UMP THESIS GUIDE

CENTER FOR GRADUATE STUDIES
UNIVERSITI MALAYSIA PAHANG

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PREFACE

The preparation of graduate thesis is a logical and scrupulous process. It involves numerous steps. The Universiti Malaysia Pahang (UMP) Thesis Guide describes the formatting standards set forth by the Center for Graduate Studies. This guide helps graduate candidates in the preparation of their theses. The guide covers facet of thesis writing from the language to be used, to technical specifications that include typeface and font size, number of pages for a Masters and PhD thesis, pagination, line spacing, units, chapter format and references style. The guide is divided into five chapters which explain in detail the formatting requirements and submission options to be followed by all candidates writing theses at the Universiti Malaysia Pahang.

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CHAPTER 1

INTRODUCTION AND GENERAL INFORMATION

1.1 PURPOSE OF THE GUIDE

The Universiti Malaysia Pahang (UMP) Thesis Guide is prepared to provide guideline for the preparation of graduates at UMP, Malaysia. It establishes the technical parameters within which all candidates must observe such as margin settings, spacing, format and style, the sequence of pages within the document, and items required for final submission. Since most graduate students will publish during and after their graduate education, it is logical to encourage the use of this Guide as reference for practices. The application of this concept is not simple. However, it becomes necessary for students to understand the various elements of a manuscript and general formatting requirements in various academic publishing. Although knowledge and use of formatting are essential, the regulations established by the guide precede over any other manuals for final submission of a thesis in UMP.

The fact that UMP accepts a thesis and awards the degree, place its academic reputation on the line. While the technical quality and content of the thesis are evaluated by the examiners, Center for Graduate Studies (CGS) imposes format requirements to ensure an appropriate academic appearance of the manuscript.

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The commitment of Center for Graduate Studies at UMP has always been to assist graduate students in meeting the goals of consistency, logical organization, attractiveness and correctness in thesis preparation. The Center for Graduate Studies is

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responsible for the review and approval of the final copies of the thesis. It provides the guidance in document preparation through this guide and submitted thesis will be checked by CGS assigned person.

1.3 LANGUAGE OF THESIS

Unless approval from the senate has been obtained for the use of other language, the thesis should be written either in English or Bahasa Melayu. There should be consistency in the use of the language, especially the spelling style either British or American, throughout the thesis. The Roman alphabet should be used unless required by the discipline otherwise.

1.4 SUBMISSION

A student is required to forward the notice of submission of thesis to the Dean, CGS at least three months before the actual date of submission. A form for the notice of the submission can be obtained from CGS office. The submission has to be completed during the term of candidature.

1.5 CONSISTENCY IN FORMAT

The element that contributes most to the attractiveness and readability of the thesis is consistency. Consistency in formatting means that the students satisfy a series of convention regarding spacing, heading, sequencing and other aspects of appearance to visually guide the reader throughout the document, thus enabling the reader to concentrate on content. Consistency of thesis preparation is critical since it influences the examiner's response to its content and ultimately the acceptance of the document by the Center for Graduate Studies.

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1.6 DEFINITION OF TERMS

Typeface or Font

These terms apply to all the features available within the family of print characters including bold, italics and the various fonts such as Arial, Times New Roman and Courier, etc.

Text

In the discussion of formatting, text is used as a generic term to designate the main body of the thesis and to distinguish this element from preliminary pages, references, tables, figures and appendices.

Preliminary Pages

These pages serve as a guide to the contents and nature of the thesis. The preliminary pages comprise of the examiners approval document, title page, declaration, dedication, acknowledgements, abstract, table of contents, list of tables, list of figures and list of symbol/abbreviations.

Table

Tables are presentations in which verbal, numeric or graphical information are arranged in a systematic way in rows and columns. Tabular information allows the student to express precise information to a reader in a structured format.

Figure

Any diagram, illustration, graph, chart, map, photograph or material that does not fit into the restricted format for a table is a figure. Figures generally show relationship or illustrate information rather than present precise data.

Equation

Equations are considered to be part of the text and therefore should not be set apart from the text within a box or in any other way.

Appendix

An appendix can be used for supplementary material that is related to the text. In some cases, table and/or figures are placed in an appendix to avoid interrupting the text.

CHAPTER 2

TECHNICAL AND FORMATTING SPECIFICATIONS

2.1 PAPER SPECIFICATIONS

2.1.1 Size

A4 (210 mm × 297 mm) size papers should be used.

2.1.2 Quality

The copy should be on simile paper (minimum quality 80 grams). Duplicate copies should be on quality photostat or offset paper. Neither risograph copies nor carbon copies are acceptable. The students should use normal print and a quality printer.

2.1.3 Colour

Only white paper is acceptable.

2.2 GUIDELINES FOR TYPING

2.2.1 Typeface or Font

Typeface affects the physical appearance of a thesis more than any other single element. Word processing software package provides the opportunity to use different typefaces, sizes and font attributes such as bold or italics. The size of the type is determined by point size. Text is most readable in 10, 11 or 12 point. The students are

(vi) The number and the title of a sub-section should be aligned with the left margin;

(vii) The first line of a paragraph should be indented by 12.7 mm from the left margin;

(viii) A new paragraph should not begin on the last line of a page;

(ix) The spacing between the last line of a text and a table, or a figure should be 1.5 line spacing;

2.2.4 Paragraphing

All paragraphs should have the first line indented 12.7 mm from the left margin.

2.3 PRINTING AND DUPLICATION

Only one side of the sheet should be printed. After binding, the printed page should be on the right side. The final copies of the thesis must be produced using a laser printer. Inkjet, dot matrix or bubblejet printers shall not be used to produce the final copies of the document. Make sure that the photocopies or offset copies are in good quality.

2.3.1 Copies of the Thesis

Copies of the thesis for external examiner, internal examiner and supervisor/ co-supervisor and postgraduate committee should be submitted bound with red coloured cover for Masters and blue coloured cover for PhD thesis.

2.3.2 Copies of the Final Submission

Six (6) copies of the thesis should be submitted to the CGS after it has been examined and passed by the examiners.

required to use Times New Roman with 12 font size throughout the thesis including headings and page numbers except special foreign languages.

2.2.2 Headings

The title of a chapter should be typed using **bold capital letters** and centered. A new chapter must start on a new page. Chapters and their sub-sections must be given titles. The titles should be typed using **bold letters** and should not be underlined.

2.2.3 Spacing

Spacing has both artistic and utilitarian effects on the appearance of the document. General manuscripts should have 1.5 line spacing. Single line spacing should be used for the following

(i) Acknowledgements
(ii) Abstract and its translation
(iii) List of tables, figures, symbols and abbreviations
(iv) Footnotes
(v) References

The following guidelines should be observed:

(i) The spacing between upper edge of a page and a chapter number should be 50 mm;
(ii) The spacing between a chapter number and the title, and between the title and the first line of the text should be 2×1.5 line spacing;
(iii) The spacing between the last line of a text with the title of a sub-section should be 1.5 line spacing;
(iv) The spacing between the title of a sub-section and the first line of a text should be 1.5 line spacing;
(v) The spacing between paragraphs should be 1.5 line spacing;

2.3.3 Colour of the Cover

The colour should be used according to the types of degree

Doctor of Philosophy	: Maroon
Masters	: Black
Degree (Final Year Project)	: Green

2.4 INFORMATION ON THE COVER

2.4.1 Front Cover

The front cover should be written in capital letters with the title of the thesis, the candidate's name, the name of degree award and the university's name

Details on the cover should be in gold coloured CAPITAL letters (not bold face) with font size of 20 points and should be in the following order:

(i) Title of the Thesis (arranged in inverted pyramid, 50 mm from the upper edge of the cover)
(ii) Full Name of the Student (name as appears on identification card/ passport)
(iii) Name of the Degree (for example, DOCTOR OF PHILOSOPHY)
(iv) Name of the University (UNIVERSITI MALAYSIA PAHANG, 50 mm from bottom edge of the cover).

(Please refer to Appendix A1)

2.4.2 Spine of the Thesis

Details should be in gold coloured CAPITAL letters using font size of 20 points in the following order:

(i) Name of Student (50 mm from the upper edge of the cover)

(ii) Name of the Degree (abbreviated form, for example, Ph.D./M. Eng. (Mech.))

(iii) Year of Degree Awarded

(iv) Name of University (UMP; abbreviation of Universiti Malaysia Pahang, 50 mm from the bottom edge of the cover)

(Please refer to Appendix A2)

2.5 MARGINS SPECIFICATIONS

All pages should be set with the same margin. Student should maintain the following margin specifications:

Top edge:	30 mm
Right side:	25 mm
Left side:	35 mm
Bottom edge:	25 mm

These margins define the minimum white space to be maintained on all sides of a page. All materials included in the document including the text, tables, figures must fit within these margins.

Note:

(i) The beginning of each chapter, except for references and appendices, must begin 50 mm from the top edge of a page.

(ii) Tables and figures must follow the specifications.

(iii) The last paragraph on a page must have at least two (2) lines of the text otherwise it should begin on the following page.

(iv) The last word in the last line on a page must not be followed by a hyphen.

2.6 PAGINATION

2.6.1 Position of Page Number

Page numbers should come into view on the right hand corner, 15 mm from the upper edge, and the last digit should be 25 mm from the right edge of the paper. The candidate should follow the same font as rest of the text without trimming.

2.6.2 Numbering System

All chapters and their sub-sections should be labeled and numbered. The chapters should be numbered using Arabic numeric, i.e. Chapter 1, Chapter 2, Chapter 3 and so on. The sub-sections should not be indented but arranged in a structured manner not more than three levels as follows.

1	First level (Title of the chapter)
1.1	Second level (Title of the section)
1.1.1	Third level (Title of the sub-section)

If the length of a title is more than one line, single line spacing should be used. Sub-sections beyond level three should be labeled using the characters with italic and bold face. Preliminary pages (beginning with the title page) should be numbered consecutively in lower Roman numbers such as i, ii, iii and so on. The text should be numbered using the consecutive Arabic numbers such as 1, 2, 3 and so on. Pagination using letter suffixes (example 10a, 10b) is not allowed.

Note:

(i) The first page (title page) is counted even though the page number does not appear on the print.

(ii) The first page of each chapter is counted although the page number does not appear on the print.

CHAPTER 3

THESIS ARRANGEMENT AND LAYOUT

3.1 ARRANGEMENT OF THESIS

The layout and content of the thesis should be in the following order

TITLE PAGE
EXAMINERS APPROVAL DOCUMENT
SUPERVISOR'S DECLARATION
CANDIDATE'S DECLARATION
DEDICATION (Optional)
ACKNOWLEDGEMENTS
ABSTRACT
TRANSLATION OF ABSTRACT
TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES
LIST OF SYMBOLS
LIST OF ABBREVIATIONS
TEXT
REFERENCES
APPENDICES

3.2 PRELIMINARY PAGES

3.2.1 Examiners Approval Document

The examiners approval document certifies that the internal and external examiners have examined the final copy of the thesis for structure and content, and found the document met the requirement for the awarding of degree. Each of the final copy of the thesis submitted to the Center for Graduate Studies must be accompanied by an examiners approval document using the exact wording (refer to Appendix A3). The examiners approval document must be in the same typeface as the rest of the thesis and the student's name used on the document must appear as he/she is registered at Universiti Malaysia Pahang. Each document must have original examiners signatures. The major and degree to be awarded must be exactly the same as the official major and degree to which the student was offered by the Center for Graduate Studies. The examiners approval document is neither numbered nor counted in the numbering sequence of the thesis.

3.2.2 Title Page

The title should describe the content of the thesis accurately and concisely. The title page should provide the following information by using single spacing and in CAPITAL LETTERS in the following order:

(i) Title of the Thesis: (in inverted pyramid, 50 mm from the upper edge of the page)
(ii) Full Name of the Student: (as appears in identification card / passport)
(iii) Purpose of Thesis Submission:
(iv) Name of Faculty/Institute/Center
(v) Name of University (Capital letters)
(vi) Month and Year of Degree Awarded (50 mm from the bottom edge of the page)

(Refer to Appendix A4)

3.2.3 Statement of Award

This statement should be written on the title page. It should state the purpose and the award for which the thesis is submitted. Example of statements for various purposes and awards are listed in Appendix A5.

3.2.4 Declaration

The declaration must be on a fresh page. It should be typed 30 mm from the upper edge of the page. A thesis to be submitted for the purpose of examination must obtain prior declaration from the supervisor(s) on the standard and quality of the thesis (refer to Appendix A6). The student should prepare the declaration using exactly the same word in Appendix A7 and is signed. The student declaration also should be typed 30 mm from the upper edge of the page.

