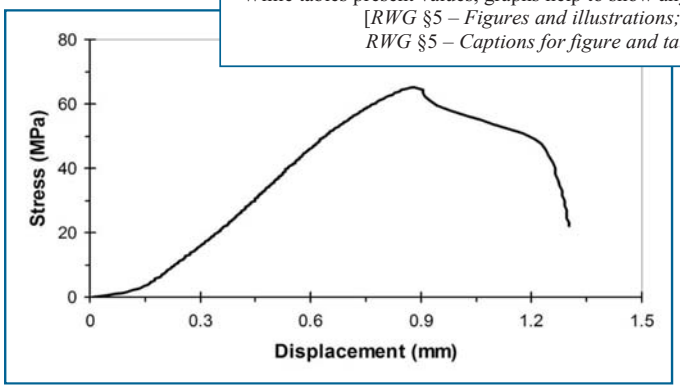


Figure 3. Loading characteristic for test sample P_1.

A hydraulic load cell was placed between two steel plates located between the concrete surface (borehole collar) and the dome plate as shown in Figure 4.

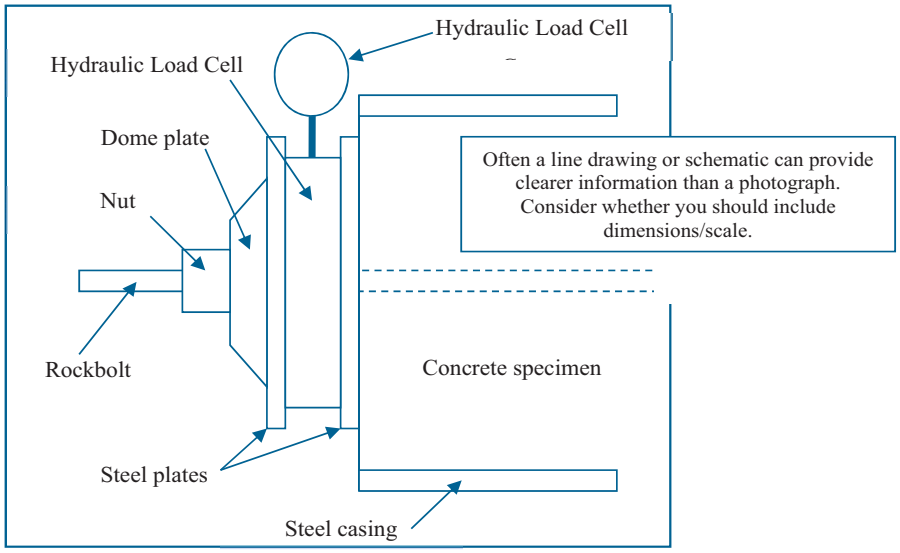


Figure 4. Schematic of load cell arrangement used to determine the level of pre-tension in a rockbolt.

A number of issues arose during installation of Samples 4 and 6. These issues are summarised in Table 2.

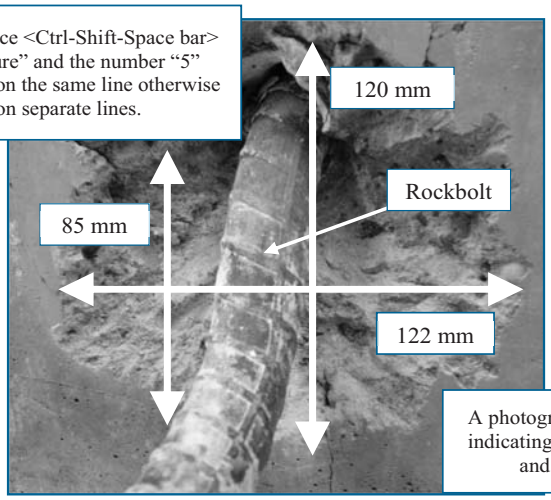
Table 2.
Summary of the issues in setting test samples.

