Report Writing Guide

for Mining Engineers

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Annotations included for ENGG1100.

- Yellow highlight used to emphasise a point.
- Green highlight used when something is not required for ENGG1100.

MEA
Mining Education Australia

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PREFACE

This edition of the *Report Writing Guide for Mining Engineers* (*MEA Report Writing Guide*) has been revised and expanded in order to better contribute to an improvement in the effective communication skills of students; a graduate attribute of the Mining Education Australia (*MEA*) program. The revisions include a new chapter on referencing in reports and in the appendices, samples of a technical report and a conference paper.

MEA is a collaborative development between the Curtin University of Technology (*Curtin*), the University of Adelaide (*UA*), the University of New South Wales (*UNSW*) and the University of Queensland (*UQ*) that aims to improve the quality of Mining Engineering education. This initiative is supported by the Minerals Council of Australia (*MCA*).

The *MEA Report Writing Guide* is intended to assist students enrolled in the *MEA* Mining Engineering Program through the process of report writing by answering many of the "how should I…" type questions that invariably arise when preparing an assignment. It should be useful when preparing reports for laboratory exercises, design projects and the mining research project or thesis. The *MEA Report Writing Guide* will be a valuable resource to students not only whilst they are at university but also later in their professional career as graduate engineers.

The *MEA Report Writing Guide* has two major aims:

- To outline the standards and conventions of technical report writing as defined by the Australasian Institute of Mining and Metallurgy (*AusIMM*), the professional association for Mining Engineers, which has specific requirements for material included in its publications including technical papers in the conference proceedings.
- To contribute to an improvement in the quality of students' written assignments.

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Editorial assistance for the sixth edition was provided by various *MEA* academic staff members and in particular by Dr Basil Beamish at *UQ*. Their contributions to the *MEA Report Writing Guide* are acknowledged.

The authors welcome any comments and suggestions for future editions of the *MEA Report Writing Guide*. Please contact either:

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001: Introduction

The *MEA Report Writing Guide* was written to help you, the student, to write better reports. This document is not intended to constrain the creative talents of students but to inform you of the norms and conventions of technical report particularly in terms of *structure, format and style*. If a student is made aware up-front what is expected in a report then they will have a better chance of meeting this expectation and when it comes to assessment, being appropriately rewarded for their efforts.

It is an unfortunate misconception held by some students on entering an engineering program that communication is not important and especially written communication. Rather it is considered that engineering is all about maths and physics and to use this knowledge to construct things. This perception could be no further from the truth. As well as design and construction, an Engineer will often need to communicate with others whether it be in a business setting, with their peers or while studying at university. There will be occasions when for example a Mining Engineer will need to convince the Board of Directors and/or those in financial institutions to provide funding for a mining project; to convince their manager or a client that a design, plan or mining strategy will meet their particular needs and objectives; or, to justify what needs to be done, when and the estimated costs and rewards.

Technical writing needs to be accurate and precise to avoid confusion and ambiguity and this is no less so in mining when for example as a Mining Engineer you are required to prepare instructions for mine operators where lack of clarity might have fatal consequences.

Report writing is the most common form of written communication used by an Engineer and using its needs to become second nature if you wish to become successful in your career. It is used in industry, whether in an operational, management, technical or research role. It is a method of communication that has been found to be well suited to recording observations and analysis, and conveying this information to others.

ENGG1100 requires you to produce two (2) professional reports. It won't be the only course to assess you on your communication skills.

To this end proficient report writing is a graduate attribute in the *MEA* Mining Engineering Program. As evidence of its importance to industry, Engineers Australia requires this is included in all engineering programs that it awards official accreditation.

The sooner a student realises the importance of good report writing and begins to develop the skills of effective report writing, the better the engineer and in the short-term, the better the marks a student should receive for assignments whilst at university.

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 written in an impersonal style. But as with all skills, a student should become proficient given time, practice and persistence.

Developing this skill will not only ensure the intended message is understood but it will allow the student to concentrate more on the report's content and message that is wished to be conveyed.

While at university use this time to hone your report writing skills so that when you graduate and are ready to begin your professional career you will have made significant headway in mastering this form of communication.

It is recommended students always have available the *MEA Report Writing Guide* when preparing each reporting assignment. The document outlines *the report writing standard for all the courses in the MEA program* and hence is a key element in the assessment criteria of student assignments.

Initially it is likely a student will have to often check on the standards and conventions but, over time, this knowledge should become second nature. It is also suggested you examine the report writing efforts of others as there are many variations possible that conform to the standards.

Students should be aware that report writing requirements may differ outside of *MEA* (including between different university departments) and that some fine tuning may be required. This could arise for example during industrial training when you find your employer has slightly different reporting requirements. Even so many of the underlying elements of report writing are essentially similar.

However the basics will be the same. I have indicated in this document where ENGG1100 requirements differ.

While there are many publications available on engineering and scientific writing with several of these listed in the *References* section, two of the more important publications which students should obtain are:

- *AusIMM Guide to Authors* (AusIMM, 2008). This is published by the Australasian Institute of Mining and Metallurgy (*AusIMM*) which is the professional society for Mining Engineers in Australasia and outlines the requirements for its publications. A copy of the publication can be downloaded from their web site at <www.ausimm.com.au>.
- *Style Manual for authors, editors and printers* (Snooks and Co., 2002). This publication is the reference standard throughout most of the government and private sectors in Australia as it "provides guidance for anyone faced with the task of preparing material for publication."

These publications are referred throughout this document as *AusIMM Guide to Authors* and *Style Manual* respectively.

When undertaking the research project in the final year of the *MEA* program, students should be aware of the specific requirements for the preparation of a thesis. These requirements are outlined in "Preparation and Submission of Master by Research and Doctoral Theses for Examination" in *Calendar Summary Volume* (UNSW, 2006a). Similar documents should be available at your home university.

Information specifically on thesis writing can be found in:

- *Practical Aspects of Producing a Thesis at the University of New South Wales* (UNSW, 2002);
- *Writing an Honours Thesis* (Wolfe, 1995);
- *Writing and Presenting Your Thesis or Dissertation* (Levine, 1998); and
- *Research and Study Skills Internet Links* (UNSW, 2005a)

002: Aims of report writing

What is a report – its aims and objectives?

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

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

As well as being used as a means of recording information, reports can be used to present and discuss options or present an argument intended to influence others in decision-making. How well this is done will be dependent on:

- the quality of the information presented in the report;
- the persuasiveness of the conclusions and recommendations;
- the quality of the report – how well it is prepared and presented to the reader.

In ENGG1100 we ask you to write your report for Project Leaders that do have an understanding of the topic and engineering processes. YOU CAN THEREFORE WRITE KNOWING THAT YOUR READER UNDERSTANDS THE SAME THINGS YOU DO.

Who asks for 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 these reports is an important aspect of the learning process. It is meant to not only aid in understanding of scientific and engineering principles but also to improve the process of report writing and the quality of your reports.

As a graduate, you are likely to be asked to prepare reports for your supervisor or manager in order to record information, an event, the options on a particular subject, the design of a new project or the outcomes of a completed project or operation.

One critical piece of advice that may help in preparing a report is to *direct your writing to the "average" person,* a person who may have a general knowledge of the topic but who may not necessarily be a technical expert. In

preparing reports, students often make the (understandable) assumption that the lecturer is an expert in the field and understands all the concepts and technical language used in the report. This can lead to short-cuts being taken by the student.

In industry, such assumptions may have undesirable consequences in terms of an unfavourable response, outright rejection of the report and its findings or, implementation of the wrong design leading to a catastrophic event.

It is suggested students practise writing for the average person whilst at university so you will be accomplished at 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 compiled in 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 common “look and feel” to a report. While the report could be primarily intended for your supervisor, it may also be read by your peers, those in senior management or indeed anyone within the organisation.

Whatever the purpose and whoever the audience, the objective is to gain acceptance of the concepts, ideas and recommendations contained in the report. Effective communication will contribute to acceptance of the report and its content.

The mechanics of most writing, be it an essay, play or novel, usually have some common elements of structure, format and style. In a report these elements of writing are just as evident and have evolved with changes in science, engineering and business.

Adoption of a common structure, format and style in a report will improve the communication process by minimising the clutter or noise that might otherwise confuse and distract the reader. Despite this commonality, there is still sufficient flexibility that reports can be adapted to the needs of different audiences and objectives. Each of the elements of report writing 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 process of report writing

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 objective, investigation, planning, drafting, editing and re-editing.

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 questions involving who, what, why, when, where and how related to the report.

- Who is the intended audience of the report?
- What is the topic of the report?
- What is the objective/aim of the report?
- Why have you been asked to prepare the report?
- When does the report need to be submitted?
- Where are the resources to be used in preparing the report?
- How will the report be distributed?

Ask these questions each time you begin a 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 industrial processes and systems. All of this information may need to be documented and analysed. Alternatively, a project may involve experiments to collect data to test a hypothesis. In all such cases, you will need to consider the following questions.

- 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 a list of the headings and subheadings that will be used in a report; in essence the order in which information to support the conclusions and recommendations are presented. 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 to form the basis of a report's contents page.

Drafting and editing

Writing a report usually requires a number of drafts to ensure a consistent professional standard and ensure that the report's objectives have been met. You will need to do the following.

When writing as part of a team, begin with a Style template.

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 non-essential 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 and figures are often included in reports to 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 that are more likely to spot any errors or holes in the argument.
- Ask someone else for their comment 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 1*. You may wish to compile your own checklist. 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 necessary to properly format and edit a report is frequently underestimated. This is unfortunate as a poorly prepared report can reflect (perhaps unfairly) on the overall quality of the project, undoing much of the good work that may have been gone into collecting information and in the analysis.

Remember this in your planning. And include time for printing and binding.

004: Structure

The structure of a report differs from other forms of writing such as an essay or novel. Whereas an essay is usually read from beginning to end, often only particular sections of a report may ever be read by different people. For instance, senior management may only read the Summary and the Conclusions sections in a report to assess the project outcomes, whereas an Engineer might be interested in details of the analysis and what assumptions were made during the course of the investigation.

Depending upon its length and purpose, a technical report will generally include a number of parts. The more common parts in a report are discussed in the following sections.

Appendix 2 contains an example of a technical report that illustrates how these parts come together in a report as well as addressing elements of report format and style.

Don't forget to bind your report. This will add to the professional look and ensure no pages are lost.

Title page

The title page presents routine information and should indicate the contents of a report through an informative title. The design of the title page should be simple yet functional and appropriate for the audience and the task. Some of the more common elements found on the title page include:

- Name of Institution, School and/or Department (eg Curtin University, UA, UNSW, UQ))
- Person to whom the report will be submitted (in most instances the course convenor)
- Course name and code For ENGG1100, include your project group and team name.
- Title of the report
- Author (student's name and number)
- Date of submission.

In addition to the formal title page for the report, most universities require their students to attach a standard Assignment Coversheet with a signed declaration as to ownership of the work. You should refer to your particular Course Outline/ Profile for requirements at your university.

Statement of Originality*

This is generally not required in most technical reports as the Assignment Coversheet will normally suffice.

The Statement is a formal declaration made by the author(s) that it is their own original work and all sources of information including data, illustrations and copyrighted material contained within the work have been properly acknowledged. The declaration is usually included at the beginning of a thesis immediately after the title page.

Summary

The summary contains an overview of *the most important aspects of the report*. While it can sometimes be called a Synopsis, Executive Summary or Abstract, it is recommended to use the term *Summary* in all *MEA* reports.

*** 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.

Abstract is the term used in a thesis and in scientific publications such as journal articles and conference papers. While the other terms are sometimes used its use is discouraged in *MEA* reports.

Ideally the summary should be *less than one page* and contain no more that 250 words. It must be placed after the title page and before the contents section in the report.

The summary should succinctly state the objective; a description of the process/method undertaken in the investigation; and, the major conclusions and recommendations.

