FACULTY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MARINE SCIENCE AND ENGINEERING

All BEng and BSc Honour's Degree Programmes

in

Mechanical/Marine/Composites Engineering

INDIVIDUAL PROJECT HANDBOOK

Projects Co-ordinator: Dr Y M Dai, Room 019, Reynolds Building

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1. INTRODUCTION

The Project is an integral part of the Honours programme, successful completion is necessary to satisfy the regulations for the award of an Honours degree. All Honours degree students in their final academic year of Mechanical/Marine/Composites Engineering subject area undertake a project which is chosen during the second year of the course. The assessment of the project contributes 30 credits (or 25%) to the total final year mark achievable, which is approximately 17.5% of the overall aggregate mark. Your project report may provide the focus of discussion in interviews conducted by our External Examiners/Industrial Advisors; it may also provide useful evidence to a prospective employer of your involvement and competence in areas of mutual interest.

Registration of the project includes enrolment on the project module and reflects the commitment of about 300 + hours of investigative project work culminating in the publication of a substantial report document of approximately 5000 words in length forming the permanent record of the outcome of your investigative work.

This Handbook aims to:

(a) Describe the procedures for selection, registration and supervision of Honour's projects.

(b) Identify the responsibilities of the Project Student and role of the Project Supervisor.

(c) State the procedures and criteria for assessment of the project.

(d) Offer advice on the practical conduct of a project.

(e) Summarise the guidelines for the preparation and publication of the project report.

Initial steps in project preparation include appraisal of the contents of this Handbook, discussions with the Projects Co-ordinator at the advisory meeting on project administration and development culminating in the preliminary and formal registration of your selected topic and the definition of the objectives/deliverables of your project work.

Academic tutors may advise you on the selection of a suitable area of work, and will act as Supervisors to provide support and monitor the project work and the writing of the report. The Supervisor will eventually assess it (in conjunction with another academic tutor acting as moderator and/or the External Examiners where necessary).

The Projects Co-ordinator (Dr Y M Dai, RYB 019, y.dai@plymouth.ac.uk), is responsible for prescribing the guidelines for registration, presentation and assessment. Contact him with any queries relating to project arrangements or the contents of this Handbook.

2. AIM OF THE PROJECT

The general aim of a project is to provide you with the opportunity for integrating and extending knowledge relating to your undergraduate programme of study by exercising skills of initiative, resourcefulness, creativity, analysis and communication.

3. SELECTION AND REGISTRATION OF PROJECTS

This phase involves consultation with a prospective Project Supervisor and registration with the Projects Co-ordinator by the end of Stage Two.

3.1 Types of Projects

Broadly, projects fall into one of three categories:

(a) Standard projects which have been tackled before, and have a known result or proven methodology. Students may wish to improve on one of these, or use one in a different context or location.

(b) Innovative projects which are proposed or formulated by a supervisor, often they are linked to the particular interests of the supervisor.

(c) Original projects proposed by students themselves and approved (possibly with modification) by the supervisor.

3.2 Choosing Your Project Topic

The range of acceptable topics and methods of investigation is clearly very wide. They may lie within any discipline/s of the mechanical/manufacturing systems/composites engineering/marine technology spectrum, e.g., fluids, stress analysis, thermodynamics, control, tribology, design, structural integrity, production, computing, systems analysis, CAE, CAM etc. Projects may comprise an experimental study, a computer investigation, a design study or a combination of these types. In all cases, an analytical literature review will be required.

Normally the topic will be chosen by yourself. Guidance is available from academic staff. The Projects Co-ordinator maintains a list of possible project titles proposed by the academic staff which will be made available to assist you. Start thinking seriously now about possible topics and discuss your ideas with members of the academic staff to ensure they are both worthwhile and workable. It is important to select a topic which you are confident will maintain your interest.

The aims and objectives need to be clearly defined at the outset (they may be revised as the project develops). Any special needs, e.g., components making,

materials purchase, technician support, etc., must be identified and approved by the Project Supervisor from the outset.

3.3 Seeking a Supervisor

The nomination of a Supervisor is determined by the relationship of the project theme to an identifiable Subject Area. Advice from Subject Leaders and Module Leaders can help target a specific staff member to provide supervision. In many instances a liaison will develop as a consequence of regular contact through teaching.