3.2.5 Dedication (optional)

If the student wishes to dedicate the thesis, the dedication statement is included on this page. The dedication must be brief, not more that one paragraph and must not contain any number, chart or photograph. It should be placed in the middle of the page. (Refer to Appendix A8)

3.2.6 Acknowledgements

It is normal to acknowledge any individual or organization that has provided any sort of special assistance in the preparation of the thesis. Permission to quote copyrighted material is also listed here. It is perfectly appropriate to express gratitude for financial or other support that the student has received. The words ACKNOWLEDGEMENTS should be typed 30 mm from the upper edge of the page. Candidate should avoid lengthy and wordy acknowledgements. This should be written in single line space within a page.

(Refer to Appendix A9)

3.2.7 Abstract and its Translation

Thesis submitted to the Center for Graduate Studies must include an abstract. The abstract and its translated version should be on separate pages after the page of Acknowledgements. The word ABSTRACT must be typed 30 mm from the upper edge of the page and centered between the right and left margins. The length of the abstract should be within 350 words and written in one paragraph, single line spacing. Generally, the abstract should provide a concise description of the study and should not be a critique. A number of criteria including comprehensiveness, preciseness, stating the objectives, conciseness and intelligibility must be respected. Normally, an abstract should include the following information:

(i) Brief statement of problem and/or objectives of the study
(ii) A concise description of research design, methodology and materials
(iii) Brief summary of major research findings including their significance
(iv) Conclusions of the research

An abstract should not include the followings:

(i) Additional content, corrections or any information that do not appear in the text of the thesis
(ii) Tables, figures, references and abbreviations or acronyms. Abbreviations or acronyms must be preceded by the full terms at the first use
(iii) Details of experiment, organisms, standard procedures, techniques and instruments
(iv) References to other parts of the thesis and bibliographic references

Abstract should be written in English and Bahasa Melayu. The version to appear first should be of the same language used in the thesis text, for example, for a thesis written in English, the abstract in English should appear first, followed by its Bahasa Melayu version. Even though a thesis has been written in English, the abstract in Bahasa Melayu must also reach an acceptable scholarly standard. Common pitfalls such

as spelling errors, incorrect usage of prepositions and prefixes should be avoided. Scientific terms must be used accurately and consistently.

(Refer to Appendix A10 and A11)

3.2.8 Table of Contents

Table of Contents should start on a new page with the word TABLE OF CONTENTS typed 30 mm from the upper edge of the page and centered. A table of contents consists of an ordered list of headings for all the chapters, topics, subtopics, list of references, appendices (if used) with the page numbers that mark the start of each. Titles, headings and subheadings should be worded exactly as they appear in the body of the text.

(Refer to Appendix A12)

3.2.9 List of Tables

This appears on a fresh page with the heading LIST OF TABLES typed 30 mm from the upper edge of the page and centered. The list must contain all the titles of the tables that appear in the text or in the appendix and worded exactly the same as they appear in the text. The page number of the table must also be included. The table number should be arranged according to the chapters.

(Refer to Appendix A13)

3.2.10 List of Figures

This page appears on a new page with the heading LIST OF FIGURES typed 30 mm from the upper edge of the page and centered. This list contains the titles of figures (charts, diagrams, photographs, drawings, maps, graphs and any other kind of illustrations) together with their page numbers, which are listed in the text or in the appendix. The titles must be worded exactly as they appear in the text of the thesis. The

page number of the figure must also be included. The figure number should be arranged according to the chapters.

(Refer to Appendix A14)

3.2.11 List of Symbols/Abbreviations

All symbols/abbreviations/terminologies and glossaries appear in the text should be listed on this page. It should be placed 30 mm from the upper edge of the page. They are listed in the following order:

(i) Roman letters - alphabetical order
(ii) Greek letters - alphabetical order
(iii) Superscripts - alphabetical order
(iv) Subscripts - alphabetical order

(Refer to Appendices A15 and A16)

3.3 THE TEXT

3.3.1 Length

The maximum number of words for a project/dissertation/thesis is as follows:

Doctor of Philosophy:
Not more than 1 00 000 words

Masters:
By Research: Not more than 60 000 words
By Coursework: Not more than 40 000 words

Degree (Final Year Project):
Not more than 30 000 words

The total number of words does not include footnotes, quotations, appendices, formulae, tables, diagrams and the like.

3.3.2 Major Divisions

Thesis must be divided into a logical scheme that is followed consistently throughout the document. This logical scheme begins with a major division such as a chapter and section. Chapters are the most common division but sections and parts are also permissible. Each chapter must have a title and it should reflect its content. A new chapter must begin on a fresh page. A chapter must be divided into sections. These sections must be given appropriate titles and numbered. Texts must be written in paragraphs. Long paragraph should be avoided. Each paragraph must describe an issue or subject. There must be continuity between paragraphs.

The text starts with a chapter that is CHAPTER 1. The heading CHAPTER 1 must be positioned 50 mm from the top edge of the page and centered. The title of the chapter begins 2×1.5 line spacing below the chapter title and is according to margin specifications. The same requirements apply to the subsequent chapters.

(Refer to Appendix B)

3.3.3 Subsections/Headings

Any logical system of subsection within a chapter is permissible but the scheme used should be consistent throughout the document. The appearance of the heading must vary in style for each level of the heading unless a numbering sequence is used to indicate level. The headings within a chapter do not begin on a new page unless the proceeding page is filled with text. If there is no space for a complete heading and at least two lines of the text at the bottom of a page, the new heading should begin on the next page. The primary headings (first headings), subheadings (secondary heading) are left justified. The tertiary headings (more than third level) should be written in italics font with bold face and are not listed in the Table of Contents. The headings and subheadings of the chapter should be the first level, for example, Section 3.1 and 3.2

would denote two consecutive headings in Chapter 3 and Sections 3.2.3 and 3.2.4 would similarly denote two consecutive subheadings in Chapter 3.

(Refer to Appendix B)

3.3.4 Tables in the Text

All tables must be numbered using the Arabic numeric. The caption should be positioned at the top of the table. If the table is presented across the length of the page (landscape direction), the head of the table must be along the bound edge of the thesis. Tables must be numbered according to the chapter. **The caption is written in single line spacing and it should be centered. If the caption is written in more than one line, the second and the following line should be aligned to the left caption text.** The tables must be numbered with respect to the chapter such as Table 3.1 is the first table that appears in Chapter 3. Table sources should be placed below the table. If the table has a source but has been adapted, indicate by using "Adapted from: ..." instead of "Source: ...".

A table should be positioned after it is being cited for the first time in the text. All tables in the chapter can also be grouped together and positioned near the relevant text. Since tables are typeset by the student rather than photographed, copied or imported from an external source, the same typeface used for the thesis must be used for table number, title and data. The size of the typeface for table content should be the same as the rest of the document but may differ slightly if necessary, for example, a font size or two smaller.

(Refer to Appendix C1 and C2)

Required Format for Tables

Since tables consist of tabulated material, the use of lines in tables assists the reader in distinguishing the various parts of the table. The table must include the following three horizontal lines:

direction), the top of the figure must be along the bound edge of the thesis. Figures must be numbered according to the chapter.

Typeface

Since figures are considered illustrations or diagrams and may be imported from an external source, any text that is part of the figure can be in any typeface, provided it is neat and readable. The figure number and title must be in the same typeface as the rest of the thesis because this material is considered to be part of the typeset body of the document.

The caption is written in single line spacing and it should be centered. If the caption is written more than one line, the second and the following lines should be aligned to the left caption text. The figures must be numbered with respect to the chapter such as Figure 4.2 is the second figure that appears in Chapter 4.

(Refer to Appendix D1 and D2)

Continued Figures

A figure containing several related parts too large to be included on a single page may be continued onto other pages. The first page contains the figure number and complete title and the subsequent pages contain the remainder of the figure and the designation is Figure #. Continued.

(Refer to Appendix D3)

3.3.6 Placement of Tables and Figures

Tables and figures must be referred in text by number instead of expressions. When more than one tables/figures are referred on a page of text, each table/figure should follows in the order mentioned until all have been placed. In degree of importance, tables/figures are secondary to the text. It means that all text pages must be

filled with text. It is recommended that tables/figures are assigned on pages separated from the text to avoid problems in shifting during last minute revisions. However, if the student wishes to incorporate tables/figures within the text, the following criteria must be met:

(i) Table/figure must be separated from the text by extra space (1.5 line spacing).
(ii) Table/figure cannot be continued onto the following page
(iii) Table/figure must be placed at the top or bottom of the page, instead of the center/near to the center of the page.

There should always be a balance of not less than half a page of the text and not more than half a page of table/figure below or above the text. If multiple tables/figures are included on a page, it is permissible to provide approximately 1.5 line spacing between each table/figure.

Placement in an appendix: When all tables/figures are placed in an appendix, this fact is stated in a note in the body of the text and is not repeated thereafter. This note should be placed on the page of text that refers to the first table or figure in the document. The note could be presented as part of a sentence, parenthetical information or a footnote. When only some of the tables/figures are in an appendix, their location must be clearly indicated as references in the text, unless the numbering scheme makes the location obvious.

3.3.7 Equations in the Text

Equation number should be Arabic numerals enclosed in parentheses on the right hand margin. The equations whether mathematical or/and chemical should be cited in the text and must be numbered with respect to the chapter such as Eq. (4.2) as the second equation that appears in Chapter 4. Equations are placed at the center of a page (refer to Appendix B). If detailed derivation is needed, it is to be placed in an appendix. When a complete version of an equation requires more than a single line, the expression should be divided immediately before a convenient plus or minus sign but not one that

direction), the top of the figure must be along the bound edge of the thesis. Figures must be numbered according to the chapter.

Typeface

Since figures are considered illustrations or diagrams and may be imported from an external source, any text that is part of the figure can be in any typeface, provided it is neat and readable. The figure number and title must be in the same typeface as the rest of the thesis because this material is considered to be part of the typeset body of the document.

The caption is written in single line spacing and it should be centered. If the caption is written more than one line, the second and the following lines should be aligned to the left caption text. The figures must be numbered with respect to the chapter such as Figure 4.2 is the second figure that appears in Chapter 4.

(Refer to Appendix D1 and D2)

Continued Figures

A figure containing several related parts too large to be included on a single page may be continued onto other pages. The first page contains the figure number and complete title and the subsequent pages contain the remainder of the figure and the designation is Figure #. Continued.

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falls within the bounds of a set of fences. Actually the best place to break a lengthy equation is right ahead of an equals sign.

3.3.8 References within the Text

Reference/Citation is a mean of formally recognizing within the text, the sources from which the information or idea are obtained. The purpose is to acknowledge the work of others, to demonstrate the body of knowledge in which the work is based on and to lead others to further information. Citation in the texts must be written according to this guide. Referencing usually consists of information in parentheses within the text. The purpose of internal referencing is to guide the reader to the appropriate entry in the list of references/bibliography, where complete information is available.

3.3.9 Quotations

Quotations within a sentence should not exceed 40 words and must be placed within quotation marks " ... ".

All quotations exceeding 40 words must be typed separately in a new paragraph with 1.5 line spacing below and indented without the use of quotation marks. If the quotation is in a different language, it must be written in italic.

3.4 LIST OF REFERENCES

A thesis must include a list of materials used in the preparation of the document. **The student should not cite articles that were published from the studies that he/she conducted during his/her candidature as references.** The list of references should start on a fresh page with the heading REFERENCES 30 mm from the upper edge of the page and centered. This section should contain all the sources referred to by text. Sources not referred to in the text should not be listed in the references section. The purpose of listing the references is threefold:

(i) To serve as an acknowledgment of sources

(ii) To give readers sufficient information to locate the material

(iii) To save the reader the trouble of attempting to locate material that is not available in the case of personal interviews or correspondences.

The format used for the references should follow the Author-Year system. References cannot be collected at the end of the chapters and only at the end of the document. All references should be listed in alphabetical order. The detailed reference styles are described in Chapter 4.

3.5 HEADER AND FOOTER

The use of header and footer is not allowed.

3.6 APPENDICES

An appendix is a useful device to make available material that is relevant to the text but not suitable for inclusion in it. Thesis does not necessarily have to include appendices. The appendices may comprise of the following, glossary, data from the study, tables, charts, detailed engineering drawing, computer program listings, sample of questionnaires, maps, photographs, and any other such material that is either too lengthy to be included in the text or not immediately relevant to the discussion in the text.

Appendix can be named as APPENDIX A, APPENDIX B and so on, depending on the types and quantity of information to be included. Specific titles for an appendix can also be given. Appendices should be paginated consecutively with the main text. The heading such as APPENDIX A should be typed 30 mm from the upper edge of the page and centered. If appendices are included, they should be listed according to their titles in the Table of Contents. If there are five or less appendices, their details should be listed in the Table of Contents. If there are more than five, the Table of Contents should include a list of appendices with the page numbers.

falls within the bounds of a set of fences. Actually the best place to break a lengthy equation is right ahead of an equals sign.