Examples of a summary section together with 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 exposure 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 country rock.

Table 2
An example of a more concise Summary section written by a student.

SUMMARY

Valley-Power Coal has secured a contract with Valley-View Power Station to supply up to 4.5 Mtpa of coal. The results of this study has found that the best haulage option for Valley-Power Coal 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 5 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), upfront costing ($10.69 million capital outlay) and running cost ($2.19 per tonne).

Acknowledgments*

In this section the author acknowledges the people and organisations that helped and supported the project for example by providing resources and/or information. This would usually include the name of the mine or organisation and relevant key people involved in the project. A few sentences or a short paragraph is usually all that is required. An acknowledgment section is normally included in a thesis, conference paper and research report.

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 *not* included in the list of contents. However whenever there are separate lists of figures, tables and/or abbreviations then these should be included.

For details on the how to number pages in a report see the section on *Page numbering* in the chapter on *Format*.

List of figures and tables*

A list of the figures and/or tables contained in a report is often included as an adjunct to the Contents section.

A separate listing is made for each of the figures and tables. Each listing 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

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 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 larger 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 have to be prepared on the findings of a study on say alternate dust suppression systems for haul roads. In other cases it might be required to report on observations and information gathered during a field trip to several mine sites detailing leading 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 might entail:

- history of the issue;
- 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 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.	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.
In terms of Style, note the inappropriate change in tense in the one paragraph - past, present and past again. Replace "is" with "was found to be"	The direct distance between the sites was found to be 15 km and approximately 30 km by haul road. The required capacity for the materials handling system was given as 8 Mtpa. The design life of the system is 8 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.
Note the use of past and future tense in one phrase - "was to be."	The final decision on which bulk haulage option was to be recommended was based on: • economic viability, • environmental considerations, • safety considerations, and • social considerations
Main criteria to be used are clearly presented. Brief description of methodology and report structure is included	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 which will permit the method, results and conclusions to be reviewed and, if necessary, modified and/or repeated.

It is usually important in such instances to draw conclusions from the data and to place these conclusions in the context of other related work, that is in the published literature. Typical section headings might include:

- Theory (and/or current knowledge on the subject setting the context for the project);
- 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.

Practical work 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
- Outline of industrial relations.

Conclusions

Every report must 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 will this might have on the subject.

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

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 beyond the 400 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.*

Recommendations

The Recommendations section outlines what further work might be necessary 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 references that were cited in the main body of the report.

The reference list must be sorted alphabetically by author(s) and by year of publication.

There are specific requirements as to what publication details need to be included for each reference, the order in which this is arranged and the punctuation that must be used. See the chapter on *Referencing* for further details. The References section in the sample technical report shown in *Appendix 2* provides examples of referencing different types of information sources and typical format.

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.

The main body of the report should contain information that is directly relevant to the discussion. Information that indirectly supports the discussion should be inserted as 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 details in the *Section numbering* in the chapter on *Format* for details on numbering convention in an Appendix.

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

- listing of raw/primary 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.

005: Format

Layout and formatting

The layout and format of a report is a matter of personal preference but there are some norms that should be observed. In any case, the chosen format should make the report easy to read and be pleasing to the eye – the format should not be a cause for annoyance or distraction to the reader.

Importantly, ***consistent*** formatting must be used throughout a report. Table 6 shows typical format settings suggested in a report.

Italics and bold fonts are used whenever special emphasis is desired for particular words in the text. A common trap for novices is to make *too much use* of the various font options and this should be avoided.

Which is why a template is so important when you write as a team.

TABLE 6
Typical format settings for a report.

Format option	*Setting*
Typeface – text in the report	A serif typeface such as Times New Roman, Constantia or Palatino
Typeface - section headings	The same serif typeface as the text although a sans serif typeface is often preferred eg Arial, Calibri or Helvetica.
Font size	12 point
Spacing between sentences	Single space after full stop
Spacing between paragraphs	12 point
Line spacing	single spacing
Left margin	25.4 mm (alternatively 30 mm)
Right margin	25.4 mm (alternatively 20 mm)
Top margin	25.4 mm (alternatively 20 mm)
Bottom margin	25.4 mm (alternatively 20 mm)

These can be used for the main body too. Verdana is another good one.

Try and keep to one or two fonts though.

The *italics* font is used to give emphasis to a phrase or an entire sentence. It can be used to denote a quotation and 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 one or two words at a time. Where emphasis is required for three of more words then it is suggested to use italics. Bold is often also used for major section headings in a report.

A third option that can be used to give emphasis in the text of a report is the use of CAPITALS. This option is particularly useful in circumstances 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." Since words set in capital letters are more difficult to read, it 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 occasions when you might want to alert the reader to where use of certain options may not be appropriate. Underlining is particularly effective whenever part of a word needs to be emphasised, for example unrepresentative. As with the use of Capitals, underlining should be rarely used in reports.

A list of layout settings recommended for use in a report is shown in Table 7.

Many word processing software packages now include provision for style sheets. Once configured, these simplify the task of formatting the different elements of a report such as font type, size and line spacing for section headings, paragraphs, figure captions etc. Style sheets also help to ensure consistency in formatting throughout a report.

On a final note, combining of different fonts (that is italics, bold etc) should be avoided (as opposed to ***AVOIDED***).

Section numbering

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

There is no need to increase font sizes for headings. However this is at your discretion.

ALWAYS number sections in engineering reports.

Move to i), ii) etc if you need 4 levels.

Table 7
Report layout settings.

1. HEADING	18 point (pt) Arial (sans serif) bold font, small/all caps, start each section with a new page.
1.1 HEADING	14 pt Arial bold font, all caps, 18 pt line space before.
1.1.1 ***Heading***	12 pt Times (serif) italic bold font, align left, 12 pt line space before. Note the start of the text in all three levels of section headings (as opposed to the numbering) is aligned perfectly.
Text in report	12 pt Times font, left and right justified margins, sentence case
Tables/Figures	Centred on page with 12 pt spacing from text
Table/Figure captions	10 pt Times font. Centred above Table/under Figure
Table contents	10 pt or smaller Arial font
Header	10 pt Times italics font, thin line below the text
Footer	10 pt Times italics font, thin line above the text
References	12 pt Times font, align left, indent second and consecutive entry lines

Similar to the main body of a report, an Appendix can be divided into sections each containing disparate information. A different numbering convention is used to distinguish it from the rest of the report. Two numbering systems that are often used in reports are:

- Appendix A, Appendix B, Appendix C etc; or
- Appendix 1, Appendix 2, Appendix 3 etc

Numbering of tables and figures in an Appendix should be separate to that 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 certain Appendix, for example "...as shown in Table 3 of Appendix 2..."

Page numbering

Page numbers for all the preliminary sections up to and including the Contents section are set in Roman numerals, usually in an italics font (*i, ii, iii* etc). The report's coversheet and title pages should NOT be assigned page numbers.

Page numbering recommences with the start of the main body of the report after the Contents section which is usually the Introduction section. By convention page numbers in the main body of a report are set in Arabic numerals (1, 2, 3 etc).

While in most published works and theses, page numbering in the Appendix often follows on from the main body of the report, the numbering of pages in the Appendix of a technical report is optional. Even so, the various sections contained in the Appendix should be listed in the Contents section.

While there are several positions on a page where a page number can be located, the preferred position is in the top right hand corner of the page and if using a word processor, within the Page Header section of the page.

Page headers and footers

Page Headers and Footers are often over used. The best advice is to include only minimal information such as page number.

I recommend only a footer with page number and unique report ID of some kind.

In textbooks, the Header often contains 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 information for document control, the name of the organisation or author.

Include a unique report ID.

All too often quite elaborate designs for Headers and Footers are used containing information that adds little value. The main problem is that too much information can 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?

Whenever used, their impact can be toned down by using a smaller font size.

In a thesis, the convention is to place only the page number in the Header and nothing in the Footer.

Numbers and units

All measurements should be stated in metric units according to industry convention and abbreviated to the International System of Units (*SI*), for example:

- volume of waste rock or other material is usually reported in cubic metres, or when referring to material movement in millions of cubic metres *in situ* or bank (bcm), eg 1460 m^3, 2.8 x 10^6 bcm;
- mass of mineralised rock is reported in tonnes, kilotonnes or million tonnes, eg 2.45 t, 12.4 Mt;
- production rate is usually reported in tonnes for product and volume for mullock/waste material per unit of time, eg 34.5 Mtpa, 67 t/h;
- material density is usually reported in units of tonnes per cubic metre eg 2.45 t/m^3, 3.2 t/bcm;
- blasthole diameter and length of blasthole are usually reported in millimetres and metres respectively, eg 215 mm, 12.5 m;
- rock strength is reported in megapascals, units of stress, eg 132 MPa;

Note space between number and unit.

Include a date if costs aren't current – $4.5M (Q3, 2008)

- units of currency are by default reported in Australian dollars (eg $4.3M) but if two or more currencies are used within a report then a prefix can be used to distinguish between each currency eg A$145M, US$6.2M; and
- use the symbol % when combined with a numerals (eg 6%) but write the words "per cent" when a number is spelt out (eg ten per cent of...).

A list of abbreviations of some commonly used units in mining can be found in *Appendix 5*. A more comprehensive discussion on units and numbering can be found in Chapter 11 of the *Style Manual* (Snooks and Co., 2002) and in Section 12.3 of the *Field Geologists' Manual* (1989).

When stating a number in a report use either an appropriate scientific notation to adjust the value (eg $x10^6$) or a scaling factor to adjust the unit (eg M for mega $x10^6$, k for kilo $x10^3$, m for milli $x10^{-3}$).

You decide based on what the reader wants to know and what is important. e.g. 482.5kg or 490kg or 0.5t?

Pay particular attention to the number of significant figures as this reflects the accuracy assigned to that value. In most instances three significant figures will normally suffice.

A mistake often made by students when using spreadsheets is to cut and paste a calculated value directly into the main body of a report, neglecting to adjust the number of significant figures. For example in calculating the tonnage of ore reserves, the student might determine the value to be 1 346 578.574 t—inferring an accuracy to ±0.5 kg. The corresponding value that should be inserted in the report is 1.35×10^6 t or 1.35 Mt.

Be wary of inadvertent changes between the upper and lower case of letters used in units as they denote different scaling factors, for example 10 MPa (ie 10×10^6 Pa) is not the same as 10 mPa (ie 10×10^{-3} Pa). Sometimes automatic spell checking in word processing software packages can change the capitalisation in units, eg 250 MPa (4) can be altered to 250 Mpa (8).

There are a number of conventions with respect to the use of numerals in reports. These conventions are summarised in Table 8.

It is suggested to insert a space between a value and its unit—both the value and its unit should appear on the same line. A non-breaking space placed between the value and its unit will ensure both will appear on the same line. In Microsoft Word, a non-breaking space is inserted by typing Ctrl-Shift-Space bar.

Formulae

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

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

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

Centre tabs can be set to align the centre of the equations.

TABLE 8
Conventions when using numbers in reports.

Rule	*Example*
Use numerals when combined with units of measurement and when associated with abbreviations.	4 km, 2 t, 6% The 2nd and 20th samples
For numbers of ten (10) or less then spell out numbers. Use numerals for numbers greater than ten that do not take a unit of measurement.	There are three ball mills... ...the circuit contains 26 flotation cells.
Spell out all figures if they are placed at the start of a sentence.	Twenty-five risk values are given
No commas or spaces used for values under 10 000.	1000 5870 9999
The number 10 000 and above has a non-breaking space(s) (Ctrl-Shift-Space bar).	11 000 kg or 11.0 t, 1 228 000 tonnes or 1.23 Mt
Express fractions as decimals.	2.5 s, 2.75 g

Equations should be consecutively numbered as they appear in the report, with each number placed in brackets and set using a tab to the right hand margin. Each equation should be referred to in the text of the report by its assigned number, for example "...as shown by Equation 1."