The Supervisor cannot do the work for you, but as your investigation progresses he or she will act as a useful 'sounding board' for you to try out your ideas and plans. He/she will also be capable of providing direction when needed and suggestions for sources of knowledge and information.

Talk to your Supervisor! Set up an arrangement to meet **REGULARLY** with him/her, and don't forget to bring your logbook with you all the time.

3.4 Provisional Registration of Project

All prospective final year project students are requested to choose a project title by registration of provisional project title/interest with the Projects Coordinator by the end of their Stage 2. The 'Provisional Project Title/Interest Registration' form should be delivered to the Projects Coordinator (in person or via e-mail) by 01 June, 2009. This will help the allocation of suitable project supervisor(s) and the necessary preparation work for all projects to start during the summer holidays and before the final year.

Contact the prospective Supervisor(s). Discuss aims and objects of the project. Follow up references suggested by the Supervisor and locate sources of information by starting a literature search. Contact industrial companies that may be interested in supporting the project by providing advice, equipment or material.

Early consultation with a prospective supervisor is strongly recommended since each member of academic tutor will be supervising a limited number of students, (normally 8-9 including BSc and MSc project students), during the forthcoming academic year.

3.5 Formal Project Registration

The form "**Honour's Projects Registration**" (Appendix A) together with the proposed Project Plan of Work (**Gantt Chart**, an example is given in Appendix B), must be signed for approval by the Supervisor and submitted to the Projects Co-ordinator before the deadline date of **3pm Tuesday, 6 October 2009** via the

Faculty Office. Retain copies of this registration form and the project Gantt Chart for yourself for future reference.

It is imperative that your project title and supervisor are formally registered with the Projects Co-ordinator (Dr Y M Dai) by the above specified deadline.

NB Failure to comply with these registration arrangements may mean you will be unable to proceed to the Honours programme.

3.6 Special Note on Projects Requiring Materials or Manufacture

Project drawings and materials specifications are to be submitted by individual student to their supervisors, who will check that they are acceptable and then pass them on to the Technical Manager for approval by completion of the Technician and Lab Request Form (Appendix C), which is available on portal, before any machining/fabrication is auctioned

(i) Drawings: Detailing and general standard of presentation must be satisfactory, i.e., adequate to enable manufacture to be carried out with the minimum supervision of technicians. Assembly drawings are essential. Lecturing staff in Design, are prepared to offer specialist advice on drawing presentation, and consult with Technicians if necessary.

(ii) Materials: Materials must be specified by the student and should either be available from existing stocks or purchased from laboratory funds, although these funds are very limited. Bear in mind that suppliers of materials often stipulate a minimum cost or quantity order. Free samples of materials may often be supplied by industrial firms who may be interested in the results of the project and students, supervisors should consider this avenue of approach.

(iii) Manufacture: Students requiring specialist advice on manufacture should consult the Supervisor first then the Technical Manager/Technicians. If significant amounts of manufacture are involved, supervisors should submit completed drawings to the Senior Technician for distribution to the appropriate area. Owing to the other calls on technician time, especially during term time, it is of paramount importance that drawings/specifications for equipment that is required for the project work should be completed as early as possible. Ideally this would be specified in the Formal Project Registration and subsequently formally submitted as part of the Project Specification before the end of October.

3.7 Policy on Industrially Sponsored Projects

It may be possible for students to accomplish a project in partnership with their sponsor or the company that employs them during their industrial placement year. However, situations must be prevented where a final year project could have been virtually completed wholly within the period of industrial placement. This, of course, may cause problems in respect of :-

(i) Ability of supervisor to assess the work components, and

(ii) Lack of fairness to other students who have not had such an opportunity and consequently have more commitments in the final year.

In order to ensure equitable treatment of all students and yet not to discourage industrial sponsored projects, the student must obtain approval before commencing an industrially sponsored project. In general, such approval will be granted providing the following conditions are met :-

(i) Pending approval, the academic supervisor must be drawn into the discussions with student and industry at an early stage and project specification must be agreed.

(ii) The project must involve a substantial body of work to be done during term time when the student returns to college for the final year! This means work in addition to writing to project report.

(iii) The student's academic supervisor must be kept fully informed with developments while the student is working on the project in industry, including, if necessary, a site visit by the supervisor or industrial tutor. Regular progress report may be required.

