

WRITING A TECHNICAL REPORT

INTRODUCTION

- Contrary to current layman thinking that engineering works only involve working with machineries, many tasks perform by an engineer involve writing.
- A technical report is a formal report designed to convey technical information in a clear and easily accessible format. It is divided into sections which allow different readers to access different levels of information.

INTRODUCTION/2

- The purpose of a technical report is to completely and clearly describe technical work, why it was done, results obtained and implications of those results.
- The technical report serves as a means of communicating the work to others and possibly providing useful information about that work at some later date.

IMPORTANCE OF WELL-WRITTEN TECHNICAL REPORT

- Clear presentation of results is at least as important as the results themselves; therefore, writing a report is an exercise in effective communication of technical information. Results, such as numerical values, designed systems or graphs by themselves are not very useful. To be meaningful to others, results must be supported by a written explanation describing how results were obtained and what significance they hold, or how a designed system actually functions.

HOW TO BEGIN A TECHNICAL REPORT WRITING?

- As with any writing, one of the first questions that must be asked in the planning process is "**Who is the target reader?**" In engineering practice, the reader can be a client, a colleague, a manager or a junior. In academic writing, the target reader is usually the examiner.
- The process of writing a technical report begins with planning the work on which the report is based. Even at this early stage, the task can be broken down into elements which are likely to become the chapters or sections of the report.

HOW TO BEGIN A TECHNICAL REPORT WRITING?/2

- The general rule is to begin writing the sections of the report as soon as possible. The table of contents should be drafted very early in the process of writing the report since the table of contents provides a good overview of the entire document and, while the report is being written, provides an indication of which sections still need to be done.
- It is important to keep in mind that report writing is an integral part of the thought process: it helps to define and order ideas and to derive well-considered conclusions so that further planning of the work can be undertaken.

STRUCTURE OF A TECHNICAL REPORT

- The key to a well-written report is organization. A report that is divided into several sections, occurring in a logical sequence, makes it easy for the reader to quickly obtain an overview of the contents as well as locate specific information.

STRUCTURE OF A TECHNICAL REPORT/2

- *Title page**
- *Abstract**
- *Dedication**
- *Acknowledgements**
- *Table of contents**
- *List of tables**
- *List of figures**
- *Nomenclature**
- *Introductory chapters(s)**
- *Central chapters**
- *Conclusions**
- *Tables**
- *Figures**
- *Appendices**
- *References**
- *Bibliography**

TITLE PAGE

- The purpose of the cover page is to protect and identify the report. It must contain the title, the initials and surnames of the authors, the date, the name of the department and university, and the emblem of the university.

TITLE PAGE


Report
on
LIGHT WATER NUCLEAR REACTORS

submitted to
Mr. David A. McMurrey
Center for Technology Research
Austin, Texas

July 24, 20xx

by Bonie B. Student
Technical Research Associates, Inc.

Descriptive abstract: Indicates
the purpose of the report and
its main contents.



This report examines light water reactors as a possible energy alternative for municipalities. Both types of light water reactors and their processes for producing electricity are described. The report concludes with a review of these reactors' economics and safety systems.

TITLE PAGE/2

A few guidelines for the selection of titles are the following:

- Think about the reader's first impression.
- Include important and distinguishing key words, for example the words that somebody will use in a literature search.
- Leave out any words that are not essential. Avoid meaningless expressions, such as "A Theoretical and Experimental Study of...", or longwinded descriptions, such as "Concise Practical Guide for the Writing of Technical Reports and Papers". Every word must count.

ABSTRACT

A short summary or abstract of 100 to 150 words must appear on the second page of the report. It must summarize the contents and most important findings so that the reader can decide whether he/she wants to read the rest of the report.

- The abstract is not an introduction to the report. It often provides no background information.
- Convey the key elements of the objective and context, and the most important methods, findings and recommendations.
- The abstract is usually the last part of the report to be written.