Visual information

Aside from text, other modes 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 discussed in the 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.

When designing visual information, ensure sufficient labels and headings are provided. Figures and tables should, as far as possible, be self-contained in terms of highlighting a particular point for the reader's attention.

Figures and tables should be included in a report only if they assist in the communication process. *They are used to supplement a discussion in a report and should not be used as a substitute*. As such they should form an integral part with the text and not be used as a separate means of communication.

Sometimes they are preferrable to prose.

Hence each figure, table and equation contained in a report must be referred to by its caption number in the text of the report. Further, it should explained in the text of the report, the particular points that are intended to be illustrated in the figure or table; that is explicitly tell the reader what to look for in the table or figure.

The caption for a figure or table has two parts: *a number and a short description*. It is customary to consecutively number all figures and tables in the order that they are placed in the report (eg Table 1, Table 2 and, Figure 1, Figure 2 etc).

When referring to a figure, table or equation, it is sufficient to refer to the respective figure/table number. Do NOT use expressions such as "refer to the figure above…" or "as the following figure shows…" It is not only redundant but opens the report to errors as later editing may alter the location of the figure relative to the text.

The words figure, table and equation should be treated as proper nouns when used in the text of the report as well as in the caption and should not be abbreviated, for example "...as shown in Figure 1."

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

- *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 1.

Needless to say, it is always desirable to place the figure or table in close proximity to and preferably after the paragraph where it is has been referred to in the text of the report.

As with values and units, it is good practice to insert a non-breaking space between the word Figure (or Table) and the caption sequence number to ensure both appear on the same line.

The report must acknowledge any figure or table that is copied or adapted from another work. Otherwise it is considered as plagiarism and possibly a breach of copyright. Use the author-date system to include the reference citation in the label caption and provide the full publication details in the References section of the report.

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 9.
- Figure: the reference follows the figure caption within brackets using an expression such as "(after Jones, 1996, p 42)" or "(Jones, 1996)." Examples are provided in Figures 2 and 3.

When copying a table or a figure from another publication do NOT paste the caption in the report. The original caption is unlikely to be compatible with both the numbering system and formatting used in your report. Instead create a new caption for the table/figure in keeping with the rest of your report.

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 9 illustrates the following points concerning the layout of a table.

- Data in the table are arranged with column and row headings.
- Units where appropriate are provided within brackets in the column heading.
- The table is centred on the page.
- Lines are used to differentiate headings from data in the table. Shading and colour should not be used.

Resist the urge unless you are using colour to help the reader (e.g green shading shows good practice, red shows bad)

TABLE 9
Properties of different mineral types.

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 (1989)

- 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.
- A table should not be copied and pasted as a scanned image into a report. It is preferred that the information should be re-typed into the report.

Figures

Each illustration should be selected so that the message intended to be conveyed is clear and unambiguous.

The quality of the illustration is also important. If the image is of poor quality then it should not be included as it will only detract from the quality of the report. Instead re-draw or re-graph the 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 be effectively used as a means to differentiate or highlight particular points in an illustration. It should be used judiciously, however, as overuse can distract when it is not intended.

The use of greyscale and different line types (thickness, solid/broken lines etc) can also be used to the same effect as colour.

The graph shown in Figure 1 illustrates the following points.

- The graph is centred on the page.
- The independent variable is shown on the x-axis of the graph and the dependent variable shown on the y-axis.
- Both axes are clearly labelled with units indicated. A bold sans serif font has been used to give added emphasis to each of the axis labels. The size of font is not too large as to be out of proportion with the graph.

Remember IF adding colour that photocopiers are usually black and white. Is your message/data still clear?

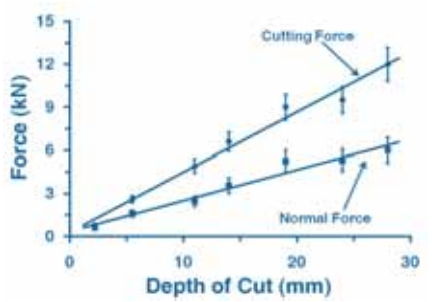


Figure 1. Variation in forces on a cutting tool with depth of cut.

- Values are shown on both axes. The upper and lower limits of the range for each axis were selected to more clearly show the nature of the relationship. Again a sans serif font was used but without bold and is 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 axis.
- 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.
- A label has been placed against each line to identify and distinguish the particular variable.
- As multiple measurements were made at each level of the independent variable the average value of the dependent variable is shown together with the corresponding range indicating the standard deviation.
- Note this is no figure title is included within the plot/chart area (which is included by default when using MS Excel) as the figure caption already serves this purpose.

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 a north direction indicator.

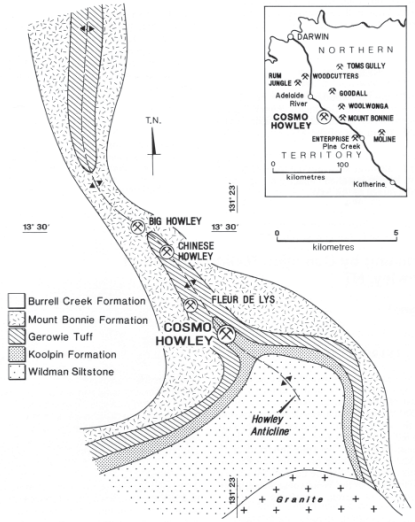


Figure 2. An example of a map or plan illustration (after Gloyne, 1993).

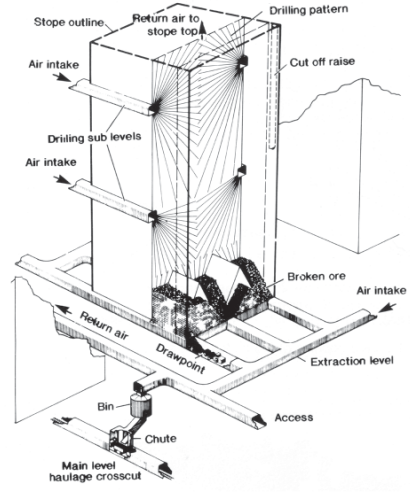


Figure 3. An example of a sketch or line drawing (Hall, 1993).

It is optional to enclose these illustrations within a border to designate the limits of the illustration on the page.

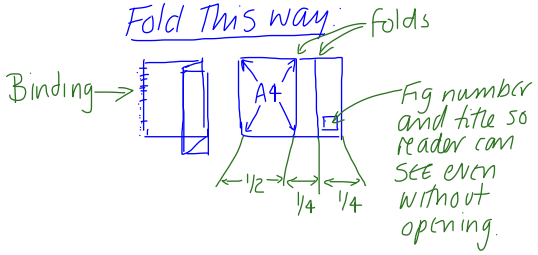
The geological plan in Figure 2 includes information necessary to identify the location of the mine, an insert locality map, a scale, arrow indicating direction of true north, longitude and latitude and a legend for the structural features used in the plan. Underneath the caption is a an acknowledgement as to original source of the plan.

Figure 3 shows an isometric perspective of a stope and various other underground excavations in an underground mine. Labels are used to identify the different elements surrounding the stope.

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

If they are important to the report, then place them in the body of the report.



006: Style

Aim to inform

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

An example of a literary sentence might read as:

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

A scientific/technical sentence would probably read as:

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

Since the primary aim of the report writer is to inform, emotive language should be avoided. You should try to convey information as objectively as possible.

Be concise

Avoid long sentences. Sentences with four or more clauses (or parts) can be 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: Dibble and Co., Sooky Ltd, and Bungle Pty Ltd, we have 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 sentences might be:

"Three manufacturers were consulted: Dibble and Co., Sooky Ltd, and Bungle 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."

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, while the 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.”

Similarly, avoid long paragraphs and especially one long sentence paragraphs. A simple but effective rule is that each paragraph should 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.

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’.

Do not use contractions of verbs and pronouns as these are ‘spoken forms’ (doesn’t, can’t, it’s, they’re). Formal writing at university and in the workplace requires use of the unabbreviated form (eg does not, cannot, it is, they are etc).

Be correct

Check that 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.

Sometimes you can see errors more easily if you do not proof read your writing until a day or two after finishing the draft. This is called ‘the bottom-draw treatment’ referred to earlier.

The UNSW Learning Centre has many resources available online on topics including punctuation, grammar and spelling that can be used to improve written expression.

Do not discriminate

Nondiscriminatory language must be used when talking generally about people. Nondiscriminatory language helps you avoid stereotyping, patronising and demeaning people on the basis of their gender, status or race. This issue will be even more important in the workplace when you graduate. Some examples of discriminatory language and acceptable neutral terms are provided in Table 10.

Check for jargon

Jargon is language and acronyms related to a particular field of knowledge or activity. Jargon is commonly used when communicating with others in that field. Communication problems arise when jargon is used in reports aimed at a more general audience.

Jargon can also include sub-technical words. This can cause confusion as some words will have a different meaning depending on the context. For example the word ‘fast’ has specific meanings in medicine (resistant to), mining (a hard stratum under poorly constructed ground) and painting (colours not affected by light, heat, or damp). Stress and strain to an engineer has a different meaning to a person with a medical background.

TABLE 10
Discriminatory terms and their alternatives in the workplace.

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

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

First person or third person?

The strong preference is to use the third person when writing a technical report (that is to use he, she, they, them, it). This creates a distance between you and the reader, but perhaps more importantly it *creates a formal and objective tone*. Unlike that which may be found in other forms of writing rather than expressing personal opinion, reports should focus on conveying factual information that is backed up by data, analysis, modelling or reference to other publications.

Whenever possible, avoid speaking directly to your audience (you, your) or referring directly to yourself (I, me, we, us, our).

Awkward sentence structure can arise when you write about actions and events without referring directly to who was involved. In such cases choose the 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)

“I observed a large deviation.”
(active, first person)

TABLE 11
An example of “wordy” 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.

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 your project team members performed some task or hold a particular opinion, then use the first person in an active clause.

These aspects of style are illustrated in Tables 11 and 12.

Engagement of the reader

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

In this case, a writing style was deliberately chosen which is more personal and would (hopefully) engage the reader.

To illustrate how the same message can be written in different styles, consider the following three passages from a document. Though the message is the same, the level of warmth and engagement differs between the three versions.

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 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; it is not intended to constrain creative talent. The document outlines the structure, format and style used in technical writing.”

A really good thing about technical writing is that we can use bullets. In many cases bullets are preferrable because they clarify data and make it more accessible to the reader.

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 is as a continuous sentence. Here each item in the list starts with lower case letters and ends with appropriate punctuation. For example…

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

The second type of list forms individual sentences. The opening sentence ends with a colon and each subsequent line ends with a semi-colon. For 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."

A third type of list is an inventory. Here you start each item on the list with lower case letters and do not punctuate until the end. For example…

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

Edited to show ENGG1100 preferences.

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 readability follow *the Parallel Rule*. The Parallel Rule occurs when a similar grammatical pattern is used to make a list. The writer begins each new item in the list in a similar manner. In Table 12, 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' etc.

TABLE 12
An example of "clear" 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.

Abbreviations and acronyms

Abbreviations and acronyms are frequently used in mining. Abbreviations are pronounced as letters, for example CSIRO (Commonwealth Scientific Industrial Research Organisation). Whereas acronyms are often pronounced as words, for example laser (light amplification by stimulated emission of radiation) and JORC (Joint Ore Reserves Committee).

When an abbreviation is used for the first time in a report, the full name is provided followed by in brackets the abbreviation. Subsequently only the abbreviation is used. When using abbreviations, do not use punctuation marks. An example of the use of an abbreviation is illustrated in the following sentence.

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

Appendix 4 contains examples of spelling and hyphenation of 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; the latter in each case is the recommended spelling in the *AusIMM Guide to Authors*. *Appendix 5* contains a list of some commonly used abbreviations.