(iv) The project work should be additional to, and not a substitute for, the normal industrial placement work.

(v) Any hardware required to complete the work during the final year should be transported to the University, or made readily accessible to the student while studying at the University.

(vi) The Supervisor and Moderator should be able to satisfy themselves that the project is being conducted by the student at all stages and be made aware of any specialist assistance or documents available to the student.

(vii) The project may not commit the University to any expenditure without the prior approval of the Head of School or nominee.

(viii) Where work of a commercially sensitive nature is involved, the supervisor and student will take reasonable precautions to protect the interest of the company involved, e.g., by not divulging information on the project to a third party.

4. RESPONSIBILITIES OF THE PROJECT STUDENT

You will be expected to:

(a) Identify the aim and objectives of the project and complete registration by the nominated deadline date.

(b) Maintain a formal record of progress of work and achievement of objectives - Project logbook.

(c) Arrange and attend regular consultative meetings with your Project Supervisor.

(d) Advise your supervisor of factors affecting the progress of work.

(e) Prepare and submit the interim progress and the final project reports according to published guidelines and deadlines.

(f) Prepare and present the project results and findings via the Project Open Day and the initial appraisal interview as instructed by the Projects Co-ordinator.

5. ROLE OF THE PROJECT SUPERVISOR

The role of the Project Supervisor complements the responsibilities of the student. The Supervisor confirms the suitability of your project proposal with special regard to resource support, monitors progress and provides advice compatible with the general aim of an honours project. Feedback on performance during the period of the project work can be expected, unsatisfactory progress may merit consultation with your Project Supervisor, Personal Tutor and the Programme Co-ordinator.

Apart from acting as "customer" from the point of view of defining the Project Specification, the supervisor may frequently review the progress of the project but not control or direct it. The student is responsible for running the project but should seek the supervisor's advice and discuss decisions which have been made and affect the conduct of any practical investigation.

A supervisor is not the fount of all knowledge. Students may need, and are encouraged, to consult other members of staff. Academic staff, including researchers and technicians, have a very broad spectrum of expertise between them. When in doubt, find out which of them may be able to help and ASK! Supervisors should be kept informed at all times when things are not going as well as expected.

6. PROJECT ASSESSMENT

There are a number of elements to the assessment of a project:

- Project Specification
- Initial Appraisal by the Project Moderator and/or External Examiners;

- Project Logbook;
- Final Project Report;
- Technology Projects Open Day Poster Oral Presentation and;
- Project Viva (optional).

6.1 Project Specification

Project Specification (maximum 6 A4 pages), outlining accurately project aim and objectives, the deliverables, relevant literature review, proposed methodology and design, technical support request and detailed plan of work, is to be submitted to the Projects Co-ordinator (Dr Y M Dai) by **3pm Friday, 30 Oct 2009** through the Faculty Office.

Formulate ideas for experiments and devise a detailed plan of work (Gantt chart). *Be aware of the importance of statistics and sensitivity analyses in design of the experimental matrix, and make sure that adequate consideration is given to these aspects*. Prepare drawings and materials specifications. Discuss with supervisor to ascertain feasibility, resource and safety implications.

The Project Supervisor alone will be required to assess the submitted Project Specification, and ensure the feasibility of the project and technical support planning ascertained by the project students.

IF THE PROJECT SPECIFICATION IS NOT SUBMITTED, 5% OF THE OVERALL PROJECT MARK WILL BE LOST.

6.2 Initial Appraisal by the Project Moderator and/or External Examiners

During the second and/or the first weeks of the Spring Term in January 2010, an interview will be held with the allocated Project Moderator for the initial project appraisal. The External Examiners/Industrial Advisors are scheduled to visit the School for a day or two during this period and will interview a selection of project students together with the Project Moderator for about 25-30 minutes. All project students are required to make themselves available for the External Examiner's Interview (Project Walkabout). Detailed arrangement for this visit will be advised on the final year noticeboard and notified through e-mails.

All project students are required to submit an **Interim Progress Report** plus the **Project Logbook** to the Project Moderator **through the Faculty Office by 3pm Tuesday, 12 Jan 2010**, prior to the interview.