3.3.8 References within the Text

Reference/Citation is a mean of formally recognizing within the text, the sources from which the information or idea are obtained. The purpose is to acknowledge the work of others, to demonstrate the body of knowledge in which the work is based on and to lead others to further information. Citation in the texts must be written according to this guide. Referencing usually consists of information in parentheses within the text. The purpose of internal referencing is to guide the reader to the appropriate entry in the list of references/bibliography, where complete information is available.

3.3.9 Quotations

Quotations within a sentence should not exceed 40 words and must be placed within quotation marks " ... ".

All quotations exceeding 40 words must be typed separately in a new paragraph with 1.5 line spacing below and indented without the use of quotation marks. If the quotation is in a different language, it must be written in italic.

3.4 LIST OF REFERENCES

A thesis must include a list of materials used in the preparation of the document. **The student should not cite articles that were published from the studies that he/she conducted during his/her candidature as references.** The list of references should start on a fresh page with the heading REFERENCES 30 mm from the upper edge of the page and centered. This section should contain all the sources referred to by text. Sources not referred to in the text should not be listed in the references section. The purpose of listing the references is threefold:

3.6.1 List of Publications

All publications (either journals or proceedings) that result from the study that is carried out by a candidate while under supervision and during his/her candidature and for which the candidate is the first author or co-author should be listed clearly and accurately. The publications listed in the appendix are those relevant to his/her research topics and that have been either published or accepted to be published in journals or conferences during the candidate's study period.

CHAPTER 4

REFERENCE STYLE

4.1 INTRODUCTION

The details of the references cited in the text should be located in the list of references. The list should be placed at the end of the thesis. The list of sources actually cited should be compiled according to the following guidelines, based on the **Author-Year** system (Harvard System). The references are listed according to alphabetical and chronological order. If more than one references by the same author are cited, these references should be listed chronologically. In the reference list, information from books, journals, newspapers, interviews and similar sources are not classified or categorize into their own categories. References should be typed single spaced. If a reference is not in the language of the text (except for English) then it should be translated into the language of the text.

4.1.1 Author's Name

The author's name should be written in full, as it appears on the title page of the publication or as in the copyright information without any titles or honorifics. The name of author with a family name must first be shortened by starting the family name and the rest of his name in initials. The initials (without any extra spacing) are written after the family name and are preceded by a comma.

For example,

John Harvard Kennedy is written as Kennedy, J.H.
Zakri Bin Ghazalli is written as Ghazalli, Z.
Mohd Shahrir Bin Mohd Sani is written as Mohd Sani, M.S.

4.1.2 Titles of Publication

Use capital letter for the initial letter of the title and the rest of the title should be in lower case. In case of having abbreviation or acronym in the title, capital letter can be used for that. Moreover, if a proper name includes in the title, capital letters should be used only for the initial letter of the name.

For example,

... 2008. Potential of biomass electricity in four Asian countries.
... 2007. Environmental management issues in Malaysia. .....

English publications with titles beginning with "The" are listed in alphabetical order according to the first letter of the word after it.

4.2 STYLES OF WRITING REFERENCES

(a) References should be listed in alphabetical order:

Ali, I. 2006. ...
Ismail, F. 2004. ...
Mohammed, S. 2001. ...
Sharifah, H.S. 1995. ...
Zakri, A.H. 2007. ...

(b) The publication of an individual author is listed before another publication in which the same author is the first writer and both publications are in the same year.

Mohd Sani, M.S. 2006. ...

Mohd Sani, M.S. and Rahman, M.M. 2006. ...

(c) In the case of publications in which one author is the first author and the second and third author are different, the works are listed according the alphabetical order of the names of the second author and third, and so on.

Rahman, M.M. 2007.

Rahman, M.M. and Ariffin, A.K. 2004.

Rahman, M.M., Ariffin, A.K. and Noor, M.M. 2008.

(d) Single author entries by the same author are arranged by year of publication, the earliest should be placed in the first citation.

Rahman, M.M. 2003. ...

Rahman, M.M. 2007. ...

(e) References by the same author (or by the same two or more authors in the same order) with the same publication year are arranged alphabetically by the title that follows the date. If the references with same authors published in the same year are identified as articles in a series (for example Part 1 and Part 2), order the references in the series order, not alphabetically by title. Lowercase letters a, b,c and so on are placed immediately after the year.

Rahman, M.M. 2003a. Design and development of fatigue life ... .

Rahman, M.M. 2003b. Prediction of fatigue life of ... .

(f) Where two authors have the same first name, they are listed according to the alphabetical order according to the first initial.

Rahman, A. 2006. ...

Rahman, M.M. 2002. ...

Zakri, A. 2003. ...

Zakri, M.G. 2006. ...

Zakri, M.Z. 2004. ...

4.3 REFERENCES FOR BOOKS

The complete information required for a book is as follows:

[1]**Author's name**, fullstop

Year of publication, fullstop

Title of book (italics, sentence case), fullstop

Editor, compiler, translator (if indicated), fullstop

Name of series, volume number, series number (where relevant), fullstop

Edition, if not the first edition, fullstop

Volume number (bold), fullstop

[2]**Place of publication**, colon

Publisher, fullstop

[1]Name of all co-authors must be listed

[2]If published in more than one place, use the place that is named first

For example,

New York, Heidelbeg, Berlin, London, England, Singapore will be recorded as New York only.

Examples of listing the books referred to are given in Sub-section 4.3.1 to 4.3.6.

4.3.1 Single Author

Heywood, J.B. 1988. *Internal combustion engine fundamentals*. USA: McGraw-Hill.

Kececioglu, D.B. 2003. *Robust engineering design-by-reliability with emphasis on mechanical components and structural reliability*. Lancaster, PA: DEStech Publications, Inc.

Newland, D.E. 1993. *An introduction to random vibrations, spectral and wavelet analysis*. 3rd ed. Essex: Longman Scientific and Technical.

Stone, R. 1999. *Introduction to internal combustion engines*. USA: Society of Automotive Engineers, Inc.

Note:

The second and subsequent lines are typed single-spaced and indented 12.7 mm from left margin.

4.3.2 Multi-authors

Juvinall, R.C. and Marshek, K.M. 2000. *Fundamentals of machine component design*. New York: John Wiley and Sons.

Socie, D.F. and Marquis, G.B. 2000. *Multiaxial fatigue*. USA : Society of Automotive Engineers.

Bishop, N.W.M. and Sherratt, F. 2000. *Finite element based fatigue calculations*. Netherlands: NAFEMS Ltd.

Lee, Y., Pan, J., Hathaway, R. and Barkey, M. 2005. *Fatigue testing and analysis: Theory and practice*. New York: Butterworth Heinrahmanemann.

Stephens, R.I., Fatemi, A., Stephens, R.R. and Fuchs, H.O. 2000. *Metal fatigue in engineering*. New York: John Wiley and Sons, Inc.

Wirsching, P.H., Paez, T.L. and Oritz, K. 1995. *Random vibration: theory and practice*. New York: John Wiley and Sons, Inc.

Note:

Names of all authors must be listed. Initials appear after the name without any extra space.

4.3.3 New Editions and Reprints

Fuchs, H.O., Nelson, D.V., Burke, M.A. and Toomay, T.L. 1977. *Fatigue under complex loading: analysis and experiments AE-6*. Wetzel, R.M. (Ed.). USA: Society of Automotive Engineers.

Cohen, J. 1977. *Statistical power analysis for the behavioral sciences*. Revised ed. New York: Academic Press.

Buckley, C.B. 1965. *An anecdotal history of old times in Singapore.* Reprint. Kuala Lumpur: University of Malaya Press.

4.3.4 Work that are known by the Titles

Oxford regional economic atlas: the Middle East and North Africa. 1960. London: Oxford University Press.

The encyclopedia of Islam. 1960. 2nd ed. Leiden: E. J. Brill

4.3.5 Edited Work/Compilations

Rice, R.C. (Ed.). 1997. *Fatigue design handbook.* USA: Society of Automotive Engineers.

Wetzel, R.W. (Ed.). 1977. *The SAE cumulative fatigue damage test program: Fatigue under complex loading, analysis and experiments.* PA: Society of Automotive Engineers.

4.3.6 References with Corporate Authorship

Art students international. 1988. Princeton, NJ: Educational Publications International.

IELTS annual review: 2003/2004. University of Cambridge Local Examination Syndicate, The British Council and IDP Education Australia, Cambridge.

4.4 REFERENCES FOR JOURNALS

The complete information required for a journal articles are as follows:

Author's name, fullstop

Year of publication, fullstop

Title of article (sentence case), fullstop

Name of Journal (*Italics, Title case)*, fullstop

[1]**Volume number**, (bold)

Issue Number (within parentheses, no bold), colon

Number of pages, fullstop

[1]Volume number must be in Arabic numeric.

Examples of listing the journal articles referred are given in Sub-section 4.4.1 to 4.4.2.

4.4.1 Single Author

Amann, C.A. 1999. Evaluating alternative internal combustion engines: 1950-1975. *Journal of Engineering for Gas Turbines and Power.* **121**(3): 540-545.

Anthes, R.J. 1997. Modified rainflow counting keeping the load sequence. *International Journal of Fatigue.* **19**(7): 529-535.

Zhang, S. 1999. Stress intensities derived from stresses around a spot weld. *International Journal of Fracture.* **99**: 239-257.

4.4.2 Multi-authors

Agerskov, H. and Nielsen, J.A. 1999. Fatigue in steel highway bridges under random loading. *Journal of Structural Engineering ASCE.* **125**(92): 152-162.

Conley, J.W. and Tukey, J.W. 1965. An algorithm for the machine calculation of complex Fourier series. *Math. Comp.* **19**: 297-301.

Amzallag, C., Gerey, J.P., Robert, J.L. and Bahuad, J. 1994. Standardization of the rainflow counting method for fatigue analysis. *International Journal of Fatigue.* **16**(4): 287-293.

Haiba, M., Barton, D.C., Brooks, P.C. and Levesley, M.C. 2002. Review of life assessment techniques applied to dynamically loaded automotive components. *Computers and Structures.* **80**(5-6): 481-494.

Note

All authors should be listed. Initials positioned after the name with a comma and put the word "and" before last author name.

4.5 REFERENCES FOR PROCEEDINGS

The complete information required for journal articles are as follows:

Author's name, fullstop

Year of publication, fullstop

Title of article (sentence case), fullstop

Name of Conference/Seminar/Symposium (*Italics, Title case)*, comma

[1]**Volume number**, (bold, if any)

Issue Number (within parentheses, no bold), colon

Number of pages, fullstop

Note:

All authors should be listed. Initials positioned after the name with a comma and place the word "and" before last author name.

For example,

Manson, S.S. 1953. Behavior of materials under conditions of thermal stress. *Heat Transfer Symposium*, pp. 9-75.

Arshad, W.M., Thelin, P., Bäckström, T. and Sadarangani, C. 2003. Alternative electrical machine solutions for a free piston generator. *Proceedings of the 6th International Power Engineering Conference,* pp. 329-334.

Famouri, P., Cawthrne, W.R., Clark, N., Nandhumar, S., Atkinson, C., Atkinson, R., McDaniel, T. and Petreanu, S. 1999. Design and testing of a novel linear alternator and engine system for remote electrical power generator. *Proceedings of the IEEE Power Engineering Society Winter Meeting 1999,* pp. 108-112.

Fu, Z.X., Nasar, S.A. and Rosswurm, M. 1992. Stability analysis of free piston Stirling engine power generation system. *Proceedings of the 27th Intersociety Energy Conversion Engineering Conference,* **5**: 13-21.

Brown, R. and Higgins, P.J. 1978. On the connection between the second relative homology groups of some related spaces. *Proc. London Math. Soc.*, **36**(3): 193-212.

4.6 REFERENCES FOR PUBLIC DOCUMENTS

The complete information required for referring the public documents as follows:

Country(or State)/Institution, fullstop
Year of Publication, fullstop
Document referred to (include relevant details), fullstop

Examples of listing public documents referred to are given in Sub-section 4.6.1 and 4.6.2.

4.6.1 Parliament and State Assembly

(i) Parliament and State Assembly

Acts of parliament

Malaysia.1990. *Bernama Act 1967* (*Revised 1990*). (Act 449)

Reports and Documents

Dewan Rakyat Malaysia. 1986. *Peristiwa Memali.* Document 21, 1986.

Dewan Rakyat Malaysia. 1988. *Ke arah memelihara keselamatan negara.* Document 14, 1988.