Punctuation

Minimal use of punctuation is preferred in the mining profession. Understanding when and how to use punctuation helps you express ideas clearly. Some examples of correct use of punctuation are provided in Table 13.

TABLE 13
Punctuation conventions.

Name	*Symbol*	*Function*	*Examples*
Full stop	.	To mark the end of a sentence.	The overburden comprises 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

When should I reference material?

Whenever information is used in a report that was obtained by a student either directly or indirectly from a textbook, conference paper, report or any other source then details of the source of that information must be provided in the report.

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

Plagiarism - why reference at all?

Referencing is a means of acknowledging other people's ideas, information and work. If you fail to adequately provide details of the source then you may be accused of plagiarism which is a form of academic misconduct that can result in severe consequences for the student.

On a positive note, one important benefit of referencing to the student is that it indicates "you have done your research." This can be very important in assignments when you have been asked to demonstrate that you have discovered and read information relevant to the topic.

Acknowledging the work of others is a practise that you are expected to adopt whilst at university. It is also a practice that you will be expected to carry out as a professional engineer.

Finally, referencing the work of others is part of good academic behaviour. Each university has an expected level of student behaviour which in the case of plagiarism is usually defined in a policy statement. For example at UNSW this behaviour is defined in the *Policy on Academic Misconduct and Student Misconduct* (UNSW, 2005b). In the section of this policy under the heading on Ethical Use of Scholarly Material (UNSW, 2005c), the policy states:

"Students writing theses, essays and assignments must observe academic conventions in the ethical use of the materials of others.

The University seeks to enable students to acquire theoretical and practical knowledge that is both trustworthy and verifiable. The writing of research-based theses, essays and assignments is one way in which students approach this goal. These writings, in part, report on the creation of new insights and knowledge. In short, they represent scholarly work.

To maintain 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 writing essays, theses, and assignments, they are ethically bound…to cite the published (including, where relevant, the electronically 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…"

How do I include a reference in a report?

The method of referencing commonly used in science and engineering publications is based on the *author-date system* which is sometimes referred to as the name-year or the Harvard referencing system.

While there are many variants of the author-date system in use, that which must be used in the *MEA* Mining Program is a ***modified version*** developed by the *AusIMM* and used in its publications. Details of this version are contained in the *AusIMM Guide to Authors*. Use of any other variant of the system will be considered noncompliant and marks will be deducted accordingly.

What should be included in a reference?

As with many referencing systems, there are two parts.

The first part provides for an in-text citation placed next to where the information is contained in the main body of the report. The citation includes the name of the author(s) of the reference source together with the year in which it was published. Depending on the structure of the sentence, the author(s) may be placed within round brackets while the year is always placed within round brackets. Examples of two alternate forms of author-date referencing in a report are:

> Following analysis of the results of the core cuttability testwork, Roxborough (1988) is reported to have to found a reasonable correlation between the laboratory determined level of specific energy and performance of readheader machines.
>
> It has been found that the laboratory determined value of specific energy can provide a reasonable prediction as to the performance of readheader machines (Roxborough, 1988).

The second part of the system provides details of the reference source which for a journal article, book or conference paper are the publication details. These details are contained in a list within the References section of the report; see the section on *References* in the chapter on *Structure*.

In the case of the two in-text citations to Roxborough (1988) which is a conference paper, the corresponding publication details as they would appear in the Reference section of a report would be:

> 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).

What should not be included in a reference list?

The References section of a report should only include publication details of information that have been cited in the report. If an in-text citation to a reference source has not been provided in a report then it should not be included in the Reference list.

In some instances a students may be required to include an additional list of readings or other information sources that may have been referred to in preparation of an assignment but not actually cited in that assignment. This list of readings is often referred to as a bibliography.

A bibliography though is not usually found in a technical report and it should NOT be included in any *MEA* assignment unless specifically requested in the assignment briefing.

Further information on plagiarism

For students enrolled at *Curtin University*, relevant information on plagiarism can be found at:

- Guiding ethical principles at <http://www.policies.curtin.edu.au/documents/geps.docs>
- Academic misconduct at <http://www.policies.curtin.edu.au/documents/academic_misconduct.doc>
- Plagiarism at

  <http://www.policies.curtin.edu.au./documents/plagiarism.doc>

  <http://www.academicintegrity.curtin.edu.au/studentguide.pdf>

  <http://startup.curtin.edu.au/study/plagiarism.html>

Students enrolled at *UNSW* may find relevant information in the *Guidelines and Rules on Student Plagiarism* available at <http://www.lc.unsw.edu.au/plagiarism/link.html>

For students enrolled at *UQ*, relevant information can be found in Handbook of Policies and Procedures, Policy Number 3.40.12 available at <http://www.uq.edu.auhupp/index.html>

Some examples of referencing

Two examples of in-text referencing are shown in Table 13. The paragrah that includes a reference to the work of Brake and Bates in 1999 is an example of a direct quotation with words from the reference enclosed within quotation marks.

The paragraph referring to Eocene coals is an example of paraphrasing. Whenever a student summarises (or paraphrases) the original words from a source you are ***still*** required to reference the original author. Two examples of how to reference paraphrased information include:

> Keilblock *et al* (1998) simulated an ERS door being opened 30 times at the rate of five seconds per time…
>
> The oldest known sediments with reliable dates are of middle Eocene age, although it is possible that deposition may have begun earlier than this (Hutchison, 1996).

The two references concerning Roxborough are further examples of paraphrasing.

The following sections provide examples of referencing different types of information that can sometimes be found in reports. Note in each example the order in which the publication details are presented and the use of punctuation marks.

Further examples on referencing are provided in *Appendix 6* and in *Appendix 7*. A discussion of the author-date system together with extensive examples can be found in *Chapter 12 Methods of Citation* of the *Style Manual* (Snooks and Co., 2002).

Multiple reference sources

In some instances it might be required to note more than one reference source in support of an argument, concept, issue etc. Citing multiple reference sources is useful if the particular point might be contentious. 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 indicates high levels of dissolved metals (Joghson, 1996; Neval and Smith, 1990; Williams *et al*, 2001).

Multiple publications in same year

Whenever two or more references are attributed in a report to the same author in the same year then to distinguish each reference a lowercase letter is added following the year of publication, for example:

> It has been shown (Haas, 1981a; Haas, 1981b) that...

The corresponding publication details in the References section of the report would be:

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

Haas, C J, 1981b. Analysis of rockbolting to prevent shear movement in fractured ground, in *Symposium on Rock Bolting*, pp 156-162 (The Australasian Institute of Mining and Metallurgy: Melbourne).

Multiple authors

If a reference has three or fewer authors then the names of ALL authors must always be provided in the in-text citation and in the Reference section. An example of a citation with three authors is:

Lawrence, Smith and Jones (1988) found...

Whenever a reference source has four **or more** authors then the in-text citation should use the expression *et al* after the name of the first author. This is a Latin phrase that means "and others" (note: *et al* does not include a full stop). Two examples of a citation having four or more authors include:

The level of mining dilution "can vary significantly between mining systems" (Lawrence *et al*, 1995).

Lawrence *et al* (1995) noted the linkage...

The publication details in the References section, however, must include the names of ALL the authors in the usual manner; that is never use *et al* in the References section.

Discussion or interview

Sometimes the only available source of information may be an interview, meeting or telephone call etc. This is classed as a Personal Communication. It is important the student gains permission of the relevant person(s) to nominate them as the reference source before including them in a report.

Two examples of citing personal communication in the text of a report include:

Discussion with Mr G Andrews on 18 October 2006, confirmed...

Flexible belt conveying systems are more often favoured in in-pit mining applications than cable belt conveyors (G Andrews [Australian Belting Systems], 2006).

Note in this instance the person's title and initial appear before the family name.

The corresponding citation in the References section would be:

Andrews, G, 2006. Personal communication. 18 October.

Secondary sources

In some situations, reference is made to information found in a publication that refers to an earlier work by the same or different author; this is called a secondary source.

While it is preferable to find and confirm the information from the original source (the primary source), this might not always be possible. This might be the case for example when the primary source is no longer available because the publication is out of print or the reference is written in another language.

Examples of how this might be referred to in a report are:

...acoustic emissions are generated in a material when it is subjected to stress (Kaiser, cited in Hardy 1983)...

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

The corresponding information 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, in Acoustic Emissions, in *Geotechnical Practice*, STP 750, pp 4-92 (ASTM).

Document published on a web site

When a document is obtained from a web site then the full address of the web site must be provided together with the name of the document and the date when the information was accessed.

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

Note the use of angle brackets (<>) to signify a web address.

Document from a CD-ROM

When information is obtained from a document on a CD-ROM rather than a hardcopy publication then it is listed in a manner similar to a conference proceeding, for example:

Kerr, P, 2002. Independent 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: Melbourne).

Information from a web site

When information is obtained directly from a web site then the author/date system is used in the report where the author is a person or an organisation and the date is the year of the site's creation or when last updated. An example of a reference listing would be:

Geoscience Australia, 2006. Department of Industry, Tourism and Resources, Canberra, viewed 12 December 2006, <http://www.australianminesatlas.gov.au/>.

Lecture

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 text of the report. The listing in the References section should include the name of the lecture, venue where the lecture was delivered and date of the lecture. Two examples of referencing 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, University of New South Wales, 23 October.

Ker, C, 2006. Approach to mine planning. Presentation to UNSW students at offices of Perilya Broken Hill, 12 August.

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

Managing references

In large reports and in theses, managing references can become tedious and mistakes are likely to be made as new references are added to the list, especially for multiple publications in the same year.

Various software tools such as Endnote are available that can make this process easier to manage. At some universities such software is provided free to students in which case students are encouraged to use it as early as possible in their studies so they will be proficient is its use by the time they come to write their thesis.

Summary

A student must always acknowledge the use of any information or material included in a report that is not your own original work whether it be whole or part of a text, table or an illustration. The author(s) and year of publication should be placed in the report next to where it is used and the full publication details of the source must be provided in the References section of the report.

008: References

AusIMM, 1989. *Field Geologists' Manual,* Monogram No. 9, 382 p (Australasian Institute of Mining and Metallurgy: Melbourne).

AusIMM, 2008. *Guide to Authors [online].* Available from: <www.ausimm.com/publications/books.asp#guide> [Accessed: 21 October 2008].

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).

Levine, S J, 1998. *Writing and Presenting Your Thesis or Dissertation* [online]. Available from: <www.learnerassociates.net/dissthes/> [Accessed: 24 October 2006].

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, 2002. *Practical Aspects of Producing a Thesis at the University of New South Wales* [online]. Available from: <www.postgrad.unsw.edu.au/files_pdfs/Thesis%20Guide.pdf> [Accessed: 21 December 2005].

UNSW, 2005a. *Research and Study Skills Internet Links* [online]. Available from: <http://info.library.unsw.edu.au/skills/study.html> [Accessed: 21 December 2005].

UNSW, 2005b. *Academic Misconduct and Student Misconduct* [online]. Available from: <https://my.unsw.edu.au/student/academiclife/assessment/AcademicMisconductStudentMisconduct.html> [Accessed: 21 December 2005].

UNSW, 2005c. *Ethical Use of Scholarly Material* [online]. Available from: <https://my.unsw.edu.au/student/atoz/Ethical.html> [Accessed: 21 December 2005].

UNSW, 2005d. *Guidelines and Rules on Student Plagiarism* [online]. Available from: <www.lc.unsw.edu.au/plagiarism/link.html> [Accessed: 21 December 2005].

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UNSW, 2006b. *Undergraduate Handbook* [online]. Available from: <http://publish.web.unsw.edu.au> [Accessed: 21 December 2005].

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

Wolfe, J, 1995. *Writing an Honours Thesis [online].* Available from: <www.phys.unsw.edu.au/~jw/hons.html> [Accessed: 24 October 2006].

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).