The project Interim Progress Report should include an outline of the project aim and objectives, literature review work undertaken to date, clearly defined methods and analytical approach, progress made in the first term and what investigations remaining, any possible obstacles identified based on preliminary results and findings, thus to revise a plan of work and finalize the project pending outcomes. The Interim Progress Report should require minimum effort of writing, but it is absolutely necessary and essential. This is

designed to help you to focus on the core issues at a critical or milestone stage of the project to ensure successful completion to the project. There are also the possibility of external academic or industrial involvement and support.

IF PROJECT INTERIM REPORT IS NOT SUBMITTED AND THE INTERVIEW IS NOT ATTENDED, 10% OF THE OVERALL PROJECT MARK WILL BE LOST.

6.3 Project Log Book

The log book will provide a means of assessing the progress of a project, both during the execution of a project and afterwards during the final assessment phase. It must be handed in, together with the two copies of the final project report, to the Projects Co-ordinator in aid of the assessment of your project, although the logbook itself is not a formal part of the project presentation. The logbook, together with the second copy of your final report, will be returned to you, and will be ready for collection from the Faculty Office after the final assessment phase in June 2010.

6.4 Project Poster Oral Presentation and Technology Projects Open Day

Project Poster Oral Presentation (The Supervisor and/or Moderator to arrange with the Student) will take place **before or during the morning on the Technology Projects Open Day** which is scheduled on **Thursday, 25 March 2010. All** Project Students are required to produce a project poster and attend the Technology Projects Open Day, and be in charge of their display on the day. It is the responsibility of the Supervisor to ensure that the Poster Oral Presentation by the student to be made for assessment before noon.

This is the opportunity for you to demonstrate the achievements, attract potential employees and establish industrial links. It is also the ideal time for you to invite industrial placement supervisors, contacts with former school or college, or family and friends to celebrate your achievements after 3 or 4 years' academic study at the University.

IF THE PROJECT POSTER ORAL PRESENTATION ARE NOT PERFORMED, 10% OF THE OVERALL PROJECT MARK WILL BE LOST.

6.5 Final Project Report

The project report is the major contribution towards the overall project classification and should be approximately 5000 words in length. Maximum limit in length is 6000 words.

6.5.1 Delivery of Project Report

Two copies (master and photocopy plus one CD) of the final project report together with the project logbook must be submitted to the Projects Co-ordinator **via the Faculty Office by 3pm Wednesday, 21 April 2010**. Both copies must have approved card covers and spiral binding. These will be paid for by the School and to be collected from

the School Receptionist in Reynolds Building; Media Services will give you the proper materials and use of the binding machine.

6.5.2 Assessment of the Project Final Report

The report will be assessed on the following criteria:

- Project rational, originality and difficulty;
- Literature review : use of available literature and external enquiry for information;
- Methodology;
- Contents/Knowledge/Student understanding and coverage of the project as titled;
- Critical analysis and examination and discussions/Use of evidence;
- Relevance and accuracy of conclusions and or recommendations;
- Structure and presentation: literacy, style, appropriate length, consistence and layout of the project report; proper reference to sources and inclusion of a full bibliography; relevance of appendices;

6.6 Project Viva (Optional)

Project Viva is normally not required. However, there is an option for the project assessors to request you to attend for a viva in order to assist the assessment of your project work. This is also an option for you to defend yourselves orally in a relaxed environment to clarify any unanswered issues and queries that the examiners may have on your project report, and an ideal opportunity to obtain feedback on your work. The Project Viva, if requested by the project assessors (Project supervisor to arrange with the and the student), must take place before the specified assessment deadline date during the exam period. The deadline for all projects assessment is **by Wednesday, 19 May 2010**.

IF THE PROJECT VIVA IS NOT PERFORMED, THE PROJECT ASSESSMENT WILL BE BASED ON THE SUBMITTED FINAL REPORT AND LOGBOOK ONLY. AND THERE IS NO MARK ALLOCATED TO THE VIVA.

6.7 Project Formal Procedures

In addition to this handbook, the following will be issued to all project students :-

- ***Honours Projects Timetable***
- ***Honours Projects Registration Form***
- ***Project Initial Appraisal Interview Form***
- ***Project Marking Scheme***

Please retain them for information and strictly adhere to all specified deadline dates in the timetable.