ABSTRACT

Example: Abstract

Example 1: Abstract (50 word limit)

This report suggests that research into truancy has neglected the critical role of school play-time. In depth interviews with 6 former truantism now students, highlight the pivotal role of group dynamics within the playground. The interviews suggest that 'feeling like an outsider' at play-time encourages initial acts of truancy.

Example 2: Abstract (100 word limit)

This report presents an analysis of adult responses when given the choice of foods dyed blue, or foods dyed with traditional colourings. The initial hypothesis based on research by Jay (2000b), was that adults would show a preference for food dyed blue over foods that looked more natural. This project replicated the methods used by Jay, by substituted sweet for savoury foods. 32 adults, all aged over 25, were asked to select three items from a selection of 16 possible choices. Their responses indicate that adults are less likely to select blue food for savoury items. The results were statistically significant.

DEDICATION

- This is a short sentence, in the middle of a separate page, in which the report is dedicated to a family member, friend or acquaintance. It may be left out and is seldom included in short technical reports. It is more suited to theses.

TABLE OF CONTENTS

- The table of contents must begin on a new page. The page is provided with a heading, such as “Contents” or “Table of Contents”, followed by a list of the three main levels of headings and their page numbers.
- The first item in the table of contents should be the first heading that appears after the table of contents, for example List of Figures. Front matter that precede the table of contents are not listed. Appendices must be listed, each with their title and starting page.

TABLE OF CONTENTS/2

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LIST OF FIGURES AND LIST OF TABLES

- These lists, arranged according to the table and figure number, each begin on a new page and indicate the relevant page number in the right-hand column. The titles of tables and figures must be descriptive enough so that a specific figure or table can be identified in the list and must correspond to the title used for the figure or table in the text.

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NOMENCLATURE (LIST OF SYMBOL)

- The list of the symbols that are used must begin on a new page. The list is arranged in the following sequence: All the ordinary symbols are listed first, followed by the superscripts and then the subscripts. Finally, the auxiliary symbols, for example overbar and underscore for vectors and averages or accent marks for time-dependent components, are listed.

NOMENCLATURE (LIST OF SYMBOL)/2

α	angle, coefficient of thermal expansion, form factor for shear
β	numerical factor, angle
γ	shear strain, weight per unit volume or specific weight, angle
δ	deflection, finite difference operator, variational symbol, displacement
$\{\delta\}$	nodal displacement matrix of finite element
Δ	change of a function
ϵ	normal strain
θ	angle, angle of twist per unit length, slope
ν	Poisson's ratio
λ	axial load factor, Lamé constant
Π	potential energy
ρ	density (mass per unit volume), radius
σ	normal stress
τ	shear stress
ϕ	total angle of twist
Φ	stress function
ω	angular velocity
ψ	stream function

INTRODUCTION PART

The introductory chapter or chapters should provide the reader with the following information:

- The context in which the report originated, i.e. the work from which it originated, how it links to/differs from preceding or related work, the limitations that were placed on the work (as a result of external circumstances or through own choice), and so forth;
- The purpose of the report, i.e. the problem that was examined and the specific objectives of the work;
- The motivation for the work or report, that is, why the work was undertaken.

CENTRAL CHAPTERS

The structure of the central chapters depends on the contents of the report. Typical contents of the central chapters for various cases (for example design reports, experimental reports, etc.) are given in the appendices.

The following are general guidelines for the central chapters:

- Every chapter should be focused on one topic, i.e. it should have a clear purpose. The title of the chapter normally reflects the purpose.

CENTRAL CHAPTERS/2

- The following structure of chapters or within chapters can usually be followed and corresponds to a scientific approach:
 - Introduction: the purpose of the chapter, and how it links to the purpose of the report;**
 - Underlying or simplified assumptions;**
 - Analytical or numerical theory used, or the procedure for the investigation;**
 - Measured results, results of the analysis or observations (verifiable results);**
 - Processing of results: method and answers (objective);**
 - Interpretation of results (subjective, but critical and well motivated);**
 - Conclusions: usefulness and importance of results; how the results contribute to achieving the purpose of the report.**

CENTRAL CHAPTERS/3

- The contents of the central chapters must remain strictly linked to the purpose of the report. Contents that are only of marginal importance should preferably be placed in the appendices.
- The central chapters do not usually follow the chronological sequence of the project.
- Each conclusion drawn in the conclusions must be corroborated in the central chapters.