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: Philadelphia)

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

A checklist for report writing

FORMAT	
physical presentation, legibility, layout	title page; stapled or comb-bound; individual plastic sleeves for each page should NOT be used
heading and subheadings	laid out logically and consistently at each level (size and style of headings)
decimal and numbering system	used accurately and consistently; in most cases three levels of heading will suffice
TABLES AND FIGURES	
key tables/figures	placed in main body of report: each table and figure must be referred to in the text of report
significant figures	round values to appropriate number of figures; use scaling factors for units and/or scientific notation
captions for tables and figures	concise but self-explanatory; captions for tables placed above the table; captions for figures below the figure
caption information	complements the information stated in the text
data in tables and figures	consistent (cross-checks) with the data in text
symbols, labels and signs	explained clearly
notation/asterisks	explanatory notes provide further information immediately below table/figure
reference citation	if table or figure not your own then cite source
STRUCTURE	
names/titles of people etc	spelt correctly and appropriately acknowledged
summary	written to highlight and summarise significant information
table of contents	matches exactly the headings in the report - both label and page number
page numbering	on preliminary pages use Roman numerals; Arabic numerals commence at the introduction; locate at top left hand corner or (less common) bottom centre
definitions of new terms	expressed accurately and clearly
abbreviations and acronyms	written out fully when first used with abbreviations in round brackets
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

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
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	sources of all references citing author and year are placed in main body of report
documented reference list	full bibliographical details provided for all reference sources
elements	all elements of reference provided (author, year, title of publication and publisher) and laid out in preferred style.
punctuation	standardised and consistent – order of elements, punctuation, use of capitals and formatting
TECHNICAL	
wordiness	report has been adequately proofread; spelling conforms to Australian standards; redundant or unnecessary words and phrases omitted; uses “Plain English” and avoids “old world words and phrases (eg appertaining to, herewith); avoids colloquialisms
sentences	complete, tight and varied in length; avoids long sentences
passive voice	used appropriately to emphasise the object of action rather than the agent; avoid first person, use third person appropriately.
parallel construction	applied accurately for lists of information
agreement	subjects and verbs are related in number and person, eg she does, they do, it does

adapted from Winckel and Hart (1996)

Appendix 2

An example of a technical report

This Appendix contains an example of a technical report that reflects the standards outlined in the *MEA Report Writing Guide*.

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 introduces the context of the project

Page numbering in *Roman* numerals

i

Preferred at bottom of page.

SUMMARY

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.

The test facility was developed to improve understanding of the behaviour of rock reinforcement elements when subjected to shear. The project examined some of the parameters that can influence the performance of reinforcement elements in order to better manage shear loading conditions and thereby contribute to better design and application of these elements in underground mine environments.

...then the aims and scope are presented

The test results demonstrated that interaction between different rock [illegible] elements in the underground environment can be markedly different to the properties and behaviour of the individual elements when observed in isolation; that is the rock environment behaves as a system with some synergy occurring between the individual elements.

...and finally, the key results are presented

CONTENTS

A typical layout for a Contents page illustrating the hierarchy used in the report. Note the use of different fonts and indenting to differentiate the report structure hierarchy.

To ensure the reader's attention and their interest, present some brief general information as context for the project

Page numbering restarted using *Arabic* numerals at beginning of main body of report

(1) bottom of page preferred - with Unique report ID.

1 INTRODUCTION

Rock support has evolved within the mining, tunnelling and civil industries particularly with the widespread 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 [illegible]rly trialled and used in Australia and the rest of the world. [illegible]derground coal [illegible]ts are most often used as a reinfo[illegible]ry roof and rib

Note the use and non-use of spaces in numbers and scaling of SI units

Note the form of citation for multiple authors and for multiple publications

[illegible]ralian 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 re-enforcement test facility was undertaken in the School of Mining Engineering at the University of New South Wales (UNSW)…

1.1 RESEARCH OBJECTIVES

Note full term is written followed by its abbreviation given in brackets

The objectives of this research project are aligned with initial objectives of the ACARP project C12XY *'Mechanical Behaviour of Reinforcement Elements'*.

Clear statement of research objectives

The objectives of this research project were:

1. To determine current understanding related to the performance of reinforcement elements when subjected to shear
2. To design and develop a test facility which will meet the need of the required testing, and
3. To conduct a series of controlled laboratory experiments using the facility to study the effect of:
   - geomechanical properties of test block;
   - 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.

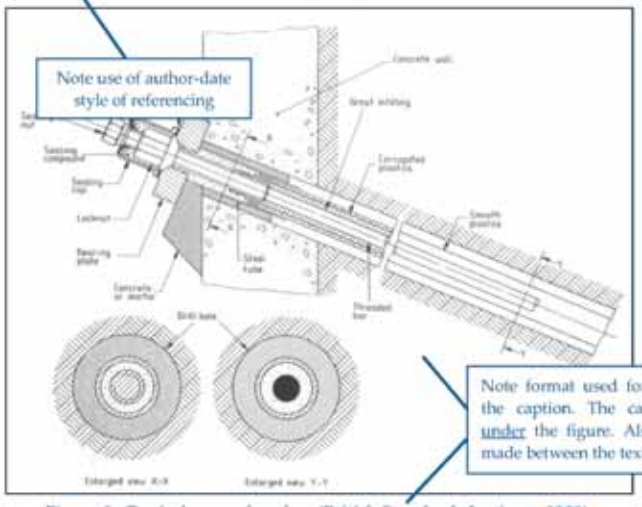
1.1.1 Ground anchors

Ground anchors are more commonly used in the field of civil engineering rather than mining. They are used to transmit a tensile load to a load bearing stratum. A ground anchor commonly consists of an anchor head, free anchor length and fixed anchor as shown in Figure 1. Ground anchors are generally greater than 15 m in length and

Note the link to the figure is embedded in the sentence – it is not an addendum to the sentence

tend to be designed with large cross-sectional areas needed to provide sufficient capacities to support the large volumes of unstable material. Commonly ground anchors are formed into two different categories based on their primary modes of action including high axial capacity elements and high shear capacity elements (Windsor and Thompson, 1999).

Note use of author-date style of referencing



Note format used for the figure and the caption. The caption is placed under the figure. Also note the link made between the text and the figure

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

High axial capacity elements make up around 90% of all ground anchors and include an array of long individual elements that are orientated for a stable reinforcing element 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 rockmass face using an external mechanical fixture (free length). The free length is ava[illegible]ables considerable load to be dispersed around the su[illegible] large, rigid stressing blocks at the free surface.

Alternate use of author-date referencing system

High shear capacity ground anchor elements are usually in the form of universal beam steel sections, large diameter steel tubes or railway line that is cast in concrete to continuously couple the element within the rockmass. These reinforcing elements are commonly used for pre-reinforcement in surface excavations. Windsor and Thompson (1999) stated that these types of ground anchors are installed sub-parallel to the excavation bo[illegible] that occur in the sur[illegible]

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 organized.

3

A concise introduction to a new section. This section is the methods or 'What the researchers did'.

2 CONCRETE CASTING

2.1 INTRODUCTION

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 with similar strength and mechanical properties.

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.

As part of the test procedure, tests were conducted on the hardened 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 poured concrete into cylindrical test specimens (100 mm diameter by 200 mm high) for determination of the properties of the concrete as shown in Figure 2.

Where possible avoid using 'we' or other personal pronouns. The preferred alternate would be… "During casting of the concrete into the steel formwork, concrete was poured into cylindrical test specimens…"

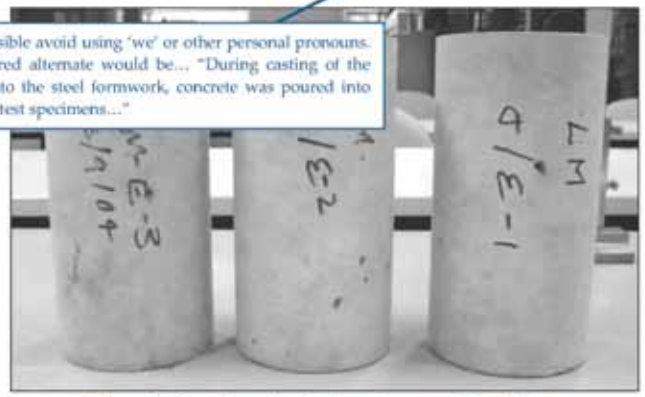


Figure 2. Concrete cylindrical specimens prior to testing.

The compressive tests were undertaken as per the American Society of Testing Materials (ATSM) by the School of Civil and Environmental Engineering at UNSW…

Section 2.2 justifies the choice of sample, describes the sample preparation, and gives the general conditions of the experiment.

The analysis and testing of the sample is documented. Important equations that were used are given, results are summarized in tables, and brief statements of key results are presented.

4

3 PROPERTIES OF TEST MATERIALS

The determination of Static Modulus of Elasticity (E) and Poisson's Ratio (ν) was undertaken in accordance with ATSM Designation: C469. The Standard specifies that Young's Modulus and Poisson's Ratio of Portland cement concrete is determined under longitudinal compression using the chord modulus to define elasticity. For normal weight concrete, E typically ranges between 14 and 41 GPa.

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

$$E = \frac{\sigma_2 - \sigma_1}{\varepsilon_2 - 0.00005} \quad 1)$$

Note: format for an equation

where:

E : Chord modulus of elasticity
σ_2 : Stress corresponding to 40% of the estimated ultimate load
σ_1 : Stress corresponding to a longitudinal strain
ε_2: Longitudinal strain corresponding to the σ_2 stress

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

Format for a table. Note the link made between the text and table. Note caption is placed above the table.

Table 1
Results of concrete cylinder compression test.

Sample No.	P_1	P_2	P_3	P_4	*mean*
Core Diameter (mm)	100.2	100.2	100.3	100.1	100.1
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…

4 TEST RESULTS

Figure 3 shows graphically the variation in compressive strength of sample P1 with ram displacement during testing using the Schenk Test Machine. The graph indicates a constant stiffness up to the point of failure and that there was significant resistance to loading in the post-failure region

While tables present values, graphs help to show trends in the data.

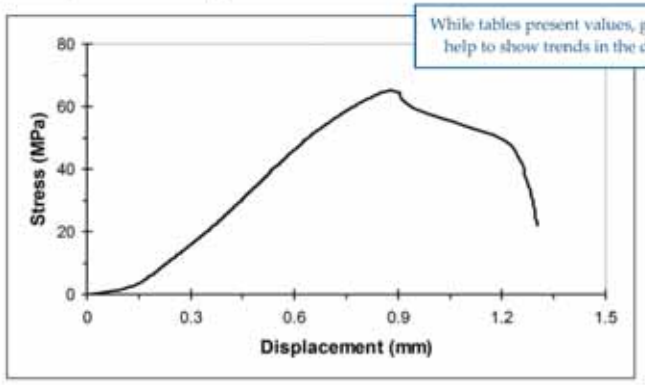


Figure 3. Loading characteristic for test sample P1.

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.

Often a line drawing or schematic can provide clearer information than a photograph.

Consider whether you should include dimensions/ scale.

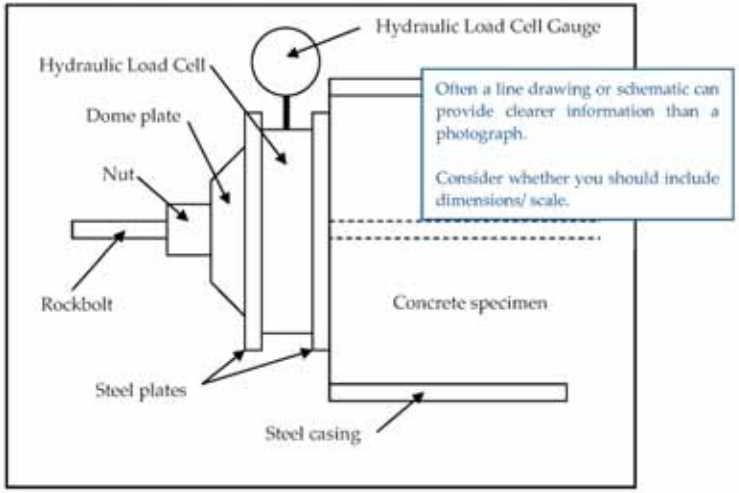


Figure 4. Schematic of load cell arrangement used to determine the level of pre-tension in a rockbolt.