Parliament Debates

Dewan Rakyat Malaysia. 1984. Perbahasan rang undang-undang mesin cetak dan penerbitan. *Penyata Rasmi Dewan Rakyat.* **2**(12): 1792-1850 Parlimen Keenam Penggal Kedua.

United Nations. 1986. *Report of the committee on information.* General Assembly Official Records. Forty First Supplement No. 21 (A/41/21). New York: United Nations.

(ii) UNESCO

UNESCO. 1960. *Director General of UNESCO report*. Paris: UNESCO.

(iii) IAEA

IAEA. 1995. *Coordinated research program on assessment of environmental explosure to mercury in selected human populations.* Vienna: International Atomic Energy Agency.

(iv) WHO

WHO. 1991. *Guidelines for the assessment of herbal medicines.* Geneva: World Health Organization.

4.7 REFERENCES FOR MAGAZINES

The complete information required for referring the magazines as follows:

Author's name, fullstop

Year of publication, fullstop

Title of article (sentence case), fullstop

Name of magazine (*Italics, Title case)*, comma

Month of publication, colon

Date of publication, fullstop

For example,

Poster, M.I. 1993. Seeing the mind. *Science*, October: 29.

Robert, R. 2003. The right spot to write. *Going places,* August: 20.

(ii) Government Publications (Federal, State)

Federal Government Gazettes

Federal Malay States. 1926. *Government Gazette*. **18**(12): Notification No. 3178.

Federal Malay States. 1939. Sedition Enactment 1939 (Enactment No. 13 of 1939). *Government Gazette*. **31**(23): 231-255.

Malaysia. 1990. Akta Kehakiman 1964 (Akta 91). *Warta Kerajaan.* **43**(26): Circular No. 10926.

State Government Gazettes

Johor. 1990. Akta Eksais 1976: Peraturan-peraturan Eksais (Lembaga Perlesenan) 1977. *Warta Kerajaan Negeri Johor.* **34**(1).

Federal Government Reports

Malaysia. 1991. *Rancangan Malaysia Keenam 1991-1995.*

Ministry of Finance Malaysia. 1988. *Economic Report 1988/89.* 17.

(iii) Committee Reports

Jawatankuasa Tetap Bahasa Malaysia. 1987. (2nd ed.). Pedoman umum ejaan Bahasa Malaysia. Kuala Lumpur. Dewan Bahasa dan Pustaka.

4.6.2 Documents of International Organizations

(i) United Nations

United Nations. 1974. *The charter of economic rights and duties of states*. General Assembly Resolution 321, 29. UN G.O.A.R Supplement. (No. 31), 50, UN Document A/9361. New York: United Nations.

(ii) Government Publications (Federal, State)

Federal Government Gazettes

Federal Malay States. 1926. *Government Gazette*. **18**(12): Notification No. 3178.

Federal Malay States. 1939. Sedition Enactment 1939 (Enactment No. 13 of 1939). *Government Gazette*. **31**(23): 231-255.

Malaysia. 1990. Akta Kehakiman 1964 (Akta 91). *Warta Kerajaan.* **43**(26): Circular No. 10926.

State Government Gazettes

Johor. 1990. Akta Eksais 1976: Peraturan-peraturan Eksais (Lembaga Perlesenan) 1977. *Warta Kerajaan Negeri Johor.* **34**(1).

Federal Government Reports

Malaysia. 1991. *Rancangan Malaysia Keenam 1991-1995.*

Ministry of Finance Malaysia. 1988. *Economic Report 1988/89.* 17.

(iii) Committee Reports

Jawatankuasa Tetap Bahasa Malaysia. 1987. (2nd ed.). Pedoman umum ejaan Bahasa Malaysia. Kuala Lumpur. Dewan Bahasa dan Pustaka.

4.6.2 Documents of International Organizations

(i) United Nations

United Nations. 1974. *The charter of economic rights and duties of states*. General Assembly Resolution 321, 29. UN G.O.A.R Supplement. (No. 31), 50, UN Document A/9361. New York: United Nations.

United Nations. 1986. *Report of the committee on information.* General Assembly Official Records. Forty First Supplement No. 21 (A/41/21). New York: United Nations.

(ii) UNESCO

UNESCO. 1960. *Director General of UNESCO report.* Paris: UNESCO.

(iii) IAEA

IAEA. 1995. *Coordinated research program on assessment of environmental explosure to mercury in selected human populations.* Vienna: International Atomic Energy Agency.

(iv) WHO

WHO. 1991. *Guidelines for the assessment of herbal medicines.* Geneva: World Health Organization.

4.7 REFERENCES FOR MAGAZINES

The complete information required for referring the magazines as follows:

Author's name, fullstop
Year of publication, fullstop
Title of article (sentence case), fullstop
Name of magazine (*Italics, Title case)*, comma
Month of publication, colon
Date of publication, fullstop

For example,

Poster, M.I. 1993. Seeing the mind. *Science*, October: 29.

Robert, R. 2003. The right spot to write. *Going places,* August: 20.

4.8 REFERENCES FOR NEWSPAPERS

The complete information required for referring the newspapers as follows:

Author's name, fullstop
Year of publication, fullstop
Title of article (sentence case), fullstop
Name of Newspaper (*Italics, Title case)*, fullstop
Date and Month of publication, colon
Number of pages, fullstop

Examples of listing the newspaper referred are given section 4.8.1 and 4.8.2.

4.8.1 With Author's Name

Philip, G. 2004. Primer on primates. *Star.* 18 January: 4-5.

4.8.2 Without Author's Name

The title of the article should be placed before the year of publication.

For example,

Nuclear power for deep space travel. 2003. *New Sunday Times*. 21 December: F7.

4.9 NEWS REPORTS FROM NEWSPAPERS

The complete information required for referring the news reports from the newspapers as follows:

Author's name, fullstop
Year of publication, fullstop
Title of article (sentence case), fullstop

Name of Newspaper (*Italics, Title case)*, fullstop

Date and Month of publication, colon

Number of pages, fullstop

4.9.1 News/article with Author's Name

Hardev, K. 2004. Kuala Lumpur, Bangkok agreed to develop border areas. *New Straits Times.* 17 January: 1.

4.9.2 News/article without Author's Name

Abdullah slams tax traders for irresponsibility. 2004. *Star.* 18 January: 2-4.

4.9.3 Letters to the Editor

Izhab, Z. 1992. Effective reading is the way to ensure success of science students. Letter to the Editor. *New Straits Times.* 25 January: 9.

4.10 GENERAL REFERENCES TO NEWSPAPERS

The complete information required for general references to the newspapers as follows:

Name of Newspaper (*Italics, Title case)*, fullstop

Year of publication, fullstop

Date and Month of publication, fullstop.

For example,

The Malay Mail. 2002. 26 July.

The Star. 2005. 11 March.

New Straits Times. 2006. 10 December.

4.11 REFERENCES FOR FILM, VIDEO AND SLIDES

4.11.1 Film

The complete information required for referring the film as follows:

Title of film (sentence case, italics), fullstop
Year of production, fullstop
Type of film, (for example, film or documentary drama), fullstop
Origin of film, colon
Name of production House/Company, fullstop

For example,

Crystals and their structures. 1973. Film. New York: Modern Living Aids.

My name is Natrah not Bertha. 1992. Documentary drama. Singapore: Singapore Broadcasting Corporation.

4.11.2 Videos

The complete information required for referring the video as follows:

Title of video (sentence case, italics), fullstop
Year of production, fullstop
Type of video, fullstop
Origin of video, colon
Name of production House/Company, fullstop

For example,

Language and verbal skills. 1976. Video. Virginia: Association for Retarded Citizens.

4.11.3 Slides

The complete information required for referring the film as follows:

Author's name, fullstop
Year of production, fullstop
Title of slide (sentence case, italics), fullstop
Type of slide, fullstop
Origin of slide, colon
Name of production House/Company, fullstop

For example,

Deacon, J.E. 1975. *The Galapagos island: birds.* Slide. New York: Harper and Row.

Investigation in life science: man and nature. 2003. Slide. Colorado: Crystal Productions.

4.12 REFERENCES FOR MAPS

The complete information required for referring the maps as follows:

Author's name, fullstop
Year of production, fullstop
Title of map (sentence case, italics), fullstop
Scale of the map, fullstop
Place of publication, colon
Name of publisher/Company, fullstop

For example,

Gobbett, D.J. 1972. *Geological map of Malay Peninsular.* Scale 1:1000000. Kuala Lumpur: Geological Society Malaysia.

4.13 UNPUBLISHED MATERIALS

Examples of listing the unpublished materials referred to are given in Section 4.13.1 to Section 4.13.4.

4.13.1 Thesis

The complete information required for referring the thesis as follows:

Author's name, fullstop

Year of publication, fullstop

Title of thesis (italic, sentence case), fullstop

Type of the thesis, fullstop

Place (institute, town, state) where thesis is kept, comma

Country, fullstop

For example,

Shen, C. 1994. *The statistical analysis of fatigue data.* Ph.D. Thesis. University of Arizona, USA.

Aichlmayr, H.T. 2002. *Design consideration modeling and analysis of micro-homogeneous charge ignition combustion free-piston engine.* Ph.D. Thesis. University of Minnesota, USA.

Benasciutti, D. 2004. *Fatigue analysis of random loadings.* Ph.D. Thesis. University of Ferrara, Italy.

4.13.2 Working Paper and Abstract for Conference

The complete information required for referring the working paper and abstract for conference as follows:

Author's name, fullstop

Year of publication, fullstop

Title of article, fullstop

Type of the documents, fullstop

4.13 UNPUBLISHED MATERIALS

Examples of listing the unpublished materials referred to are given in Section 4.13.1 to Section 4.13.4.

4.13.1 Thesis

The complete information required for referring the thesis as follows:

Author's name, fullstop

Year of publication, fullstop

Title of thesis (italic, sentence case), fullstop

Type of the thesis, fullstop

Place (institute, town, state) where thesis is kept, comma

Country, fullstop

For example,

Shen, C. 1994. *The statistical analysis of fatigue data.* Ph.D. Thesis. University of Arizona, USA.

Aichlmayr, H.T. 2002. *Design consideration modeling and analysis of micro-homogeneous charge ignition combustion free-piston engine.* Ph.D. Thesis. University of Minnesota, USA.

Benasciutti, D. 2004. *Fatigue analysis of random loadings.* Ph.D. Thesis. University of Ferrara, Italy.

4.13.2 Working Paper and Abstract for Conference

The complete information required for referring the working paper and abstract for conference as follows:

Author's name, fullstop

Year of publication, fullstop

Title of article, fullstop

Type of the documents, fullstop

Name of the conference/seminar/symposium, fullstop

Place of conference/seminar/symposium, colon

Date and month, fullstop

For example,

Malcolm, C. 2003. Expressing opinions in court. Abstract. Language and the Law. Sixth International Conference. University of Sydney: 9-12 July.

Jamaluddin, M.J. 2000. Environmental issues and management challenges in Malaysia: facing the new millennium. *Working Paper. National Seminar on Environmental Management Issues and Challenges in Malaysia.* Universiti Kebangsaan Malaysia: 25-26 July.

4.13.3 Technical Reports

The complete information required for referring the technical reports as follows:

Author's name, fullstop

Year of publication, fullstop

Title of report, fullstop

Type of the report, fullstop

Place, colon

Identification number, fullstop

Collection number, fullstop

For example,

Hafriza, B. 2003. A comparative study of linguistic strategies used by counsels representing Malaysia and the Republic of Indonesia in the Case concerning sovereignty over the islands of Sipadan and Ligitan. Technical Report. UKM: SK/008/2003.

4.13.4 Interview

The complete information required for referring the interviews as follows:

Author's name, fullstop
Year of interview, fullstop
Title of interview, fullstop
Place of interview, fullstop
Interview, colon
Date and month of interview, fullstop

For example,

James, T.A. 2001. *Lobby urges Japan reform, not devaluation, Hong Kong*. Interview: 19 June.

4.14 ELECTRONIC REFERENCES

Generally, references from the electronic sources for instance CD-ROM, internet, websites, electronic journals and electronic mail should provide the following information:

Name of author, fullstop
Year, fullstop
Title of article, fullstop
Name of journal/book (italics)
Volume Number (bold)
Issue number (within parentheses), colon
Number of pages, fullstop
Website/file/e-mail address, comma
Date of access (within parentheses)

However, the information may be adjusted if necessary, without affecting the validity of the reference materials.

For example,

Clark, J.K. 1999. Humidity sensor. *Journal of Physics.* **2**(2): 9-13 (online). http://www.cit.edu/phy/sensor/phy/sensor.html (20 July 1999).