All projects are double marked by the allocated internal moderator and the project supervisor. The initial assessment will be based on the Project Specification (5%) and the interim assessment will be based on interim progress report and initial appraisal interview with the students (10%). In the final assessment, the supervisor and moderator will award marks out of 75 using the Project Marking Scheme for the final report and for the work elements (project logbook) throughout the whole investigation of the project. The project poster presentation to the supervisor and moderator will contribute to the final 10% of the overall mark. The moderators and supervisors may work together to adjust the final marks awarded in the light of all the projects moderated at a pre-panel project moderation meeting.

In fairness to all, each student should complete project work within the same time period. **Late submissions cannot be accepted** under current university regulations, which read as follows :-

> *Final Stage Honours Degree students who have missed a deadline and been awarded a mark of zero for coursework comprising the single piece of assessed work in a final stage module (thereby putting at risk their Honours Degree) may submit evidence to the Screening Committee in support of a claim that they had made all reasonable efforts to submit work within the deadline and that the circumstances which prevented their meeting the deadline were outside their control.*

Office staff, supervisors, and the Projects Co-ordinator therefore have no latitude to authorise, or accept, late submissions.

7. EXECUTION OF PROJECTS

7.1 Design Methodology

It is difficult to define precisely the way in which a project should be tackled since projects can differ considerably in scope and content. For example, a project may be part of a current research field, in which case you may be breaking genuine new ground and a more "scientific" approach is called for. Alternatively, the project may contain a large proportion of practical work, or perhaps the development of an existing idea or piece of equipment.

In general, however, the major elements of the projects can be considered to be:

(a) Definition of aim and objectives
(b) Literature survey
(c) Project specification
(d) Investigation phase
(e) Project report.

7.2 Definition of Aim and Objectives

The success of any project depends upon having an overall strategy carefully worked out at the very beginning. A systems approach takes into account the many influences which can range from the application of scientific principles to their social consequences. In simplistic terms, it can be reduced to five steps:

(a) Defining the aim - to specify what is required and to what standards.

(b) Identifying the objectives - to produce and compare alternative solutions for the achievement of the aim.

(c) Designing the solution - to develop and specify the optimal solution with the available information and expertise.

(d) Implementing the solution - to execute the solution within the planned resources and to measure the results.

(e) Evaluating the results - to analyse the results and to compare the performance with the original aim.

There may be several ways of achieving the aim of the project and each should be explored and decisions made on the way forward. In considering each choice the availability of resources may be a deciding factor, investigations may need the assistance of specialist technicians. Only after all the factors have been carefully considered and decisions made will it be possible to refine the outline programme into a timetable of events which can be achieved.

7.3 Literature Survey

Projects should always begin with a survey of relevant literature in order to put the project into perspective and to ascertain the extent of work carried out by other investigators. It has a considerable bearing on the practical work you perform and the way in which you interpret any results you obtain. Perhaps a market survey or manufacturers' sales literature, product catalogues or trade journals may help. It is even possible to arrange visits to commercial firms in cases where your project is in some way linked with industry.

You should become familiar with the learned JOURNALS which are pertinent to your studies, and information can be found by means of the numerous e-RESOURCES (electronic library) which give compilations of the most recent publications in relevant fields. Usually, search engines are available which provide further assistance in finding out. It is important that this time-consuming operation is started at the earliest possible time since the retrieval of printed material can be a very lengthy process. Seek the advice of the library staff: they are there to help you. When project work is in an area of current research interest, information may not yet be available in text books since most science and technology books are three or four years out-of-date by the time they are published.

Remember, a literature survey carried out well, in the early stages of the project, is extremely useful later on, especially in the writing up stage when it often supports significant sections of the project report. The report of the literature survey should be suitable, with appropriate modification, for use as part of the main body of text of the project report.

A literature survey is NOT to produce a list of books and journal papers for references.

7.4 Project Specification

The project specification is a critical element of the project and is a yardstick by which the success of the project can be measured. It is a detailed listing of the aim(s) and objectives, ie the deliverables, of the project and represents a form of contract between student and supervisor. It also provides the relevant literature survey, proposed methodology and investigation approach, technical support request, and detailed plan of work.

If the project is to develop or needs to hire equipment then details of the mechanical, electrical, software, environmental and operational requirements should be given. The specification will also give an outline costing of the final product, and all consumables and/or capital expenditure associated with the project. This should be carried out at the earliest possible stage of the project, and details of the costing and funding of the project should be included in the Project Registration Form, but finalised in the project specification. Failure to do so may mean funding will not be available for the project.