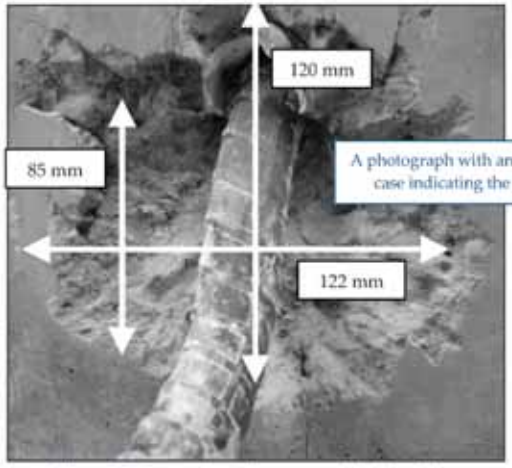
There were issues encountered with regards to the installation of Samples 4 and 6. These issues are summarised in Table 2.

Table 2
Summary of the issues in setting test samples.

Sample #	*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-tensio required: Pre-tensio attained:	Two fast-set resin capsules were inserted into the borehole in order to

It is not a sign of weakness to include 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 comb
to the creation of two plastic hinges at 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.



A photograph with an overlay, in this case indicating the dimensions.

If you include photos, annotations can often help reader make sense of them and/or highlight important features.

Figure 5. Extent of crushing around the borehole.

6 CONCLUSIONS

Opening paragraph that summarizes and justifies the accomplishments outlined earlier in the report

There were numerous changes made to the original design of the shear testing facility resulting from extensive consultation with various industry, consulting and technical personnel. After the test facility was assembled, changes were required after each of the three stages of testing. These modifications and enhancements improved the reliability of the facility to model real-life behaviour as well as the repeatability of testing the shear performance of installed rock reinforcement elements.

Restate the aims/objectives of the project

The objective of this project was to design, construct and commission a full-scale laboratory shear testing facility that replicates the influence of shear forces on installed rock reinforcing elements present in underground environments. The single failure plane design adopted in the test rig has found to be successful in allowing shear loading to be directly applied to a fully installed (and where relevant, pre-tensioned) reinforcing elements.

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

- Standard rockbolts installed in a concrete rock mass can result in a shear resistance that is more than double the shear strength of steel, and higher than the ultimate tensile strength of the rock bolt steel. It is considered that a major contributor to this enhanced performance is the friction induced between the shear surfaces.

Present the key findings and conclusions

- There were two distinct loading regimes observed between applied shear load and shear displacement. Initially the system reflected a large stiffness afterwhich the stiffness reduced with continued displacement until eventual failure of the rockbolt.
- Stiffness of the shear load-displacement curves varied with loading rate; greater stiffness was observed at higher loading rates....

7 RECOMMENDATIONS

It is recommended that further investigation be undertaken with respect to:

- Borehole and element geometry
- Element orientation relative to discontinuity
- Element and encapsulation material geomechanical properties
- Block geometry
- Further element pre-tensioning
- Characteristic of discontinuity
- Discontinuity aperture

Nice use of bullets for clarity and much easier to write than prose.

Note formatting applied to references in accordance with *AusIMM Guide to Authors*. List is sorted by author and year.

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APPENDIX

DRAFT GUIDELINES

CONSIDERATION OF SHEAR BEHAVIOUR ON BEST PRACTICE IN THE DESIGN OF ROCK SUPPORT SYSTEMS IN UNDERGROUND COAL MINES

Based on the findings of initial test work undertaken as part of ACARP Project C12, the following guidelines have been developed to improve the design of underground excavations with respect to re-enforcement elements subjected to shear loading.

1. In the design of the support system for underground excavations, the loading bearing behaviour of re-enforcement elements is a function not only of the material property characteristics of the elements but also of the rockmass in which the element is embedded.

    a. In stronger rock types such as sandstones, the support system is likely to be less compliant and stiffer. The system is better able to maintain the integrity of the laminated beds and hence contribute to overall stability.

    b. In weaker rock types such as coal and shale, the system is likely to be more compliant and allow for more differential movement between bedding plains. However the strength of the system should be enhanced with the rockbolt capable of sustaining a higher level of resistance to shear loads.

2. The loading capacity of a re-enforcement element in shear when embedded in a rockmass may be greater than the rated tensile and shear specifications for that element.

3. The stiffness imparted to a rockmass by a re-enforcement element can be high and independent of the level of shear displacement or shear load applied. With continual increase in load eventually the re-enforcement element with begin to yield resulting in a reduction in stiffness.

4. Even after a re-enforcement element has yielded, it can still provide support to a rockmass in terms of resistance to further shear loading.

Appendix 3

An example of a conference paper

Section A: This section contains an example of a conference paper (amended and with annotations) indicating various styles used in preparing the document and various editing notes. The style sheet, *StyleTemplate_MEA_ConferencePaper doc*, was used to prepare the document which is available for download from the Learning Management System.

Section B: This section contains the editted version of the conference paper without annotations.

This original paper was 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)

Section A

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

Heading_PaperTitle

{Insert paragraph space , i.e. press Enter}

Paul Hagan
The University of New South Wales (UNSW), Sydney

Author

{Insert paragraph space}

Comments in solid line boxes refer to pre-formatted Styles. Each style should be prefixed by "Paper", for example "Text" should be read as "Paper_Text"

...igns and resin anchors are available for use in ...nt years at the UNSW Mining Research Centre led ...testing facility. This facility has subsequently been ...est work has been completed to verify the pull-test process.

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

Abstract

Heading_1

{Insert paragraph space followed by Inset Column Break}

Bullets

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 co... million. Previous research by U... Control Technology Pty Ltd (SCT) and Powercoal Ltd has found that over 30% of rockbolts 'are not providing optimum perf... environments' (Galvin et al, 20...

Text

Set "Spacing before" to 6pt in Format Paragraph

A research init... combining the skills and experience of industry and research expertise in the university to develop an understanding of fully encapsulated rockbolts. The broad objective being to improve the performance of rockbolt systems and hence improve the overall safety in mines. This initiative resulted in the establishment of a test facility at UNSW that operates within a controlled laboratory environment.

TEST FA...

Heading_2

Design objectives

The desirable attributes of a rockbolt test facility were seen as:

- the facility should be capable of examining a wide range of parameters associated with the installation of rockbolts and of replicating a wide range of conditions;
- tests should be carried out unde... 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) for such purposes as independently assessing the performance of new products or changes in the ...

Set alignment to Justified in Format Paragraph

The design of th... corporates a hydraulic ram similar to that used in most rockbolt pull-out tests. The ram can apply various load conditions to a rockbolt. A bi-axial cell is used to hold 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 faci... are:

Insert Ctrl-Shift Spacebar between number and unit

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

TEST SAMPLE PREPARA...

Figure

Test sample

Heading_3

Type

A cementitous grout (Celtite MG75S) was selected in place of cored rock samples in the test program. The grout strength was approximately 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 cor... of 145 mm and length of 200 mm.

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

In the graph, note no description above the graph, only in the caption under the graph next to figure number. Also with respect to each axis note: difference in font size between the axis labels and units; spacing between major tic marks and the minor tic marks so each axis does not appear too busy; units are included in axis labels; and, a legend is included where more than one set of results are plotted

Figure_Caption

Rockbolt anchorage

A Celtite 24 mm extra high strength ... used in the test program. The rockb... core diameter of 21.7 mm, a diameto... of 22.8 mm and rib spacing of 10 m... has an ultimate tensile strength of 344 kN.

...atability was ob... ...vel as illustrated in ... ...ure ...l/displacement curve for the 3 mm

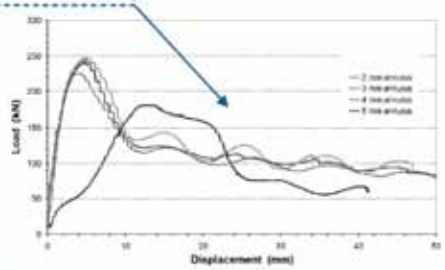

Figure 2. Load/displacement curve for an anchorage system with a 3 mm annulus (after Hagan and Weckert, 2002).

A mix-and-pour resin was subsequently used in the test program. After mixing, the resin was injected into the hole into which the spinning rockbolt was rammed. The rockbolt was supported in the chuck while t... ...in. The resin w... ...with the rockbol...

Note: when referring to a specific Figure, Table or Equation the word should be treated as a proper noun; hence the word should begin with a capital letter.

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 intended to simulate the induced load on a rockbolt when separation occurs between ... strata.

During each test, the outer surface of the test sample was subjected to a confinement of 10 MPa within the bi-axial cell. Before a pullout test began, 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 pullout test. A pressure transducer monitored any pressure change in the bi-axial cell during each test.

The results from the test program are summarised in Table 1. There was little meas... in the pressure of the bi-axia... ...he experimental noise tende... ...at might have otherwise occurred.

Table_Caption

Table header row is italics

Table 1
Summary of results

	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

Unfortunately 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 for resin annulus thic
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rockbolt, res
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interface or

Beyond the
applied load
the rockbolt
reached for the anchorage system. It is interesting to note that this residual resistance still represented a reasonably high value equivalent to a
MPL.

Font types used in this document are:

- Headings: Arial (i.e. sans serif), 10 pt
- Text: Times New Roman (or any serif font, e.g. Palatino), 10 pt
- Figure and Table captions: Times New Roman.

Paragraph. Single spacing, 6pt spacing before paragraph

To use a Style, select the text then go to Format/Styles and Formatting and pick the relevant style name from the list, e.g. Paper_Text

Left and right margins are 1.5cm and column spacing is 1.0cm

References. Note indent in second and subsequent lines

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.

Either side 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 for the case of a 21.7 mm rockbolt used in the test program when resin annulus reached 5 mm in a 32 mm diameter hole, there was a reduction of nearly 25% 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 is 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.

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ACKNOWLEDGEMENTS

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REFERENCES

Galvin, J M, Offner, J C, Whitaker, A, Fabjanczyk, M and Watson, J O, 2001. Establishing anchorage and failure mechanisms of fully encapsulated roof support systems – End of grant summary report. ACARP Project C7018.

Hagan, P C and Weckert, S, 2002. Anchorage and failure mechanisms of fully encapsulated rockbolts (Stage 2) – interim progress report. ACARP Project C10022, April.

[Note: Only references cited in the Conference Paper should be listed in the References. Do NOT include all references from thesis or original report.

References are cited to the standards stated in *AusIMM Guide to Authors* (2008)]

Section B

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

Paul Hagan
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 construction of a rockbolt pull-testing facility. This facility has subsequently been upgraded, commissioned and initial test work has been 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 A$35 million. Previous research by UNSW, Strata Control Technology Pty Ltd (SCT) and Powercoal Ltd has 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 being to improve the performance of rockbolt systems and hence improve the overall safety in mines. This initiative resulted in the establishment of a test facility at UNSW that operates within a controlled laboratory environment.

TEST FACILITY

Design objectives

The desirable attributes of a rockbolt test facility were seen as:

- the facility should be capable of examining a wide range of parameters associated with the installation of rockbolts and of replicating a wide 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) for such purposes as independently assessing the performance of new products or changes in the method of installation.