Crane, N. 1997. Electronic sources: MLA style of citation. http://www.uvm.edu/ncrane/estyle/mla.html (31 July 2000)

Kawasaki, J.L. 1996. Computer administered surveys in extension. *Journal of Extension.* **33**(3): 204-210 (online). http://www.apa.org/journals/sebret.html (18 November 1999).

Medical Information Group. 1998. Arsenic contamination of drinking water (online). http://www.cit.edu/phys/sensor.html (4 July 2000)

Pritzer, T.J. (undated). An early fragment from central Nepal (online). http://www.ingress.com/astanart/pritzer/pritzer.html (5 June 2000)

Clark, J.K. 1993. Complication in academia: sexual harassment and the law. *Siecus Report.* **21**(6): 6-10. (CD-ROM). 1994 SIR/SIRS 1993 School/Volume 4/Article 93A (13 June 1995).

4.15 REFERENCES WITHIN THE TEXT

References in the body of the text are made to acknowledge the source of writing which is taken from other books, articles or papers. The complete bibliographical details are recorded in list of references at the end of the thesis. The references cited in the text should be indicated using the **Author-Year** system. In this system, references within the text must include only the **Author** and **Year** of publication. Examples of citation in the text are given in Subsection 4.15.2- 4.15.5.

4.15.1 Single Author

The surname of the author followed by the year of publication is written in the relevant place in the text. If the name of the author is written as a part of a sentence, the year published should be written in parentheses.

(i) Noor (2007) has stated that … .

(ii) … as has been carried out by Mohd Sani (2008).

(iii) In a study on the teaching and learning of mechanical engineering (Rahman, 2008) … .

(iv) In a study on the teaching and learning of mechanical engineering, Mohd Sani (2007) expressed the view that … . Mohd Sani also said that … .

If the author's name is used as part of the sentence, as examples (i) and (ii), only the year is within the parentheses. If it is not, both the author's name and year of publication, with a comma in between are placed within the parentheses (refer to example (iii)).

If the same source is referred to more than once within the same paragraph, the year of publication not need to be repeated as there is no possibility of confusion with another work by the same author (refer to example (iv)).

4.15.2 Multi-authors

Where the work of two authors is referred to, then both names must be mentioned each time it is referred to:

(i) As Rahman and Rosli (2008) carried out their study … .

(ii) As has been proven (Rahman and Ariffin, 2006).

If the reference is made to a work authored by three or more, the name of the first author is written followed by "et al." and the year of publication is typed after a comma.

(i) Rahman et al. (2006) has proposed that … .

(ii) … has been studied (Kadirgama et al., 2005).

4.15.3 Corporate Author

Corporate authors are usually spelled out each time they appear in a text citation. The names of some corporate authors are spelled out in the first citation and abbreviated thereafter. Nevertheless, references to works by an organization are written as follows:

(i) Ministry of Higher Education (MOHE, 2005)

(ii) Institute of Engineers, Malaysia (IEM, 1969) …

(iii) The name of institution (Organizations, government agencies and other can be abbreviated:

National Institute of Mental Health (NIMH, 2006) is referred to the first citation and as NIMH (2006) for subsequent text citation.

Jawatankuasa Tetap Bahasa Malaysia (JKTBM, 1979) is referred to as JKTBM (1979).

4.15.4 Authors with Same Name

If the list of references includes works by two or more authors with the same name, to avoid confusion, the full name or initials of each author must be used each time one of these works cited.

Rahman, M. M. (2004) and Rahman, M. K. (2006) carried out … .

Noor, M.M. (2007) and Noor, M.Z. (2001) also found … .

4.15.5 Multiple References

Two or more references made at the same place should be separated by semicolons. Then, the word "and" should be placed before the last author's name.

For example,

(Mohd Sani, 2004; Rejab, 2005 and Rahman et al. 2007)

(Noor, 2006; Rahman et al. 2006, and Ariffin and Rahman, 2007)

If more than one reference materials by the same author in the same year are cited, use small letter of alphabets (a, b, c and so on separated by comma) to distinguish them. The suffixes are assigned in the reference list, where references are in alphabetical order by the title.

(Rahman et al., 2003a, b, 2004)

Several studies (Rejab, 2006a, b; Rahman, 2008 and Kadirgama et al., 2009)

List two or more works by different authors which have been cited within the same parentheses in alphabetical order by the first authors surname. Separate the citations by semicolons.

Several studies (Noor, 1998; Rahman et al., 2000, and Rahman and Rejab, 2008)

Cross referencing is not allowed in a thesis. Only primary sources should be used.

Note : Foot notes can be used to make immediate clarification.

4.16 REFERENCES FOR THE AL-QUR'AN

The number of verses used and quoted from the Al-Qur'an should be placed at the end of the text. The reference should indicate the Qur'an, the chapter and the number of verse, for example, Al-Qur'an, Al-Imran **3**: 92.

4.17 REFERENCES FOR THE AL-HADITH

References to the hadith are specific collections indicated by the number or name of the book (kitab) and the chapter where it appears, for example, Al-Bukhari, Sahih, Kitab 1, Chap 1: page number, City: Publisher.

4.18 ABBREVIATIONS IN REFERENCE LIST

Accepted abbreviations in the reference list for parts of books and other publications are listed in Table 4.1.

Table 4.1: Abbreviations in the reference of books and other publications

Description	Abbreviation
Chapter	Chap.
Edition	ed.
Revised edition	Rev. ed.
Second edition	2nd ed.
Editor (Editors)	Ed. (Eds.)
Translator(s)	Trans.
No date	n.d.
Page (pages)	p. (pp.)
Technical Report	Tech. Rep.
Supplement	Suppl.

CHAPTER 5

UNITS, NUMBERS, QUANTITY AND FUNCTIONS

5.1 UNITS

Use internationally recognized units of measure such as System International (SI). Units should be written numerically not in words, for example, 5 m instead of five meters unless if they are the first word of a sentences. Use abbreviated form of units, for example, 5 sec instead of 5 seconds or 5 m instead of 5 meters. The unit of measurement should be clearly separated from the corresponding numerical value by a standard single space, for example, 4 m instead of 4m, 5 sec instead of 5second, 5 kg rather than 5kg. The abbreviation for kilo is k not K and centimeter is cm not c.

Units that are named after a person should be written as follows:

5 Newton should be 5 N
5 joule should be 5 J

The use of units should be consistent, for example 5 N/m^3 or 5 Nm^{-3}, or 45 m/sec or 45 m per sec.

Do not place a full stop after a unit except when it is at the end of a sentence. There are no plural forms for abbreviations of units, for example, 5 cm instead of 5 cms.

5.2 NUMBERS

Numerical (quantitative) information plays a key role in much scientific writing. It is essential that candidates should carefully check every piece of reported data to guarantee the absence of errors including typographical mistakes. This requires devoting particularly close attention to tables and figures. All integers less than ten should be spelt out unless they are attached to units of measure, for example, 5 kg, 15 mL. Use the figures of the number if the integer is more than and equals to 10. If a sentence begins with a number or symbol, it should be written in words or change the sentence structure or order. Use numerals for a series of figures, for example,

(i) In a lecture room, there are 50 chairs, 55 tables, 3 white boards and 15 umbrellas.

(ii) The numbers of frequency were selected in this study including 50, 100, 150, 200, 250 and 300 Hz.

The zero should be included in numbers written as decimals, for example, 0.4 m instead of .4 m. Decimal numbers should be clearly distinguished. Date should be written without a comma, for example, 31 August 2007. A range is most frequently signaled with the assistance of a dash, for example, the period of time should be written as 1993-2000, 2003-07.

Numbers up to the four digits should be written without a comma or space between them. Numbers larger than four digits should be written with a space before each set of three digits, for example, 213 000, 21 000 000, 252 000 000. Numbers written as decimals have spaces like this: 0.001, 0.000 05, 35 321.062 42.

5.3 QUANTITY OR VARIABLE

Specificity can be conferred on a letter symbolizing a quantity or variable by attaching one or more qualifying subscripts and/or superscripts to it. Sometimes, it can be crowned with a "hat" in the form of a straight line or other distinctive mark.

For example,

(i) C_p (both italicized) is used to represent the heat capacity (C) at constant pressure, p

(ii) g_n (g italicized, n normal) represents for the acceleration due to earth's gravitational force, g, while the "n" here signifies "normal".

A clear explanation should be supplied when any symbol makes its first appearance in a document. In addition, it is strongly recommended that all symbols presented in the text especially those representing quantities, be meticulously defined in a separate "List of Symbols". The list must identify applicable units of measurement and should be positioned near the beginning of the work.

For examples,

C_L liquid phase specific heat, J kg^{-1} K^{-1}
D diameter, m etc.

(iii) An expression of a measurement as the product of a numerical value and a unit, candidates should adjust the unit to a suitable prefix. Thus resulting the numerical value fall between 0.1 and 1000. In other words, it is better to write 30 μL rather than the equivalent 0.030 mL.

(iv) A single blank space is used to separate a pair of unit symbols. It is done to represent a product, for example, 80 A s, 34 N m, 10^{-3} g/(m^2 d).

5.4 SUBSCRIPTS AND SUPERSCRIPTS

The subscripts and superscripts should be set in type roughly 3/5 the size of the corresponding host symbol. In the other words, 7 or 8 pt font would be an appropriate choice to indicate associated symbol displayed in 12 pt type. Subscripts and superscripts belong immediately adjacent to the symbols they are intended to modify. In the case of

chemical formulas for charged particles (ions), one of the latter typographic solutions is actually deemed preferable, for example, NH_4^+, SO_4^-.

Multiple subscripts that apply simultaneously to a single host symbol would logically appear at the same level vertically. Potential confusion can be prevented by carefully spacing of the collaborating elements or through intervening commas or careful use of parentheses, for example, $X_{n_{max}}$ is better replaced by $X_{n(max)}$.

Now-a-day, the favor practice for typesetting the chemical expression is to consign all formulas to the normal text baseline, even ones that are intended to function as indices, in other words, the arrangement, $c(H_2SO_4)$ is preferred over $C_{H_2SO_4}$

Table 5.1 provides a summary of the most important expressions and formulas.

Table 5.1: Basic rules applicable to expressions of mathematical and physical kind.

Authorized stylistic treatment	Illustrations
Italic (*sloped*) type	
Mathematical variables	$a, b, c, x, z, A, B, \alpha, \beta, \gamma, \delta$
Symbols for physical quantities	m, l, t, T
Symbols for general functions	$f(x) = u(x)/v(x), z = \varphi(x,y)$
Symbols for natural constants	R (ideal gas constant), N_A (Avogadro's number)
Roman (Upright) type	
Numbers	1, 2, 3, 2005, π, e
Fences	( ), { }, [ ]
Operators	d, D, Δ, ∇, ∂, %, ppm, ppb, ppt, $\mathrm{d}f(x)/\mathrm{d}x$, $\partial g(x,y)/\partial x$
Operational symbols	+, -, :, =, <, >, ±, ≅, ∩, ∪, ∈, ⇒, ∉, AND, OR
Symbols for special functions	exp, log, ln, log, sin, cos, tan, Re, Im $\cos x$, $\exp(-x^2)$, $\mathrm{Re}(z) = a+ib$,
Unit symbols	m, kg, s, A, K, mo, cd, °C, W, V, Pa, ha,
Unit prefixes	G, M, k, m, μ, n, p, nm, GHz, mbar
Summation product and integral signs	Σ, Π, ∫
Extra space	
Within numbers	4150, 17 324, 234.098
Before and after operational symbols	$12 + 5 = 17$, $f(x) = x^2 + 3x - 5$, 15 mm × 25 mm
Between numerical values and units	5 m, 30 °C, 180.21 K, 15 mmol/L
Between terms in products of units	80 mg mm^{-1} L^{-1}, 0.7 mg/(kg a)

chemical formulas for charged particles (ions), one of the latter typographic solutions is actually deemed preferable, for example, NH_4^+, SO_4^-.

Multiple subscripts that apply simultaneously to a single host symbol would logically appear at the same level vertically. Potential confusion can be prevented by carefully spacing of the collaborating elements or through intervening commas or careful use of parentheses, for example, $X_{n_{max}}$ is better replaced by $X_{n(max)}$.

Now-a-day, the favor practice for typesetting the chemical expression is to consign all formulas to the normal text baseline, even ones that are intended to function as indices, in other words, the arrangement, $c(H_2SO_4)$ is preferred over $C_{H_2SO_4}$

Table 5.1 provides a summary of the most important expressions and formulas.

Table 5.1: Basic rules applicable to expressions of mathematical and physical kind.