Sample No.	*Hole Length*	*Installation*	*Comments*
4	1125 mm	Spin time: 20 s Hold: 60 s Pre-tension required: 40 kN	Borehole was too long after the steel plates and load cells were introduced to the system. The length of the hole was too long to allow the rockbolt to secure itself to the fast set resin capsule.
6	1060 mm	Spin time: 20 s Hold: 60 s Pre-tension required: 40 kN Pre-tension attained: 55 kN	Two fast-set resin capsules were inserted into the borehole in order to

It is not a sign of weakness to discuss problems or failures. Rather it is an opportunity to show what has been learned from these setbacks and it can help justify your final choices or decisions. Including 'what not to do' or 'what does not work' also serves to inform your peers, so they can avoid similar problems in the future.

The rockbolt was subjected to a combination of both shear and axial loading that led to the formation of two plastic hinges coinciding with the points of maximum bending stress. Due to the strength of the concrete, the rockbolt crushed the concrete around the borehole wall as shown in Figure 5.

Inserting an unbroken space <Ctrl-Shift-Space bar> between the word "Figure" and the number "5" ensures these two appear on the same line otherwise they can appear on separate lines.



A photograph with an overlay indicating various dimensions and main features

Figure 5. Extent of bending of the tendon and associated crushing around the borehole.

5 CONCLUSIONS

Restatement the aims/objectives of the project

The objective of this project was to investigate the behaviour of rockbolts when subjected to shear. A full-scale laboratory shear testing facility was designed, constructed and commissioned to model the action of shear forces on a rock reinforcing element as occurs in an underground environment.

Present the key findings and conclusions

As a result of the test program, the following conclusions can be made.

- The shear resistance of a rockbolt when installed in concrete was found to be more than double the shear strength and greater than the ultimate tensile strength of the rockbolt steel. The enhanced performance is thought to be due to a combination of the friction induced between the shear surfaces and confinement offered by the borehole.
- There were two distinct loading regimes observed between applied shear load and shear displacement. Initially the system reflected a large stiffness after which the stiffness reduced with continued displacement and yield of the rockbolt until eventual failure.
- The level of stiffness varied with the loading rate with higher levels of stiffness attained at higher loading rates….

8

6 RECOMMENDATIONS

Based on the results of this study it is recommended that further investigation be undertaken with respect to:

- borehole and element geometry;
- element orientation relative to discontinuity; and
- element and encapsulation material properties.

Note formatting applied to references in accordance with AusIMM *Guide to Authors*. The list is sorted first by author and then by year. [*RWG* §7 – *Referencing* and *RWG Appendix 1 Examples of referencing*]

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Appendix 3

An example of a conference paper

This section contains an example of a conference paper first published in *Technology Roadmap for Rock Mechanics, Proceedings 10th Congress of the International Society for Rock Mechanics*, 2003, (South African Institute of Mining and Metallurgy)

The effect of resin annulus on anchorage performance of fully encapsulated rockbolts

Patrick Hanrahan
The University of New South Wales (UNSW), Sydney

A diverse selection of rockbolt designs and resin anchors are available for use in underground mines. Research in recent years at the UNSW Mining Research Centre led to the establishment of a rockbolt pull-testing facility. This test facility has subsequently been upgraded, commissioned and initial test work completed to verify the pull-test process.

A test program has been completed with the objective to understand the load transfer mechanism and improve the general performance of rockbolts. This paper describes the results of this research.

INTRODUCTION

Rockbolts are increasingly relied on as a key component in the primary support mechanism of many underground mines. In the Australian coal mining industry, for example, over 5 million rockbolts are installed each year at a cost of over AUD35 million. Previous research by UNSW, Strata Control Technology Pty Ltd (SCT) and Powercoal Ltd found that over 30% of rockbolts *'are not providing optimum performance in coal mining environments'* (Galvin *et al,* 2001).

A research initiative has been launched combining the skills and experience of industry and research expertise in the university to develop an understanding of fully encapsulated rockbolts. The broad objective of this initiative is to improve the performance of rockbolt systems and thereby through more effective ground control contribute to improving overall safety in mines. This initiative resulted in the establishment of a test facility at UNSW that operates within a controlled laboratory environment (Hagan and Weckert, 2002).