The design of the new test facility incorporates a hydraulic ram similar to that used in most rockbolt pull-out tests. The ram can apply various load conditions to a rockbolt. A bi-axial cell is used to hold 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 to the bed of the lathe;
- servo-control hydraulic system used for precise control of the loading rate of a 300 kN capacity hollow core ram during a pull-out test;

TEST SAMPLE PREPARATION

Test samples

Type

A cementitous grout (Celtite MG75S) was selected in place of cored rock samples in the test program. The grout strength was approximately 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 core 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 rockbolt has an inner core diameter of 21.7 mm, a diameter across the ribs of 22.8 mm and rib spacing of 10 mm. The rockbolt has an ultimate tensile strength of 344 kN.

A mix-and-pour resin was subsequently used in the test program. After mixing, the resin was injected into the hole into which the spinning rockbolt was rammed. The rockbolt was supported in the chuck 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 intended to simulate 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 of 10 MPa within the bi-axial cell. Before a pullout test began, 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 pullout test. A pressure transducer monitored any pressure change in the bi-axial cell during each 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 for the 3 mm annulus test.

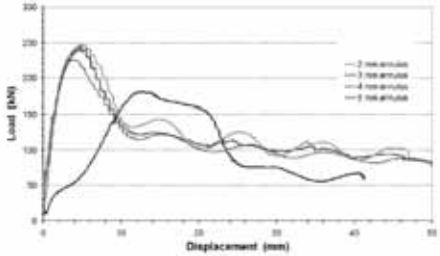

Figure 2. Load/displacement curve for an anchorage system with a 3 mm annulus (after Hagan and Weckert, 2002).

The results from the test program are summarised in Table 1. There was little measurable 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.

	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

Unfortunately 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 for resin annulus thicknesses of 2, 3 and 4 mm as indicated in the summary graph in Figure 5. 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.

Either side 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 for the case of a 21.7 mm rockbolt used in the test program when resin annulus reached 5 mm in a 32 mm diameter hole, there was a reduction of nearly 25% 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 is 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 can still provide a reasonable level of resistance to the separation or relative displacement between strata even when the maximum load bearing capacity of the 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.

REFERENCES

Galvin, J M, Offner, J C, Whitaker, A, Fabjanczyk, M and Watson, J O, 2001. Establishing anchorage and failure mechanisms of fully encapsulated roof support systems – End of grant summary report. ACARP Project C7018.

Hagan, P C and Weckert, S, 2002. Anchorage and failure mechanisms of fully encapsulated rockbolts (Stage 2) – interim progress report. ACARP Project C10022, April.

Appendix 4

Examples of spelling and hyphenation
of some mining related technical terms

ball mill
bypass
cost-effective
cross-cut
cross-section
cut-off
drill core
drill hole
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
pre-existing
program
reagent
recleaning
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)
Walled
two-thirds
world-class
worldwide

adapted from Appendix 1 in AusIMM (2008)

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
AGSO	Australian Government Survey Organisation (formerly BMR)
AGPS	Australian Government Publishing Service
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
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 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
ρ	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
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
IMMA	Institute of Metals and Materials Australia
in	inch(es)
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
MΩ	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
mol wt	molecular weight
mol	mole (amount of substance)
mol	molecule/molecular
mol/L	molecules per litre
µg	microgram
µm	micron, micrometre
ms	millisecond
Mtpa	million tonnes per annum
mV	millivolt
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
pa	per annum
Pat	patent
%	per cent when used in tables
per cent	per cent when used with 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
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/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
W	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

adapted from Appendix 2 in AusIMM (2008)

Appendix 6

Examples of referencing various types of information sources

A slightly different system is to be used for ENGG1100 but you will not be penalised for using this system.

Just make sure you are consistent!

Books

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).

A chapter or paper by an author in a book edited or compiled by others

Anderson, L E, 1980. Copper ore concentration at Kanmantoo, SA, 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).

An author with two publications in the same year

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.

Paper in a conference proceedings

Readett, D J, Quast, K B, Newell, R, Hill, S F and Ketteridge, I B, 1987. Modelling the leaching of NaCI 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* (ed: M J Jones) pp 577-584 (Institution of Mining and Metallurgy: London).

Article in a journal, magazine, newspaper or other periodical

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

Carswell, J T and Schofield, N A, 1993. Estimation of high grade copper stope grades in QTS North, 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.

Henley, R W, Matthai, S K and Kavanagh, M E, 1994. Hypothermal vein mineralisation at the Cosmopolitan Howley Gold Deposit, Northern Territory, *The AusIMM Bulletin*, 5:65-69.

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

Pozin, E Z, 1962. Fracture resistance of rocks during excavation, *Izd-vo Akad, Naulr SSR* (Moscow) 38:197-201 (in Russian).

Stopes, M C, 1919. On the four visible ingredients in banded bituminous coal: studies in the composition of coal, *Proc Roy Soc* (London) (B)90:470-487.

Thesis

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

Map

Pirajno, F and Occhipinti, S, 1996. *Btyah, WA — 1:250 000 geological series*, Western Australia Geological Survey.

Printed material with a restricted or intermittent circulation

Amos, B J and de Keyser, F, 1964. Mosman, Queensland —1:250 000 geological series, Bureau of Mineral Resources Geology and Geophysics Explanatory Notes, SE55-1.

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.

Personal communication

Clark, I, 2003. Personal communication, 10 November.

Work accepted for publication but not yet published

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

Patents and patent applications

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), 2004a. Pressure leaching of copper concentrates, *US Patent* 6650341.

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

Paper presented at a conference but not formally published

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.

Manuscript in preparation

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

Article or paper on a web site

Format: Author/editor surname, initial/s or organisation, year. Title [online]. Edition. Place of publication, Publisher. Available from: <URL> [Accessed date]. Note: The date of publication is the date the pages were last updated.

Feit, G N, Malinnikova , 0 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: <http://www.kluweronline.com/issn/1062-7391/> [Accessed: 27 October 2004].

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

Article or paper on a CD ROM

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).

adapted from Appendix 3 in AusIMM (2008)

Appendix 7

Further examples of referencing various electronic information sources

Source: The Learning Centre, UNSW.

Updates to the following document as well as other material on report writing can be found at www.lc.unsw.edu.au

Note: The various examples of electronic references provided in this Appendix are NOT in the *AusIMM* referencing style and you will need to make minor changes.

Harvard Referencing

Electronic Sources

How do I cite electronic sources?

Citations for electronic sources are usually based on the same principles as citations for print sources like books and jounrals.

The Harvard System requires two parts: you should have both in-text references and a list of references at the end of your work.

1. Within the Text—In-text Citations

The Harvard referencing system requires you to include specific information about a source within the text of your work. This information is:

- the name of the author or authors
- the year of publication

While the page number is usually included for print materials, many electronic resources don't have page numbering. Only include page numbers where applicable.

2. At the End of the Text—List of References

At the end of your assignment, you must include a List of References, a list of all the books, journal articles and other sources of information you have used to research your assignment.

What are Electronic Sources?

Electronic sources include:

- web sites
- emails
- films, videos or dvds
- podcasts and radio broadcasts
- journal articles published on the Internet
- journal articles retrieved from the full text databases available from the Library
- CD ROMs

What information should I include?

Referencing electronic resources can be confusing. It can be difficult to know which information should be included or where to find it. However, as a general principle, provide as much information as possible concerning the authorship and the location and availability of electronic sources.

Electronic citations require much of the same information as print sources (author, year of publication, title, publisher). However, some extra details are required:

- You must identify that you accessed the source in an electronic format
- You must provide an accurate access date for online sources (that is, identify when a source was viewed or downloaded).
- You must provide the location of an online source (for example, an electronic database or web address)

Some documents are published in both paper and electronic formats. You should cite according to the format you accessed. Unlike printed material, internet sources can easily be changed, or dissapear altogether, so full and accurate citation information is essential.

About this Guide

Please Note: this brochure provides a modified version of the author-date system presented in:

Style manual for authors, editors and printers 2002, 6th edn, rev. Snooks & Co., AGPS, Canberra.

Methods for referencing electronic sources are changing rapidly and do not always keep pace with the development of new technology. As the Style manual does not fully cover electronic referencing, The Learning Centre has adapted and modified the existing information. The creation of citations for new electronic sources are based on the principles of other references types.

Always check with your lecturer or tutor about their preferred referencing method. Many UNSW faculties and schools have style guides and The Learning Centre strongly suggests you check with them about which methods to use.

Table of Electronic Citations

To cite a website	
In text Cite the name of the author/ authoring body and the date created or last revised): (International Narcotics Control Board 1999)	**List of References** International Narcotics Control Board 1999, United Nations, Vienna, accessed 1 October 1999, <http://www.incb.org>. 1. author (the person or organisation responsible for the site) 2. year (date created or last updated) 3. name of sponsor of site 4. place of sponsor of site (if available) 5. accessed day month year (the date you viewed the site) 6. URL or Internet address (between pointed brackets) If possible, ensure that the URL is included without a line-break.
To cite a document or page within a website	
Information should include author/ authoring body name(s) and the date created or last revised: (Winston 1999) or: (United Nations 1999)	Winston, J 1999, *A look at referencing*, AAA Educational Services, accessed 20 October 2002, <http://www.aaa.edu.au/aaa.html>. United Nations Web Services 2006, *History of the Charter*, The United Nations, accessed 6 June 2007, <http://www.un.org/aboutun/charter/history/>. Include the following information: 1. author (the person or organisation responsible for the site) 2. year (date created or last updated) 3. title (in italics) 4. name of sponsor of site 5. accessed day month year (the date you viewed the site) 6. URL or Internet address (between pointed brackets)
If the author's name is unknown, cite the website/ page title and date: (*Land for sale on moon* 2007)	*Land for sale on moon* 2007, accessed 19 June 2007, <http://www.moonlandregistry.com>.
If there is no date on the page, use the abbreviation n.d. (no date): (ArtsNSW n.d.)	ArtsNSW n.d., *New South Wales Premier's Literary Awards*, NSW Department of the Arts, Sport and Recreation, accessed 19 June 2007, <http://www.arts.nsw.gov.au/awards/LiteraryAwards/litawards.htm>.
To cite Online Journals accessed via the World Wide Web	
In Text Cite the author name and date: (Morris 2004)	**List of References** 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*, Issue 33, August - October 2004, accessed 11 May 2007, <http://www.lib.latrobe.edu.au/AHR/archive/Issue-August-2004/morris.html>. Cite the following information: 1. author(s) name and initials 2. title of the article (between single quotation marks) 3. title of the journal (in italics) 4. all publication information (issue number, volume number etc.) 5. accessed day month year (the date of viewing) 6. URL or Internet address (between pointed brackets)

To cite a journal article from full text database

UNSW library offers students access to the full text of journals articles, newspapers, and other publications through searchable databases. They are usually accessed through SIRIUS, from links in the Library Resource Database, or through MyCourse materials.

Journals in full text databases are usually not free but are purchased on subscription by the library. For this reason, cite the database name and the date of access. Full text databases include ProQuest, EAI, and Wiley Interscience.

Library-subscribed resources usually have URLs that will not work independently, so URLs are **not generally included** when citing database resources.

In the text

Cite as you would a journal article:

(Nicholls 2006, p. 171)

(Holmes 2004)

Articles retrieved from databases are usually in pdf form and have page numbers.

List of References

Nicholls, D 2006, 'Does the meaning mean a thing?': Johnny Young's hit songs of the 60s-70s, *Australian Cultural History*, No. 24, pp. 163-183, accessed 11 May 2007 from Informit Full Text Database, ISSN: 0728-8433.

Holmes, S 2004, 'But this Time You Choose!': Approaching the 'Interactive' audience in reality TV', *International Journal of Cultural Studies*, No. 7, pp. 213-231, accessed 3 March 2007 from Sage Journals Online.