Authorized stylistic treatment	Illustrations
Italic (*sloped*) type	
Mathematical variables	$a, b, c, x, z, A, B, \alpha, \beta, \gamma, \delta$
Symbols for physical quantities	m, l, t, T
Symbols for general functions	$f(x) = u(x)/v(x), z = \varphi(x,y)$
Symbols for natural constants	R (ideal gas constant), N_A (Avogadro's number)
Roman (Upright) type	
Numbers	1, 2, 3, 2005, π, e
Fences	( ), { }, [ ]
Operators	d, D, Δ, ∇, ∂, %, ppm, ppb, ppt, $\mathrm{d}f(x)/\mathrm{d}x$, $\partial g(x,y)/\partial x$
Operational symbols	+, -, :, =, <, >, ±, ≅, ∩, ∪, ∈, ⇒, ∉, AND, OR
Symbols for special functions	exp, log, ln, log, sin, cos, tan, Re, Im $\cos x$, $\exp(-x^2)$, $\mathrm{Re}(z) = a+ib$,
Unit symbols	m, kg, s, A, K, mo, cd, °C, W, V, Pa, ha,
Unit prefixes	G, M, k, m, μ, n, p, nm, GHz, mbar
Summation product and integral signs	Σ, Π, ∫
Extra space	
Within numbers	4150, 17 324, 234.098
Before and after operational symbols	$12 + 5 = 17$, $f(x) = x^2 + 3x - 5$, 15 mm × 25 mm
Between numerical values and units	5 m, 30 °C, 180.21 K, 15 mmol/L
Between terms in products of units	80 mg mm^{-1} L^{-1}, 0.7 mg/(kg a)

With proportional symbols 15.7 %. 0.5 %, 25 ppm

Symbols for vectors and matrices are to be displayed in ***boldface*** italic type.

For examples,

$$\boldsymbol{B} = b_1\boldsymbol{e}_1 + b_2\boldsymbol{e}_2$$

$$\boldsymbol{B} = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 0 \\ 3 & 0 & 1 \end{pmatrix}$$

F (force), ***E*** (electric field strength)

An appropriate quantity symbol topped with a small arrow (for example, $\vec{a}, \vec{F}, \vec{E}$) is no longer recommended. Another rule with respect to type states that the tensors should be represented by roman, boldface characters (no italic), for example, **A, B, C.**

5.5 MISCELLANEOUS CONVENTIONS

(i) The shorten form of person's name should be written with a space after the initials, for example, M.M. Rahman not M.M.Rahman.

(ii) Abbreviations have no full stops after each letter, for example, UMP, CGS, ASME etc.

(iii) Elliptical marks consists of three dots (...) either linear or vertical direction. When an ellipsis comes at the end of the sentence, it appears as four dots (...). One dot marks the end of the sentence.

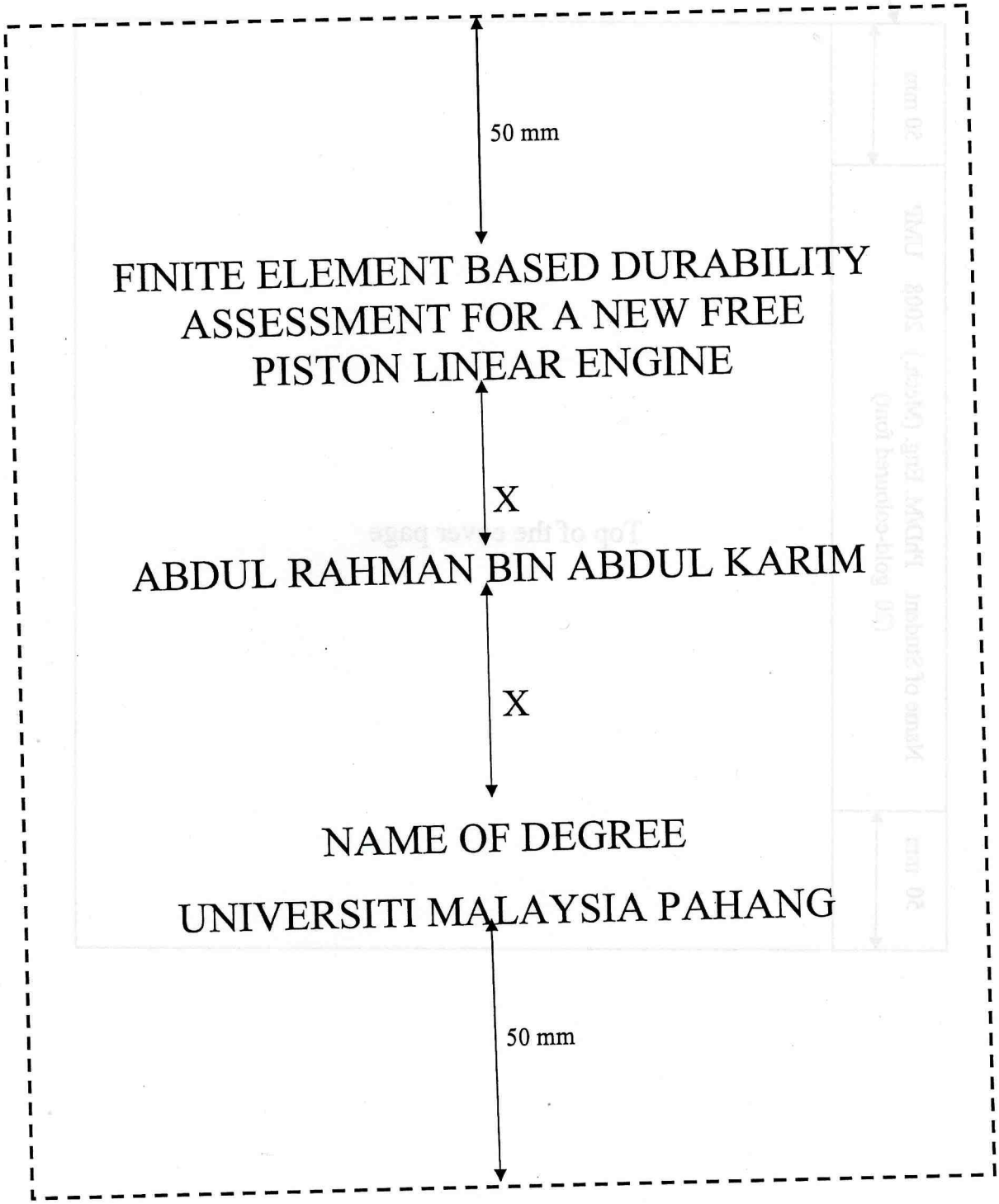
(iv) A single blank space should be inserted between the numerical value and the symbol used to indicate percentage as well as in conjunction with the related expressions ppm (parts per million), ppb (parts per billion) and ppt (parts per ttrillion), for example, 34 % 0.2 %, 30 ppm, 0.06 ppb.

(v) The symbol combination "°C" is considered a single discrete entity with the meaning "degree Celsius". It should be set one space removed from the associated numerical value, for example, 135 °C (not 135°C or 135° C). The rule is also applied to the symbols for angular minutes and angular seconds, for example 15.4′, 20′35.2″.

(vi) Information related to error limits or tolerances should be conveyed using a notation like (150 ± 10) nm not the commonly encountered.

APPENDIX A1

SAMPLE OF FRONT PAGE (COVER PAGE)



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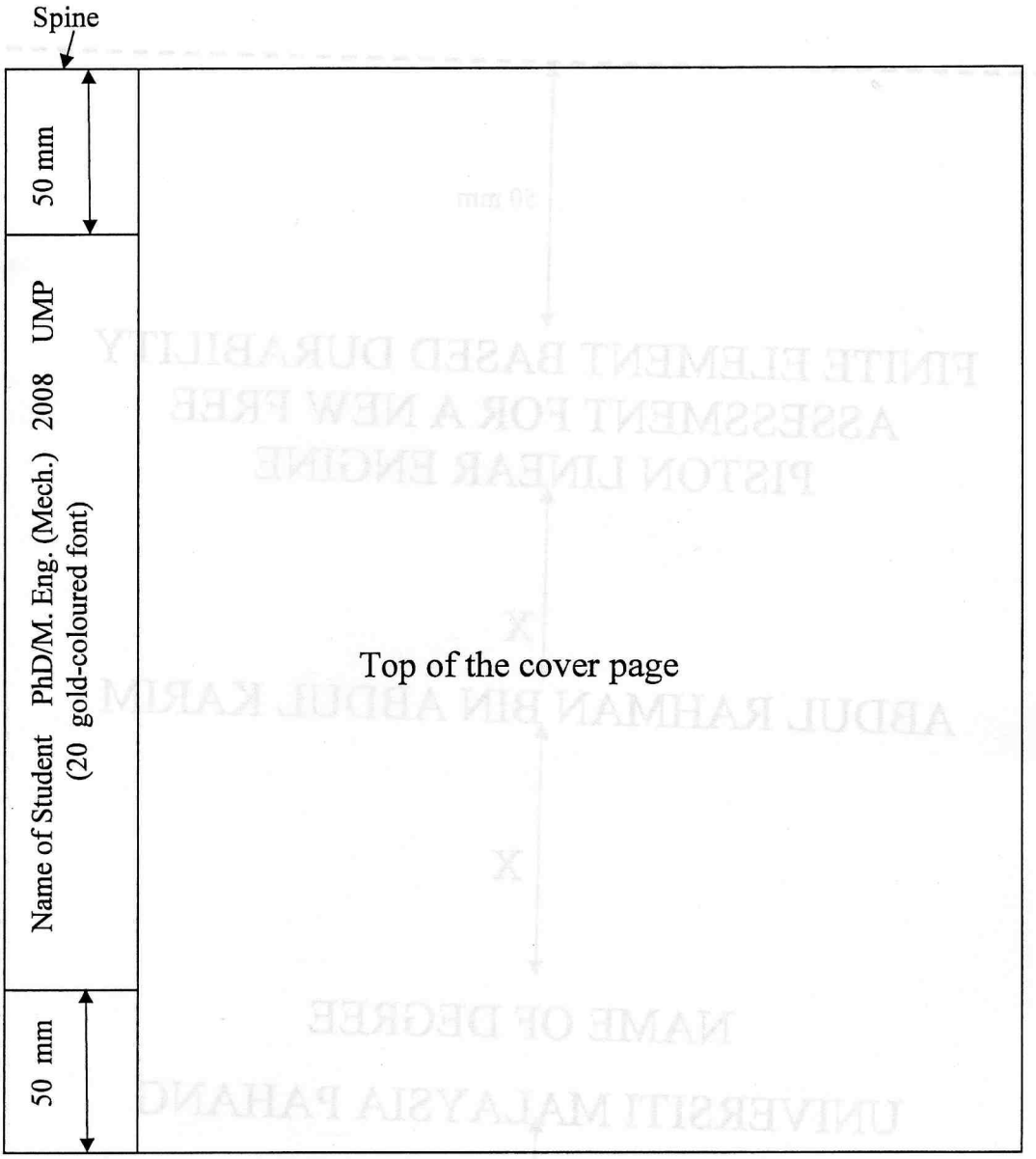
APPENDIX A2

SAMPLE OF THE SPINE



APPENDIX A3

SAMPLE OF APPROVAL DOCUMENT

UNIVERSITI MALAYSIA PAHANG

CENTER FOR GRADUATE STUDIES

1× ENTER (1.5 line spacing)

We certify that the thesis entitled " ... (title of thesis)..... ... " is written by .....(name of student)..... . We have examined the final copy of this thesis and in our opinion; it is fully adequate in terms of scope and quality for the award of the degree of *Doctor of Philosophy/Master of Science/Master of Engineeing in ..... (specialization). We herewith recommend that it be accepted in fulfillment of the requirements for the degree of *Doctor of Philosophy/ Master of Science /Master of Engineeing specializing in ..... (specialization).