7.5 Investigation

Once the aims of the project are firmly established then an in-depth investigation can commence. The execution of the project is much easier if the work has been planned carefully to avoid either too many activities being attempted at the same time or long delays due to the incorrect scheduling of any critical activities.

7.5.1 Log Book

You must keep a Log Book throughout the project. Its function is to record the progress of the work, including all the decisions made, the reasons for the conclusions reached, computations, drawings, field tests, and of course the results obtained (whatever the quality). Include graphs, diagrams, photocopies and photographs, etc in the Log Book, as long as they are firmly and permanently attached to the pages.

Log Books represent the complete record of project work and must be available for inspection by the Project Supervisor, Moderator and the External Examiner. There is no definite format for the Log Book but it should be reasonably legible and each entry should be dated. A properly kept Log Book allows the project report to be written with a minimum of effort, since most of the details, results and references, etc; are already recorded.

7.5.2 Plan

Large projects often require the use of Programme Evaluation and Review Techniques (PERT) or similar techniques to optimise the scheduling of activities. Final year projects are relatively straightforward to plan and a simple Gantt chart, such as the example shown in Appendix B, should suffice. But a more detailed weekly plan with specific meaningful activities are to be encouraged.

The timescale chart allows you to indicate key dates to be met, such as the dates of the interim progress report & interview, and the Projects Open Day and Poster Presentation and final submission deadline etc; it is also a performance indicator. It should be reviewed regularly by both student and supervisor and revised when necessary.

Retain copies of the timescale in the Log Book so that a complete and accurate record of the progress of the project is maintained.

7.5.3 Safety and Risks

It is easy to envisage project work which involves potentially dangerous activities and it is essential that such activities are considered carefully by you and your supervisor. Before carrying out any activity you should attempt to assess the risks involved. An assessment of risk is simply a careful identification of what, in your work, could cause harm to people, this process will enable you to identify and implement sufficient precautions relevant to all aspects of your work.

> A copy of the University General Risk Assessment Form is given in Appendix F together with the Guidelines for its completion on Information Sheet No 1 obtained from the University Website. ***You must complete the form with your supervisor before conducting any practical work*** and include the form in your project logbook.

7.5.4 Ethical Issues in Project Work

The University has a formal policy for the management of ethical issues which arise during the definition and execution of project work.

Please give careful consideration to the safety and ethical issues related to your project.

8. PREPARATION OF PROJECT REPORTS

8.1 Introduction

Above all, remember that your Project Report is an exercise in communication. You are trying to explain and get someone else to understand what your project work is all about. Keep in mind, therefore that someone else has to read your project, word by word, (not only your

supervisor who knows what you have been doing, but also a second member of staff and an external examiner who do not!)

An engineering project report must be submitted with the preferred spellings of the Oxford English Dictionary and type written with each page having the layout shown in Appendix D. The text is to be typed with 1½ line spacing, with the exception of the abstract and any quotations which are to be single spaced. Pages are to be numbered consecutively. If possible all mathematical symbols should be typewritten; otherwise they should be written very clearly by hand. SI units are to be used wherever possible, however, imperial units may be given in parentheses.

The text of the project throughout should be written in the third person in an objective, formal and impersonal style.

8.2 Layout

Most of the sections listed below will appear in a final year project report (dissertation), those that are optional will be discussed as such later in the guidelines.

a. Title Page/Cover
b. Abstract
c. Acknowledgements
d. Contents
e. Nomenclature
f. List of Figures
g. List of Tables
h Introduction
i. Literature Review
j Body of Text
k. Conclusions
l. Recommendations
m. References
n. Bibliography
o. Appendices.

8.3 Title Page/Cover

This should give the following information:

(a) Title of the project. This is to be informative and yet concise.

(b) Full name of the author.

(c) Statement of requirements.

(d) Supervisor(s).

(e) The month and year of submission.

See Appendix E for an example of a title page/cover.

8.4 Abstract

This should not be more than 300 words in length. It should cover:

(a) The aim of the work.

(b) Methods used.

(c) Results obtained.

(d) Conclusions.

Note the abstract is NOT an introduction to the project, but an abbreviated descriptive summary of the whole project investigation.