Cite the article as you would the same article in a print publication, listing:

1. author(s) name and initials
2. title of the article (between single quotation marks)
3. title of the journal (in italics)
4. any publication information (volume, number etc.)
5. page range
6. accessed day month year (the date you accessed the article)
7. from name of database
8. item number (if given)

To cite a newspaper article from an electronic database

In the text

If the article has a named author:

(Pianin 2001)

No named author:

(*The Illinois Gazette* 1830)

List of References

Pianin, E 2001, 'As coal's fortunes climb, mountains tremble in W.Va; energy policy is transforming lives', *The Washington Post*, 25 February, p. A03, accessed 8 March 2001 from Electric Library Australasia.

Include the following information:

1. author (if available)
2. year of publication
3. article title (between single quotation marks)
4. newspaper title (in italics)
5. date of article (day, month, page number—if given—and any additional information available)
6. accessed day month year (the date you accessed the items)
7. from name of database
8. item number (if given)

Article without a named author

If there is no named author, list the article title first.

'On Liberty and Slavery', *The Illinois Gazette*, March 20, 1830; Issue 45; col A, accessed 12 April 2007 from Infotrac Database.

'Amending the Constitution', *New York Daily Times*, 16 October 1851, p. 2, accessed 15 July 2007 from ProQuest Historical Newspapers database.

To cite an Online Newspaper Article

In the text, cite the author name and year:

(Coorey 2007)

Coorey, P 2007, 'Costello hints at green safety net', *Sydney Morning Herald*, 10 May, accessed 14 May 2007, <http://www.smh.com.au/news/business/costello-hints-at-green-safety-net/2007/05/09/1178390393875.html>.

To cite an Electronic Book

Cite in-text as for a book. An e-book usually has page numbers:

Lloyd (2005, p. 262)

or

(Lloyd 2005, p. 262).

Accessed online

Lloyd, CB (ed.) 2005, *Growing up global: The changing transitions to adulthood in developing countries*, The National Academies Press, Washington, accessed 5 May 2007, <http://www.nap.edu/books/11174/html/index.html>.

Include the following information:

1. author/ editor name(s)
2. date of original publication
3. title of e-book (in italics)
4. publisher
5. place of publication
6. accessed day month year (the date of viewing)
7. URL or Internet address (between pointed brackets)

Accessed via a database

Woodham, JM 2004, *A dictionary of modern design*, Oxford University Press, accessed 25 July 2007 from Oxford Reference Online Database.

To cite a Media Release

In the text, cite the author and date:

Prime Minister Howard (2007) announced plans for further welfare reform ...

Howard, JW 2007, *Welfare Payments Reform*, media release, accessed 25 July 2007, <http://www.pm.gov.au/media/Release/2007/Media_Release24432.cfm>.

To cite a Thesis accessed online

Cite author, date, page number:

(Lee 2005 p. 78)

Lee, C 2005, 'Beyond the Pink: (Post) Youth Iconography in Cinema', PhD thesis, Murdoch University, accessed 15 June 2007 from Australian Digital Thesis Program Database.

To cite a Film, Video, and Television or Radio program

Include the full title and date of production:

(*My Brilliant Career* 1979)

(*Four Corners* 9 July 2001)

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

Going backwards: Four Corners 2001, television program, Australian Broadcasting Corporation, Sydney, 9 July.

Include the following details in the List of References:

1. title (if part of an ongoing series, list the episode title first, then the series name)
2. year of recording
3. format
4. publisher/ distributer
5. place of recording
6. date of recording (if applicable)

To cite a Web Video

In Text	List of References
In the Overlander's (2007) short film ... *The Cabinet of Dr. Caligari* (1919) is a German expresionist classic from the silent era ...	The Overlander 2007, *Overlander.tv: Aboriginal tent embassy, Canberra*, online video, accessed 31 July 2007, <http://www.youtube.com/watch?v=abMlHjO2nh4>. *The Cabinet of Dr. Caligari,* 1919, online video, accessed 20 June 2007, <http://video.google.com.au/videoplay?docid=-411719693227284081>.

To cite Online Images

In the text	List of References
Mention the image in the text and cite the author and date: The cartoon by Frith (1968) describes ... If the image has no named author, cite the full name and date of the image: The map shows the Parish of Maroota during the 1840s (*Map of the Parish of Maroota, County of Cumberland, District of Windsor 1840-1849*)	Frith J 1968, *From the rich man's table*, political cartoon by John Frith, Old Parliament House, Canberra, accessed 11 May 2007, <http://www.oph.gov.au/frith/theherald-01.html>. Include the following information: 1. author (if available) 2. year produced (if available) 3. title of image (or a description) 4. Format and any details (if applicable) 5. name and place of the sponsor of the source 6. accessed day month year (the date you viewed/ downloaded the image) 7. URL or Internet address (between pointed brackets) If there is no named author, put the image title first, followed by the date (if available): *Khafre pyramid from Khufu's quarry* 2007, digital photograph, Ancient Egypt Research Associates, accessed 2 August 2007, <http://www.aeraweb.org/khufu_quarry.asp>. *Map of the Parish of Maroota, County of Cumberland, District of Windsor 1840-1849*, digital image of cartographic material, National Library of Australia, accessed 13 April 2007, <http://nla.gov.au/nla.map-f829>.

To cite Online Images/ Diagrams used as Figures

Figures include diagrams, graphs, sketches, photographs and maps. If you are writing a report or an assignment where you include any visuals as Figures, you must include a reference.

If you include Figures in your work, they should be numbered and labelled with captions. Captions should be very simple and descriptive and be followed by an in-text citation. Figure captions should be directly under the image.

	List of References
Cite the author and year: Figure 1: Khafre pyramid from Khufu's quarry (Ancient Egypt Research Associates 2007)	Provide full citation information: *Khafre pyramid from Khufu's quarry* 2007, digital photograph, Ancient Egypt Research Associates, accessed 2 August 2007, <http://www.aeraweb.org/khufu_quarry.asp>.

To cite Online Data in a Table Caption

If you reproduce table data found online you must include a reference. All tables should be numbered and table captions should be above the table.

	List of References
Table 2: Agricultural water use by state 2004-05 (Australian Bureau of Statistics 2006)	Include the name of the web page where the table data is found. Australian Bureau of Statistics 2006, *Water Use on Australian Farms, 2004-05*, Cat. no. 4618.0, Australian Bureau of Statistics, Canberra, accessed 4 July 2007 <http://www.abs.gov.au>.

A CD-ROM

In the text	List of References
Cite the CD title and year : (*Australia through time* 1994)	*Australia through time* 1994, CD-ROM, Random ROM in assoc. with the ABC, Sydney. The bibliographic details are the same as those required for films, videos, DVDs, television and radio programs. Include: 1. title (in italics) 2. year of recording 3. format 4. publisher 5. place of recording

Weblog (Blog)

Include author name and year of posting: (Bartlett 2006) (Bahnisch 2007)	**A blog** Bartlett, A 2007, *The Bartlett diaries*, weblog, accessed 22 May 2007, <http://www.andrewbartlett.com/blog/>. **A blog post** If you are citing a group blog, cite the author of the post: Bahnisch, M 2007, 'The commentariat vs. the people?', *Larvatus Prodeo*, weblog post, 11 May, accessed 22 May 2007, <http://larvatusprodeo.net/2007/05/11/the-commentariat-vs-the-people/>. Include: 1. the name (or alias) of the author 2. year of post 3. the title of the posting (if applicable) between single quotation marks 4. the title of the site (in italics) 5. format 6. the date of posting (day month) 7. accessed day month year (the date you viewed the site) 8. the URL of the blog post (between pointed brackets)

A Wiki

As wikis usually feature user-generated content, there is usually no named author. Cite the title of the wiki and the date of last revision: (*An Essay Evolves* 2007)	'Freud and science', *An essay evolves*, wiki article, March 8 2007, accessed 20 May 2007 <http://evolvingessay.pbwiki.com/Freud+and+Science>. Include the following information: 1. article name (between single quotation marks) 2. title of wiki (in italics) 3. format 4. date of last revision 5. accessed day month year (the date you viewed the site) 6. the URL of wiki article page (between pointed brackets)

Emails	
In the text Include the abbreviation 'pers. comm.' in your in-text reference: (J Smith 2006, pers. comm. 23 July) Note that the initial precedes the surname. If the the form of communication is relevent, mention it in the text: Email confirmation was received (J Smith 2006, pers. comm. 23 July).	**List of References** References to emails are treated as a form of personal communication and are not usually included in reference lists as they cannot be traced by the reader. However, if your tutor or lecturer requests an entry in the List of References, cite emails as below: Smith, J 2006, email 23 July, <j.smith@mailbox.com.au>.
Electronic mail lists, Usenet groups and bulletin boards	
In the text Include author name and date of posting: (Wiggers 2006)	**List of References** Wiggers, D <darryl@nestcom.net> 2006 'Media and imperialism', list server, 4 June, H-Net Humanities & Social Sciences OnLine, accessed 12 September 2006, < http://www.h-net.org/~film/> Include the following details: 1. author 2. author's details (eg.email address) 3. date of posting 4. title of posting (from the 'subject' line in the message) 5. format (listserver) 6. name of list owner 7. accessed day month year (the date of viewing) 8. URL or Internet address (between pointed brackets)
Podcasts	
In the text (*Lingua Franca* 2007) referring to the speaker: Jill Kitson (*Lingua Franca* 2007) reported that …	**List of References** *Lingua Franca* 2007, podcast radio programme, ABC Radio National, 28 April, accessed 25 May 2007, <http://abc.net.au/rn/podcast/feeds/lin.xml>. List a podcast as you would a radio program. Include the following: 1. name of the podcast (in italics) 2. year 3. format (podcast) 4. publisher 5. date of podcast (day, month) 6. accessed day month year 7. the URL (between pointed brackets)

FAQs & Troubleshooting

I can't find a guideline for the source I want to cite

As information formats and technolgies are changing rapidly, standards and conventions for citing many electronic sources have not yet been formalised by style authorities. If there is no specific guideline for a particular electronic source, base your citation on an existing guideline.

What is the 'accessed' date?

The date on which you viewed or downloaded the source. As web-based materials can change or disappear at any time, you must cite the date on which you accessed the information.

I need to cite a website and don't know where to look for 'bibliographic' information

Finding bibilogrphic information (author, date, publishing information etc) for printed sources like books is relatively easy; the required details are usually on the first few pages. With electronic sources, finding the relevant information is not always so straightforward. You may need to look a little harder and be resourceful.

- **How do I find the author of a webpage?**

If authorship of a site or web page is ascribed to an individual, then cite them as author. If you can't see a specific named author, then identify the organisation that published the information. In such cases, ascribe authorship to the smallest identifiable organisational unit.

To find this information:

- scroll down to the bottom of the webpage and look at the footer information.
- Look for an 'about' link.
- Look at the page header for organisational logos or other identification.
- If there is no information on the webpage you want to cite, go to the home page of the website and look for author information there.

- **Who is the publisher of a website?**

The term publisher is used here to cover both the traditional idea of a publisher of printed sources, as well as organisations responsible for maintaining websites. In this case, look for the largest identifiable unit.

- **Finding the date on a webpage**
- The date of publication is often provided in the footer area of the page with the author's name.
- If a Web document includes both a creation date and the date it was last updated, cite only the 'last updated' date.
- If a web document has no date, check the site homepage. If a date is available there, cite that.
- If you are citing a wiki, check the history of the page and cite the date of the most recent revision.

How do I reference a Web page that lists no author?

When there is no author for a web page, the title moves to the first position of the reference entry. See the Table of Citations for an example.

What if a website has no date?

Use the abbreviation n.d. (no date) when the electronic publication date is not available. See the Table of Citations for an example.

TIP: If factual or statistical information has no date, don't use it.

What if there's no author, publisher or date?

If you can't find date, author or publisher information on a specific webpage, use the information from the site's home page.

TIP: In the unlikely event that you can't find any information, cite the url of the site as the author. However, if the sponsorship and authorship of a site can't be identified, think twice about using the site for your research.