1.5 line spacing

Name of External Examiner Signature

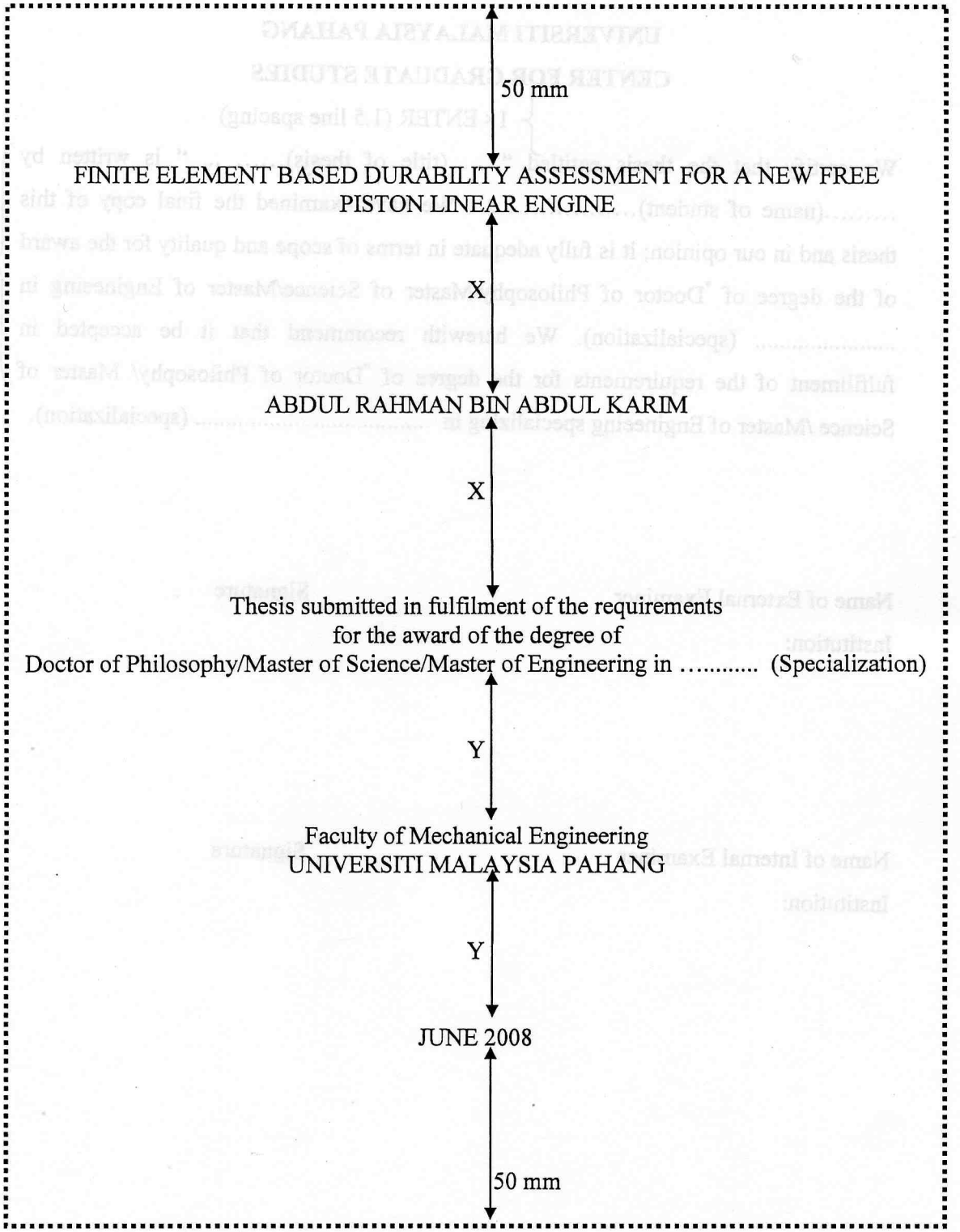
Institution:

Name of Internal Examiner Signature

Institution:

APPENDIX A4

SAMPLE OF TITLE PAGE



APPENDIX A5

SAMPLE OF STATEMENT OF AWARD FOR DEGREE

1. Doctor of Philosophy

Thesis submitted in fulfilment of the requirements for the award of the degree of Doctor of Philosophy (specialization).

2. Master of Engineering (by Research)

Thesis submitted in fulfilment of the requirements for the award of the degree of Master of Science/Master of Engineering in … … … … ... ... (Specialization).

3. Master of Engineering (by Coursework)

Thesis submitted in partial fulfilment of the requirements for the award of the degree of Master of Science/Master of Engineering … … … … (Specialization).

4. Bachelor Final Year Project Report

Report submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of … ... ... (Specialization).

APPENDIX A6

SAMPLE OF SUPERVISOR'S DECLARATION

SUPERVISOR'S DECLARATION

1× ENTER (1.5 line spacing)

I/We* hereby declare that I/We* have checked this thesis/project* and in my/our* opinion, this thesis/project* is adequate in terms of scope and quality for the award of the degree of *Doctor of Philosophy/Master of Engineering/Master of Science in ... ... (specialization) or Bachelor of ... ... (Specialization). (1.5 line spacing)

3× ENTER (1.5 line spacing)

Signature

Name of Supervisor:
Position:
Date:

(Upper case, no bold face)

3× ENTER (1.5 line spacing)

Signature

*Name of Co-supervisor:
Position:
Date:

(Upper case, no bold face)

*Delete if unnecessary

APPENDIX A7
SAMPLE OF STUDENT'S DECLARATION

STUDENT'S DECLARATION

} 1× ENTER (1.5 line spacing)

I hereby declare that the work in this thesis/project* is my own except for quotations and summaries which have been duly acknowledged. The thesis/project* has not been accepted for any degree and is not concurently submitted for award of other degree.

} 1.5 line spacing

} 3× ENTER (1.5 line spacing)

Signature

Name:

ID Number:

Date:

} Upper case, no bold face

*Delete if unnecessary

APPENDIX A8
SAMPLE OF DEDICATION

Dedicated to my parents

APPENDIX A9

SAMPLE OF ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

} 1 × ENTER (1.5 line spacing)

I am grateful and would like to express my sincere gratitude to my supervisor Professor X for his/her germinal ideas, invaluable guidance, continuous encouragement and constant support in making this research possible. He has always impressed me with his outstanding professional conduct, his strong conviction for science, and his belief that a PhD program is only a start of a life-long learning experience. I appreciate his consistent support from the first day I applied to graduate program to these concluding moments. I am truly grateful for his progressive vision about my training in science, his tolerance of my naïve mistakes, and his commitment to my future career. I also would like to express very special thanks to my co-supervisor Professor Y for his/her suggestions and co-operation throughout the study. I also sincerely thanks for the time spent proofreading and correcting my many mistakes.

} (Single line spacing)

My sincere thanks go to all my labmates and members of the staff of the Mechanical Engineering Department, UMP, who helped me in many ways and made my stay at UMP pleasant and unforgettable. Many special thanks go to member engine research group for their excellent co-operation, inspirations and supports during this study.

I acknowledge my sincere indebtedness and gratitude to my parents for their love, dream and sacrifice throughout my life. I acknowledge the sincerity of my parents-in-law, who consistently encouraged me to carry on my higher studies in Malaysia. I am also grateful to my wife, daughter and son for their sacrifice, patience, and understanding that were inevitable to make this work possible. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to attain my goals. Special thanks should be given to my committee members. I would like to acknowledge their comments and suggestions, which was crucial for the successful completion of this study.

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APPENDIX A10

SAMPLE OF ABSTRACT

ABSTRACT

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This thesis deals with durability assessment for new two-stroke free piston linear engine components using variable amplitude loadings. The objective of this thesis is to develop the general procedures for durability assessment and optimization of safety-critical free piston engine components. The thesis describes the finite element analysis techniques to predict the fatigue life and identify the critical locations of the components. Forged steel, cast iron, and a set of aluminium alloys materials were studied in this thesis which commonly used in industry. The structural three-dimensional solid modeling of free piston engine was developed using the computer-aided drawing software. The strategy of validation of finite element model was developed. The finite element analysis was then performed using MSC.NASTRAN code. The finite element model of the components was analyzed using the linear elastic and frequency response approaches. Finally, the stress-strain state of the components and frequency of the stresses obtained previously are employed as input for the fatigue life. From the results, it is observed that the analysis using Goodman mean stress correction method yields more conservative life prediction. The acquired results utilizing the strain-life method indicate that when the loading sequences is predominantly tensile in nature, the SWT and the Morrow models give shorter life than that the results obtained using the Coffin-Manson model. However, the Coffin-Manson method gives conservative prediction when the time histories are predominantly compressive, and zero mean stress loadings. The obtained results indicate that the nitride treatment produces the longest life. The results concluded that the polished surface finish conditions give the highest life. Therefore, the nitriding process is the promising surface treatments for the aluminium alloy parts to increase the fatigue life of the linear engine components. The durability assessment results are significant to improve the component design at the early developing stage. The results can also significantly reduce the cost and time to market, and improve product reliability and customer confidence.

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APPENDIX A11

SAMPLE OF TRANSLATION OF ABSTRACT

ABSTRAK

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Tesis ini membentangkan penyelidikan menggunakan unsur terhingga berasaskan pengkomputeran bagi menilai kebolehtahanan terhadap komponen enjin linear omboh bebas dua-lejang baru menggunakan beban amplitut berubah. Objektif tesis ini ialah membangunkan prosedur penilaian kebolehtahanan dan pengoptimuman bagi komponen enjin linear omboh bebas yang selamat. Proses penilaian kebolehtahanan dijalankan menggunakan analisis unsur terhingga dan lesu. Permodelan struktur pejal tiga-dimensi bagi enjin omboh bebas dibangunkan dengan perisian lukisan bantuan komputer. Strategi pengesahan model unsur terhingga dibangunkan. Analisis unsur terhingga dijalankan dengan kod MSC.NASTRAN. Model unsur terhingga bagi komponen dianalisis menggunakan pendekatan elastik linear dan sambutan frekuensi. Akhirnya, keadaan tegasan-terikan komponen dan frekuensi tegasan yang diperolehi sebelumnya digunakan sebagai masukan dalam pengiraan hayat lesu. Pendekatan tegasan hayat nominal, terikan hayat tempatan dan sambutan frekuensi digunakan bagi menilai kebolehtahanan komponen dengan unsur terhingga berasaskan aturcara analisis lesu. Keputusan didapati bahawa analisis menggunakan kaedah pembetul tegasan min Goodman meramalkan hayat konsevertif. Keputusan yang diperolehi dari kaedah hayat-terikan menunjukkan bila rentetan beban lebih kepada tegangan sifatnya, model SWT dan Morrow memberikan hayat yang pendek dari model Coffin-Manson. Keputusan berupaya menunjukkan plot kontur bagi histogram hayat lesu dan kerosakan pada tempat yang paling rosak. Keputusan yang diperolehi menunjukkan rawatan nitrat memberikan hayat lebih panjang. Dari hasil keputusan dapat disimpulkan bahawa bagi permukaan yang digilap memberi hayat tertinggi. Oleh itu, proses penitridan memberi rawatan permukaan yang baik bagi komponen aloi aluminium menambah hayat enjin. Keputusan penilaian kebolehtahanan amat bermakna bagi memperbaiki reka bentuk komponen diawal tahap pembangunan. Keputusan juga berupaya menurunkan kos dan masa ke pasaran, memperbaiki kepercayaan produk dan keyakinan pelanggan.

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APPENDIX A12

SAMPLE OF TABLE OF CONTENTS

TABLE OF CONTENTS

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1.5 line spacing, Title case

Single line spacing

CHAPTER 3 DURABILITY ASSESSMENT METHODS

CHAPTER 4 RESULTS AND DISCUSSION

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

APPENDIX A13

SAMPLE OF LIST OF TABLES

LIST OF TABLES

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APPENDIX A14
SAMPLE OF LIST OF FIGURES

LIST OF FIGURES

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APPENDIX A15
SAMPLE OF LIST OF SYMBOLS

LIST OF SYMBOLS

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ω	Natural frequency
ε	Total strain, Bandwidth parameter
ε_a	Strain amplitude
ε_f	True fracture ductility
ε'_f	Fatigue ductility coefficient
σ	True stress, local stress
$\Delta\sigma$	Stress range
σ_a	Local stress amplitude
σ_m	Local mean stress
σ_{max}	Local maximum stress
σ_f	True tracture strength
S_f	Fatigue strength
S'_f	Fatigue strength coefficient

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30 mm

73

25 mm

APPENDIX B

SAMPLE OF FRONT PAGE OF CHAPTER, FIGURE AND EQUATION

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CHAPTER 2

UPPERCASE, BOLD

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LITERATURE REVIEW

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2.1 INTRODUCTION

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The purpose of this chapter is to provide a review of past research efforts related to internal combustion engine, free piston engine, finite element analysis, durability assessment models and surface treatment on the fatigue life. A review of other relevant research studies is also provided. Substantial literature has been studied on stress history computation, fatigue life prediction, and durability analysis of components of two-stroke free piston engine. The review is organized chronologically to offer insight to how past research efforts have laid the groundwork for subsequent studies, including the present research effort. The review is detailed so that the present research effort can be properly tailored to add to the present body of literature as well as to justly the scope and direction of the present research effort.

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2.2 INTERNAL COMBUSTION ENGINE (Main title: Upper case and bold)

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2.2.1 Historical Perspective (sub-title: Title case and bold)

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The IC engine was first realized in its modern form by Nikolaus Otto in 1867 (Heywood, 1988; Stone, 1999). The technology spread quickly, and by World War I, the internal combustion engine was ubiquitous in both the mobile and stationary applications.