TEST FACILITY

Design objectives

The desirable attributes of a rockbolt test facility are:

- the facility should be capable of examining a wide range of parameters associated with the installation of rockbolts and replicating a range of conditions;
- tests should be carried out under controlled conditions to better ensure the repeatability of results; and
- the facility should be available for use by industry (both suppliers of rockbolt systems and industry end-users) to independently assess the performance of products or changes in the method of installation.

The design of the new test facility incorporates an hydraulic actuator similar to that used in most rockbolt pull-out tests. The acutator can apply various load conditions to a rockbolt. A bi-axial cell is used to secure the test specimen containing a fully encapsulated rockbolt. The test specimen may either be a sample of rock replicating the conditions in a particular mine or, a man-made material. The advantage of the latter is it mitigates many of the problems that can arise due to the variability in material properties between rock samples.

Facility features

The test facility at the UNSW Mining Research Centre uses a modified workshop lathe as the test platform. The main components of the facility include:

- a bi-axial cell with an internal diameter of 145 mm, length of 200 mm and rated maximum confinement pressure of 30 MPa mounted on the bed of the lathe;
- servo-control hydraulic system used for precise control of the 300 kN capacity hollow core ram during a pull-out test.

TEST SAMPLE PREPARATION

Test samples

Type

A cementitious grout, Celtite MG75S, was selected in place of cored rock samples in the test program. The UCS strength of the material was 75 MPa.

Preparation

In order to ensure uniform material properties, a single batch of over 100 test samples was prepared and cast in plastic moulds. Each cylindrical sample had a diameter of 145 mm and length of 200 mm.

Rockbolt anchorage

A Celtite 24 mm extra high strength CX rockbolt was used in the test program with a basic profile design. The dimensions of rockbolt are an inner core diameter of 21.7 mm, diameter across the ribs of 22.8 mm, and a rib spacing of 10 mm. The rockbolt has an ultimate tensile strength of 344 kN.

A mix-and-pour resin was used in the test program. After mixing, the resin was injected into the borehole into which a spinning rockbolt was inserted. The rockbolt was supported while the resin was allowed to set for 10 min. The resin was then left to cure for a further 48 h with the rockbolt and sample standing vertically.

EXPERIMENTAL PROGRAM

Procedure

In summary, the test procedure involved a load being applied between the rockbolt and end surface of the test sample as illustrated in Figure 1. This tensile load is simulates the induced load on a rockbolt when separation occurs between partings in rock strata.

During each test, the outer surface of the test sample was subjected to a confinement within the bi-axial cell of 10 MPa.

Before each pullout test commenced, a valve was closed to stop the flow of hydraulic fluid to the cell. The level of confinement simulates *in situ* field conditions but it was also the minimum level necessary to support the sample in the cell during drilling and testing. A pressure transducer was used to measure any pressure change in the bi-axial cell during a test.

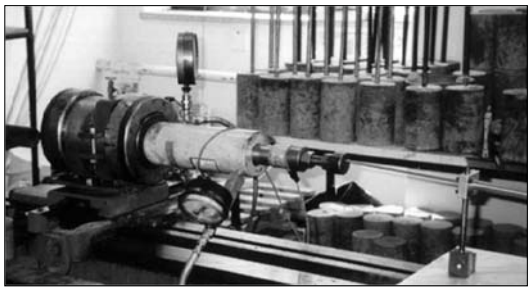

Figure 1. Test set-up showing the arrangement of the bi-axial cell, hydraulic ram, pressure transducer and LVDT.

Observations

Reasonable repeatability was observed for each level of resin annulus as illustrated in Figure 2. This figure shows the load/displacement curve in the 3 mm annulus test.