CONCLUSION PART

The purpose of this section is to make it clear to what extent the purpose of the report was achieved and which findings were made. All statements in the Conclusions must be supported in the report.

Guidelines for the conclusion part are:

- Summarize the purpose of and motivation for the document/project.
- Discuss the implications of the findings and indicate the contributions made by the report. Emphasise the most important findings.

CONCLUSION PART/2

- Clarify to what extent the purpose was achieved. Provide a summary of each section of the report to indicate how that section contributed to the attainment of the purpose. Also summarize the most important findings, methods or techniques.
- Provide suggestions for further work, if appropriate.

TABLES AND FIGURES

- Tables are used for quantitative comparisons, when the differences between lines on a graph will be too small, or when the relationship between the dependent and independent variables is not clear. Figures (all drawings, sketches, graphs and photos) can usually be more easily interpreted by the reader than tables and are therefore preferable when the more qualitative nature suffices.
- Tables and figures may be placed in the main text, at the end of each chapter or at the end of the main text. Figures are numbered as a single series and tables as another.

TABLES AND FIGURES/2

Table 1: Mineral Resource Statement for the Bongará Zn-Pb-Ag Deposit, Amazonas Department, Peru, SRK Consulting (U.S.), Inc., June 5, 2014

Category	Mass	Grade				Contained Metal (millions)				
		Zn	Pb	Ag	ZnEq	Zn	Pb	Ag	ZnEq	
	Mt	%	%	g/t	%	(lbs)	(lbs)	(oz)	tonnes	(lbs)
Measured	1.43	13.02	1.85	19.3	15.45	410.0	58.3	0.884	0.221	486.5
Indicated	1.35	12.51	1.71	17.1	14.74	372.6	50.9	0.744	0.199	438.8
Measured + Indicated	2.78	12.77	1.78	18.2	15.10	782.5	109.2	1.628	0.420	925.3
Inferred	9.07	10.87	1.21	12.2	12.44	2,173.0	241.5	3.554	1.130	2,487.6

Source: SRK, 2014

Notes:

1. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resources estimated will be converted into Mineral Reserves;
2. Mineral resources are reported to a Net Smelter Return zinc-equivalent (ZnEq%) cut-off grade based on metal price assumptions*, metallurgical recovery assumptions**, mining costs, processing costs, general and administrative (G&A) costs, and NSR factors***. Mining costs, processing, G&A, and transportation costs total US\$51.30/t.
 - i. *Metal price assumptions considered for the calculation of metal equivalent grades are: Zinc (US\$/lb 0.95), Lead (US\$/lb 0.95) and Silver (US\$/oz 20.00),
 - ii. **Cut-off grade calculations assume variable metallurgical recoveries as a function of grade and relative metal distribution. Average metallurgical recoveries for sulfide and oxide respectively are: Zinc (93.1%, 73%), Lead (84.8, 0%) and Silver (55.6%, 0%)
 - iii. *** NSR factors for calculating cutoff grades were: $ZnEq\% = Zn\% * 1 + Pb\% * 0.74 + Ag\ g/t * 0.02$
3. **Resulting cutoff grades used in this resource statement were 4.1% ZnEq for sulfide, 5.0% ZnEq for oxide, and 4.5% ZnEq for mixed material types.**
4. Zinc equivalency for reporting in situ contained metal resources above was calculated using: $ZnEq\ (\%) = Zn\ (\%) + 1.0 * Pb\ (\%) + 0.03 * Ag\ (g/t)$.
5. Density was calculated based on material types and metal grades. The average density in the mineralized zone was 2.91 g/cm³ as a function of the zinc and lead sulfide mineral content.
6. Mineral Resources as reported are undiluted.
7. Mineral resource tonnage and contained metal have been rounded to reflect the precision of the estimate, and numbers may not add due to rounding.