APPENDIX A16

SAMPLE OF LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

} 1 × ENTER (1.5 line spacing)

AA	Aluminum alloy
A-A	ASTM air to air typical fighter loading
Al	Aluminium
ASTM	American Society for Testing and Materials
CAD	Computer-aided drafting
CAE	Computer-aided engineering
DOF	Degree-of-freedom
DTP	Discretized turning point
FE	Finite element
FFT	Fast Fourier transform
FRF	Frequency response function
IC	Internal combustion
LG	Linear generator
MBD	Multibody dynamics
PDF	Probability density function
PSD	Power spectral density
SAE	Society of Automotive Engineers

} (Single line spacing)

With the advent of mass production, automobiles actuated by the chemical power plant entered the garages of middle class America. Around the world, fortunes were made and lost by those who made automobiles, fuels, tires, and all the other things necessary for peoples' new found mobility. In the manufacturing and power generation, these sources of mechanical energy were also common. Such uses include air compressors, power equipment, electrical generators, and, of course, all types of transport vehicles. The remarkable versatility of the IC engine has been due to its inherent simplicity, favorable power-to-weight ratio, and exceptional ruggedness (Heywood 1988). Figure 2.1 presents an illustration of one of these crankshaft driven machines.

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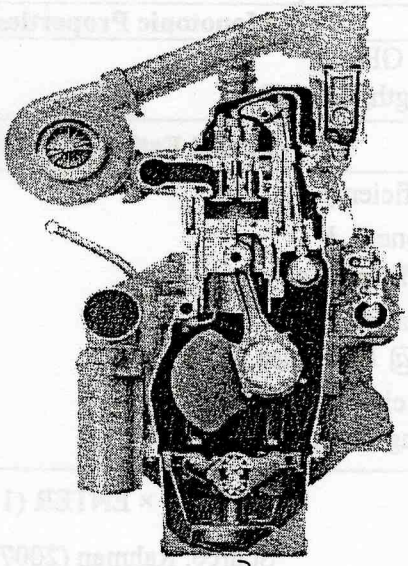

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Figure 2.1: An illustration of a conventional crankshaft driven IC engine

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Source: Heywood 1988

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2.2.2 Classification of Internal Combustion Engines

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← Sub-topic title: Title Case Bold

There are many ways in which internal combustion engines may be classified (Heywood, 1988; Dawson, 1998). However, if the limit of the scope to geometries involving reciprocating pistons, two broad distinctions are of special importance.

The force balance to the crank engine piston in the x direction is expressed as in Eq. (2.3)

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Center

$$\sum F_x = m_p \frac{d^2x}{dt^2} = P_C A_C - F_l \cos\beta \qquad (2.3)$$

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Table 2.1 are listed the materials properties of the materials used in this study

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Table 2.1: Monotonic and cyclic properties of the MANTEN and RQC100 materials

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Materials properties	MANTEN	RQC100
Monotonic Properties		
Young's modulus, E, GPa	203.4	203.4
Ultimate tensile strength, S_u, MPa	552	863
Cyclic and Fatigue Properties		
Fatigue strength coefficient, σ'_f, MPa	917	1158
Fatigue strength exponent, b	-0.095	-0.075
Fatigue ductility coefficient, ε'_f	0.26	1.06
Fatigue ductility exponent, c	-0.47	-0.75
Fatigue strength, S_f @ 10^8 cycles, MPa	10	10
Cyclic strength coefficient, K', MPa	1103	1151
Cyclic strain hardening exponent, n'	0.19	0.10

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Source: Rahman (2007)

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The SAE keyhole was modeled using the MSC.PATRAN and analyzed utilizing the MSC.NASTRAN, the finite element analysis code.

APPENDIX C1

SAMPLE OF TABLE

single line spacing

Sentence Case

Table 6.5: Monotonic and cyclic properties of the MANTEN and RQC100 materials

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Materials properties	MANTEN	RQC100
Monotonic Properties		
Young's modulus, E, GPa	203.4	203.4
Ultimate tensile strength, S_u, MPa	552	863
Cyclic and Fatigue Properties		
Fatigue strength coefficient, σ'_f, MPa	917	1158
Fatigue strength exponent, b	-0.095	-0.075
Fatigue ductility coefficient, ε'_f	0.26	1.06
Fatigue ductility exponent, c	-0.47	-0.75
Fatigue strength, S_f @ 10^8 cycles, MPa	10	10
Cyclic strength coefficient, K', MPa	1103	1151
Cyclic strain hardening exponent, n'	0.19	0.10

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Source: Juvinall and Marshek (2000)

APPENDIX C2

SAMPLE OF LANDSCAPE TABLE

Table 6.12: Predicted fatigue life using the biaxiality correction method

Loading conditions	Predicted Life in seconds at critical location (at node 49360) $\times 10^6$							
	2014-T6	**2024-T86**	**2219-87**	**5083-87**	**5454-CF**	**6061-T6**	**7075-T6**	**7175-T73**
SAETRN	42.7	12.5×10^{2}	848	35.6	13.0	21.0	10.8×10^{3}	23.3×10^{2}
SAESUS	50.1×10^{3}	37.8×10^{5}	33.6×10^{4}	25.1×10^{4}	92.4×10^{3}	87.4×10^{2}	95.1×10^{5}	11.0×10^{8}
SAEBKT	496	15.3×10^{3}	90.7×10^{2}	778	318	106	15.9×10^{4}	15.5×10^{4}
I-N	264	80.2×10^{2}	46.6×10^{2}	452	186	230	85.2×10^{3}	11.3×10^{4}
A-A	59.9	18.5×10^{2}	11.7×10^{2}	70.8	27.8	39.3	17.6×10^{3}	77.1×10^{2}

APPENDIX C4

SAMPLE OF LANDSCAPE CONTINUOUS TABLE

Table 6.12: Continued

Loading conditions	Predicted Life in seconds at critical location (at node 49360) $\times 10^6$							
	2014-T6	**2024-T86**	**2219-87**	**5083-87**	**5454-CF**	**6061-T6**	**7075-T6**	**7175-T73**
A-G	16.6	487	329	14.0	5.11	8.23	42.1×10^2	926
R-C	31.9	966	629	31.9	12.1	18.3	87.8×10^2	26.5×10^2
TRANSP	19.5×10^2	49.9×10^3	26.7×10^3	50.7×10^2	20.7×10^2	22.7×10^2	59.2×10^4	42.0×10^5

APPENDIX D1

SAMPLE OF FIGURE WITH SOURCE

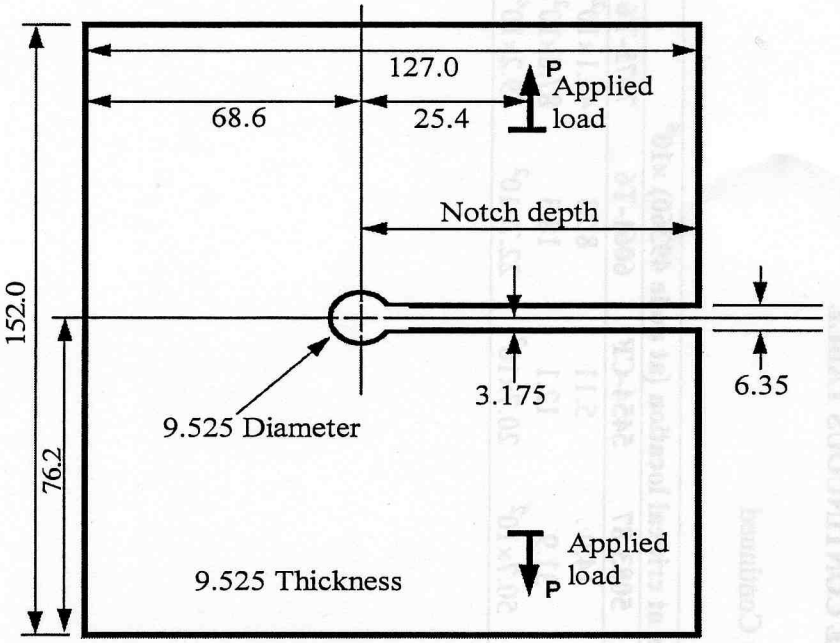

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Figure 6.8: SAE keyhole specimen in millimeter (Sentence case)

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Bold

Source: Bannantine et al. (1990)

APPENDIX D2

SAMPLE OF LANDSCAPE FIGURE

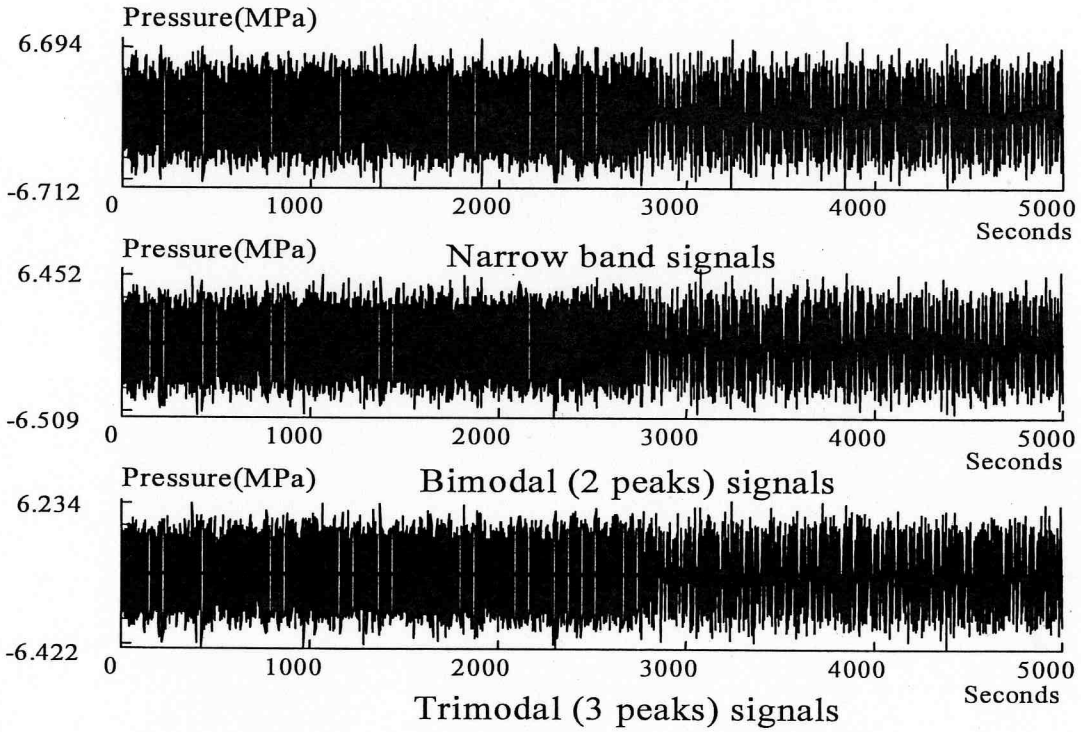

Figure 5.3: Time-loading histories of narrow and wide band signals

APPENDIX D3

SAMPLE OF COUNTINUOUS FIGURE

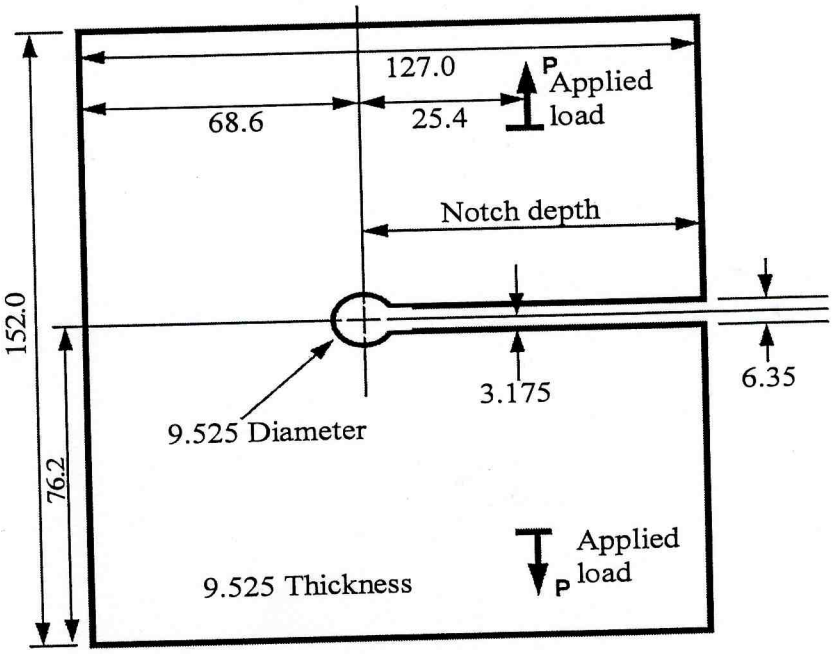

Figure 6.8: Continued