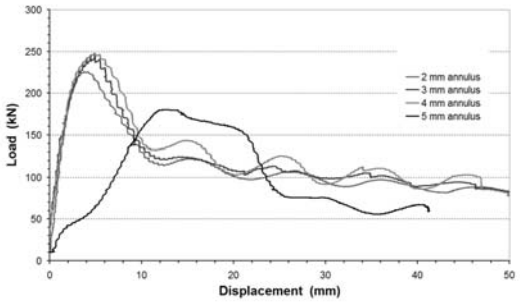

Figure 2. Load/displacement curve for an anchorage system with a 3 mm annulus.

The results from the test program are summarised in Table 1. There was little change observed in the pressure of the bi-axial cell during each test. The experimental noise tended to mask any changes that might have otherwise occurred.

Table 1
Summary of results at different annulus size.

	Annulus thickness (mm)			
	2	*3*	*4*	*5*
Limit of elastic behaviour – load (kN)	180	180	190	60
Stiffness within elastic region (kN/mm)	99.4	85.0	100	40.0
Maximum Pullout Load (MPL) (kN)	225	245	240	185
Residual load at 50 mm displacement (kN)	60	70	90	45

The current monitoring arrangement tended to even out any transient changes in stress that might occur along the length of the test sample. Alternate arrangements to monitor any induced stress changes are being considered in future experiments.

Analysis

Little difference was observed in the curves between the different resin annulus thicknesses of 2, 3 and 4 mm as indicated in the summary graph in Figure 1. The performance of the anchorage systems in these instances exhibited a relatively high as well as consistent level of stiffness up to the point of maximum pullout load (MPL); the latter being the maximum load bearing capacity of the anchorage system.

This initial elastic behaviour reflected the material properties of the rockbolt component in the anchor system as well as the cohesiveness between the rockbolt, resin and rock. As the MPL is less than the UTS of the rockbolt, the MPL is likely to indicate failure of either the resin/rock or resin/rockbolt interface or both.

Beyond the MPL, the resistance to the externally applied load fell away with further displacement of the rockbolt until a residual resistance level was reached for the anchorage system. It is interesting to note that this residual resistance still represented a reasonably high value equivalent to about 70% of the MPL.

Consequently even after failure of the resin interface, a fully encapsulated rockbolt can still provide an appreciable level of resistance against separation of rock strata.

It should be cautioned, however, that the level of this residual resistance might be dependent on the nature of material properties of the surrounding rock mass and further testing would be required to confirm this.

CONCLUSION

The test program indicated that there was an optimum range of resin annulus thickness within which there was little change in the performance of a fully encapsulated rockbolt anchorage system.

Outside of this optimum range there was a reduction in the MPL as well as other properties of the anchorage system. For example, it was found that in the case of a 21.7 mm rockbolt when resin annulus reached 5 mm in a 32 mm diameter hole, a reduction of nearly 25% was observed in MPL from that achieved within the optimum annulus range. This can significantly degrade the capability of the rockbolt to bind together rock strata. It has yet to be demonstrated whether the optimum range of resin annulus, and hence allowable tolerance of the hole diameter, varies with the diameter of a rockbolt.

The test program also indicated that a fully encapsulated rockbolt anchorage system may provide a reasonable level of resistance to the separation or relative displacement between strata even after the maximum load bearing capacity of an anchorage system has been exceeded.

These findings are in general agreement with recommendations by suppliers of rockbolt systems. The findings impress the importance of matching the correct hole size for a given rockbolt diameter.

ACKNOWLEDGEMENTS

The author acknowledges support by the Australian Coal Association Research Program (ACARP) for funding the research project. The project was also assisted by Celtite Pty Ltd which provided test materials. The author wishes to thank Dr M Smith for supervising the project and the contributions made by John Steel and Daniel Lin to the project.