TABLES AND FIGURES/3

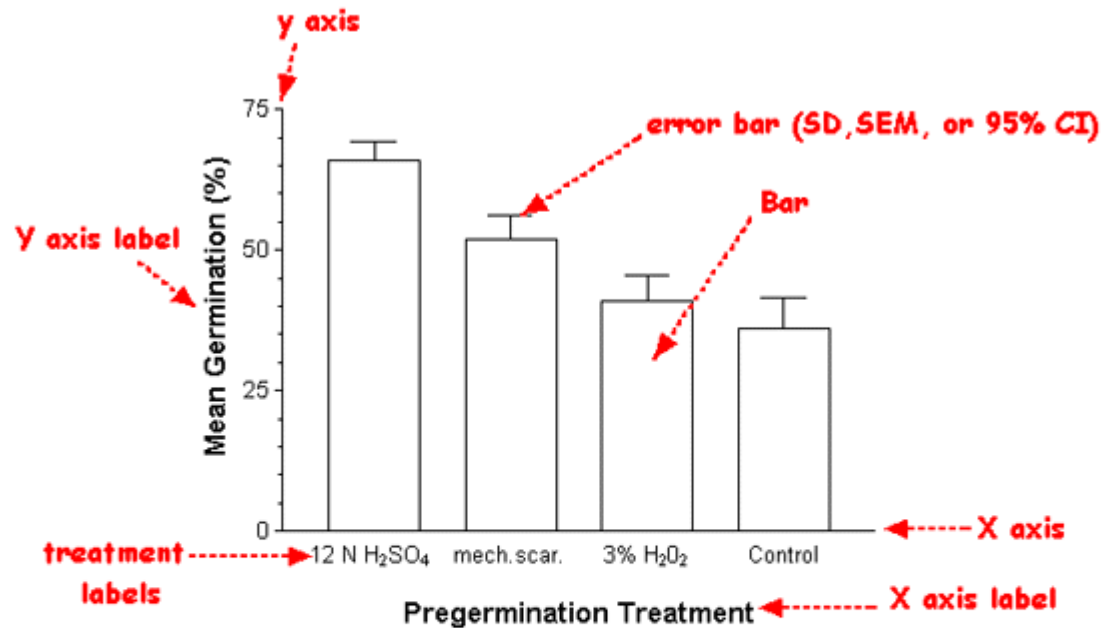


Figure 1. Mean germination (%) (+SD) of gourd seeds following various pregermination treatments. N=10 groups of 100 seeds per treatment and control. Treatments: 12 hour soak in 12 N H₂SO₄, 90 second scarification of seed coat with 80 grit sandpaper, 6 hour soak in 3% H₂O₂.

figure legend

APPENDICES

Detail that disturbs the flow of the main text, and particularly detail that does not form an integral part of the main text, must preferably be provided in the appendices. Examples of this are complicated technical derivations, detailed descriptions of apparatus, computer programs, lists of unprocessed data, sample calculations and concise commercial information (data sheets).

APPENDICES/2

- Just as in a chapter, every appendix must have a descriptive title.
- The appendices are numbered “Appendix A”, “Appendix B”, etc. Examples of numbering are: page numbers “B1”, Table A1, Figure C2. In shorter reports, the page numbers of the appendices can follow on from those of the main report.

REFERENCES PART

- The purpose of references is to indicate the origin of statements that are not (such as Newton's laws, the laws of thermodynamics or the Bernoulli flow equation) general knowledge in the field, to acknowledge the work of others, and to provide additional information for readers who might be interested in obtaining further information.
- No references may be included in the list of references to which you have not referred in the report, and vice versa.

REFERENCES PART/2

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BIBLIOGRAPHY PART

- A bibliography is a list of sources, usually books, that provide a broad background on the topic, but to which no specific reference is made. Only comprehensive technical reports, such as some theses, have a bibliography.