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Appendix 4

Examples of spelling and hyphenation
of some technical terms

ball mill
blasthole
bypass
cost-effective
cross-cut
cross-section
cut-off
drill core
drill hole
et al
flocculent
fly-in, fly-out
hanging wall
headframe
impeller
in situ
in-depth
interlevel
iron ore deposit
jackhammer
jaw crusher
lead-zinc ore
liquid-solid separation
long-term
low-grade
mine site
multilevel
non-metallic
off-line
offshore
off-site
one-half
one-twentieth
ongoing
on-site
open cut
ore dressing
ore shoot
orebody
orepass
outcrop
overall
overflocculated
per cent
pre-existing
program
reagent
recleaning
recognise
regrind
rock-crushing plant
screen sizing test
self-actuated
short-term
sink-float system
solid-liquid interface
start-up
sublevel
sulfide
sulfur (also related terms)
test work
time frame
trialled
two-thirds
world-class
worldwide

adapted from Appendix 1 in AusIMM (2016)

Appendix 5

Abbreviations used in report writing

°	degree (angle)
°C	degree (Celcius)
A	ampere
A$	Australian dollar
AC	alternating current
ACF	Australian Conservation Foundation
AGC	Australian Geoscience Council
AGPS	Australian Government Publishing Service
AGSO	Australian Government Survey Organisation (formerly BMR)
Ah	ampere hour
AIG	Australian Institute of Geoscientists
AIME	American Institute of Mining, Metallurgical and Petroleum Engineers
alk	alkaline
am	antemeridian (before noon)
AMEC	Australian Mining Exploration Companies
AMF	Australian Mineral Foundation
AMIRA	Australian Mineral Industry Research Association International
AMPLA	Australian Mining Petroleum Law Association
and	not abbreviated (do not use “&”)
aq	aqueous
AR	Analytical standard of purity
AS	Australian Standard (usually with number and date, eg AS373S-I990)
at	atomic
at wt	atomic weight
atm	atmosphere/atmospheric
ATS	Australian Tunnelling Society
ATSE	Australian Academy of Technological Sciences and Engineering
av	average
bbl	US petroleum barrel
BHN	Brinell Hardness Number
BS	British Standard
BSS	British Standard Specification
cal	calorie
calc	calculated
cf	compare
CIM	Canadian Institute of Mining Metallurgy and Petroleum
cm	centimetre
cm/s	centimetre per second
cm^2	square centimetre
cm^3	cubic centimetre
cm^3/s	cubic centimetre per second
CMMI	Council of Mining and Metallurgical Institutions
coeff	coefficient
const	constant
cos	cosine
cot	contangent
crit	critical
cryst	crystallised
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CV	calorific value
d	day
db	decible
r	density
DC	direct current
Dept	department
dia	diameter
dil	dilute
E	east
ed(s)	editor(s)
edn	edition
η	efficiency
eg	for example
EPA	Environment Protection Agency
eqn	equation
equiv	equivalent
equiv wt	equivalent weight
ESD	ecologically sustainable development
etc	etcetera
eV	electron volt
€	Euro

expt	experiment(-al)
ft	foot
g	gram
g mol	gram molecule
G	Newtonian constant of gravitation
g/L	grams per litre
galv	galvanised
GBP	British pound
GSA	Geological Society of Australia
h	hour
ha	hectare
horiz	horizontal
ht	height
Hz	Hertz = frequency
ibid	in the same reference
ie	that is to say
IMA	Indonesian Mining Association
IMMA	Institute of Metals and Materials Australia
in	inch(es)
IoM^3	The Institution of Mining, Metallurgy and Materials
ISO	International Organisation for Standardisation
J	joule
K	degree absolute (Kelvin)
kg	kilogram
kJ	kilojoule
km	kilometre(s)
km/h	kilometre per hour
km/s	kilometre per second
km^2	square kilometre
kPa	kilopascal
kV	kilovolt
kVA	kilovolt ampere
kW	kilowatt
kWh	kilowatt hour
L	litre
L/s	litre per second
lat	latitude
liq	liquid
long	longitude
m	metre
MW	megohm
m/s	metre per second
m^2	square metre
m^3	cubic metre
m^3/h	cubic metre per hour
m^3/min	cubic metre per minute
max	maximum
MCA	Minerals Council of Australia
mg	milligram
MHz	megahertz
MICA	Minerals Industry Consultants Association
min	minimum, minute
ml	millilitre
mm	millimetre
mm^2	square millimetre
mm^3	cubic millimetre
MMIJ	The Mining and Material Processing Institute of Japan
mol wt	molecular weight
mol	mole (amount of substance)
mol	molecule/molecular
mol/L	molecules per litre
μg	microgram
μ	micron
μm	micrometre
M	million
ms	millisecond
Mt/a	million tonnes per annum
mV	millivolt
MW	megawatt
N	Newton, north
nb	note well
Nm^3/h	normal cubic metre per hour
NNW	north north west
No(s)	number(s)
NPV	net present value
Ω	Ohm
op cit	in the same place previously cited
p/pp	page/pages
Pa	pascal
Pat	patent
%	per cent used in tables
per cent	per cent used in text

pers comm	personal communication
PESA	Petroleum Exploration Society of Australia
pH	measure of acidity or alkalinity
pm	postmeridian (after noon)
ppb	parts per billion
ppm	parts per million
qual	qualitative
quan	quantitative
rad	radian/radius
rev	revolution
rev/min	revolutions per minute
s	second (time)
S	south
SAIMM	Southern African Institute of Mining and Metallurgy
SD	standard deviation
SE	south east
ser	series
SI	International System Units
sic	incorrectly written in the original
sin	sine
SME	Society of Mining, Metallurgy and Exploration Inc
soln	solution
sq	square
SSW	south south west
t	tonne
t/a	tnne per annum
t/d	tonne per day
t/h	tonne per hour
t/m	tonne per month
tan	tangent
temp	temperature
TMS	The Minerals, Metals and Materials Society
US$	US dollars
V	volt
var	variety
vel	velocity
η	viscosity
vol(s)	volumes(s)
vs	versus
W	Watt, west
w/v	weight for volume
w/w	weight for weight
Wh	watt hour
wk	week
WNW	west north west
wt per cent	weight per cent
wt	weight
yr	year
¥	yen

adapted from Appendix 2 in AusIMM (2016)

Appendix 6

A checklist for report writing

FORMAT		
heading and subheadings	laid out logically and consistently at each level (size and style of headings)	pp14-15
decimal and numbering system of sections	used accurately and consistently; in most cases no more than three levels of heading is necessary in most reports	p 15
page numbers	place in top right hand corner	p 15
headers and footers	it most instances they are unnecessary so avoid using	p 15
physical presentation, legibility, layout	include title page; stapling suitable for short reports but for longer use more heavy duty forms such as comb binding or perfect binding do not use place separate pages in individual plastic sleeves	
TABLES AND FIGURES		
key tables/figures	placed in main body of report: each table and figure must be labelled and referred to in the text of report	pp 18-21
significant figures	round values to appropriate number of significant figures to reflect accuracy of value - generally three figures will suffice; use scaling factors for units and/or scientific notation	pp 16-17
captions for tables and figures	concise but self-explanatory; captions for tables placed above the table; captions for figures below the figure	p 21
caption information	concise summary that complements the information stated in the text	p 21
data in tables and figures	consistent (cross-checks) with the data in text	p 19
symbols, labels and signs	explained clearly	pp 17-18
notation/asterisks	explanatory notes provide further information immediately below table/figure	
reference citation	if table or figure not your own then cite source	p 22
STRUCTURE		
names/titles of people etc	spelt correctly and appropriately acknowledged	
summary	written to highlight and summarise significant information; usually less than 250 words and address three dimensions - what is the objective of study/purpose of report, what you did and, what you found/conclude/ recommend	p 8
table of contents	clear and simple structure on page; matches exactly the headings in the report; include section numbers cross referenced to page number in report	p 9
page numbering	on preliminary pages use Roman numerals up to and including contents pages; restart page numbering using Arabic numerals from the introduction section	p 15
definitions of new terms	expressed accurately and clearly	p 9
abbreviations and acronyms	written out fully when first used with abbreviations in round brackets	p 28
report self-contained	includes all relevant information	
appendices	each appendix referred to in main body of report; contains information to support findings; only contains relevant information; do not use to “bulk-up” report	p 12

CONTENT		
information content	depth and appropriateness; uses sufficient referenced material; author's opinions/key findings clearly stated; assumptions clearly stated especially if not all information was not known or accessible; information by other authors to support argument is clearly referenced	p 31
quality of discussions and conclusions	answers the question/problem/objective posed in the introduction – states how the objective of the study was fulfilled.	
REFERENCING		
acknowledgement of all sources of information (other than your own) in figure captions, tables and whenever paraphrased or quoted in text	cite all reference sources using author/year system in main body of report	pp 35-40
reference list	full bibliographical details provided for all reference sources; all references cited in report must be included in list; only references cite in report to be included in list; list of references sorted by author and year	pp 11-12, 36
reference components	all elements of reference provided (author, year, title of publication and publisher) and laid out in the preferred style	pp 44-50 App 1
punctuation	follow exactly the standardised punctuation; be consistent; use of capitals and italics as required	Table 14
TECHNICAL		
wordiness	ensure report has been adequately proofread and proofread; check spelling conforms to Australian standards; omit redundant or unnecessary words and phrases and, avoid obfuscation!; use plain and simple english; avoid "old world words and phrases such as appertaining to, herewith	p 23
avoid colloquialisms	avoid everyday informal language; for the message to appear impartial, to engage the reader and ensure wide acceptance of report findings it is better to adopt a formal writing style	p 24
sentences	complete, tight and varied in length; avoids long sentences	p 24
passive voice	used appropriately to emphasise the object of action rather than the agent; avoid first person, use third person appropriately.	pp 24-25
parallel construction	applied accurately for lists of information	p 27
agreement	subjects and verbs are related in number and person, e.g. she does, they do, it does	
other expression	gender inclusive language, grammar, punctuation, tenses, fluency, correct word choice, conciseness, avoids clichés	pp 23-24

adapted from Winckel and Hart (1996)

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QUICK GUIDE TO REFERENCING

All sources of information and material used in a report that is not your own original work must be acknowledged in the report. This includes text whether it is a direct quotation or paraphrased and whether it is used in whole or part as well as any other material such as a table of information or some form of illustration. The referencing system has two parts with the author(s) and year of publication cited in the body of the report next to where the material is used. The in-text citation links to the full publication details contained in the References section of the report.

The type of information that needs to be provided for a hardcopy reference source includes:

- Editor's surname
- Author surname
- Author initials
- Year published
- Conference title
- Journal title
- Title
- The pages used
- The Publisher
- City of Publisher
- Published or not
- Title of contact

The type of information that needs to be provided for an electronic media reference source includes:

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- Author surname
- Author initials
- Year last updated
- Conference title
- Journal title
- Company name
- Name of page
- Date accessed
- The pages used
- Online book info
- Source type

Examples of referencing popular information sources

Book

Boldt, J R, 1967. *The Winning of Nickel,* pp 27-32 (Van Nostrand: New York).

Hagan, P C and Mort, P, 2018. *Report Writing Guide for Engineers* (Mining Education Australia).

Information from a website

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Article or paper on a website

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For more information on referencing refer to Chapter 7 in the *Report Writing Guide for Mining Engineers*

Notes:

1. Generally only the Uniform Resource Locator (URL) for the site home page of the reference source needs to be included. If the page URL of the information being cited is reasonably short, that is less than one line, then the full URL may be included.
2. An author of a website can include an individual, a group of individuals, a company, an organisation, a department, an institution etc.
3. If a website does not state when it was created or last updated then the abbreviation n.d. (no date) can be substituted for the year of publication.
4. If there is no obvious author for the reference source then use the title of the document or webpage in place of the author followed by the year and other publication details as per the standard syntax.

Prepared by James Tibbett, Pam Mort and Paul Hagan, UNSW

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for Engineers