8.5 Acknowledgements

These should be used to thank those who have assisted the author(s) during the course of the work being reported and in the preparation of the report itself.

8.6 Contents

In sequence, this gives, with page numbers, all section and sub-sections including appendices.

8.7 Nomenclature

Where applicable such a section should be included.

8.8 List of Figures

A full list of figures should be included.

8.9 List of Tables

A full list of tables should be included.

8.10 Introduction

The purpose of the Introduction is to involve the reader in the subject matter of the project and explain the reasons for undertaking the study reported. The aim and the objectives of the project should be clearly specified. Also the Introduction should be used to relate the work to earlier work or similar studies, if relevant.

8.11 Body of Text

Most projects have as their main constituents,

(a) Theory/problem analysis

(b) Investigation

(c) Results

(d) Discussion

However, before rushing into what may appear to be water-tight compartments, assemble your notes and material and prepare a framework that suits best your project. Divide the work into sections and sub-sections, write down facts and discussions that you will use in each section and then arrange the material in a logical sequence to develop progressively.

The main text of the project report (introduction, literature review, body of text, conclusions and recommendations) must be set out in logical sections in an numerically **orderly** manner. Tables and figures are to be numbered consecutively as they appear in the text, tables in Roman numerals (I, II, III, etc) and figures in Arabic numerals (1,2,3, etc). Each figure and table is to be accompanied by a suitable title/caption, a common mistake is to introduce a figure or a table into a report without referring to it in the text.

Furthermore when referring to a figure in the text then the following practice should be adhered to:

(a) The abbreviation "Fig" may be used when it appears within a sentence, e.g., "The results shown in Fig. 3 confirm the model predictions."

(b) If the word shown is used to begin a sentence then it is written in full as "Figure", e.g., "Figure 3 shows the results which confirm the model predictions."

Also where a figure or table has been extracted from another source, this should be referenced at the end of the figure or table caption e.g.,

"Figure 4 Caption (After Spock (2049))."

Abbreviations may be used but the titles should be given in full the first time they appear in the text with the abbreviation in parentheses e.g., Department of Transport (DTp), Global Positioning System (GPS).

All equations should be sequentially numbered.
Three levels of headings are allowed in the project and it should be clear what level each is, for example:

1. CHAPTER HEADING (in bold)

Text follows here.

1.1 Sub-Heading (in bold)

Text follows here.

1.1.1 Sub-Sub-Heading (in bold and italic).

Text follows here.

8.12 Conclusions

A review of the major findings and results of the work are given here.

8.13 Recommendations

This indicates further development and work.

8.14 References

Authors are named in the text by their surname only (and the date of publication is given in parenthesis). When reference is made to more than one paper of the same year, these should be distinguished by suffix letters a, b, c, immediately after the date. If a paper has two authors both names are given. If there are more than two, all names are listed the first time the paper is cited, and for later citations the name of the first author is followed by *et al.*

Examples: Smith (1989)
Smith, Richards and Brown (1990a)
Smith et al (1990b).

In each reference, ensure the following information is given:

(a) Names of all the authors.

(b) Year of publication

(c) Title of the paper

(d) Full title of the journal

(e) Volume number

(f) First and last page numbers.

For a book, the author(s), book title, publisher and year of publication should be stated.

References should be listed in alphabetical order as shown in the References for Project Writing used in this project handbook .

8.15 Bibliography

This is a list of articles or books for further reading on the subject of the report to which no reference is made in the text. When listing these works the same format should be adopted as for references.

8.16 Appendices

These should be used for lengthy mathematical proofs and derivations, and any other material which it is felt necessary to include but which would fit uneasily in the main body of the text.

Please note that the Reference, Bibliography and Appendices Sections are not designated with a heading number.

9. REFERENCES FOR PROJECT WRITING

The following may be useful sources of reference for the preparation of your Project Report.

ALLISON, B (1983). *A Guide to Dissertation Presentation*.

BOOTH, V (1984). *Communicating in Science: Writing and Speaking*. Cambridge UP. Paperback.

LINDSAY, D (1984). *A Guide to Scientific Writing*. Longman Cheshire. Paperback.

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10. STUDENT FEEDBACK

This Handbook is designed to help you think about the choice of your project and guide you with the development and writing up of your work. Any feedback about the contents of this Handbook, or suggestions for additional information to be included in future editions, will be gratefully received by the Author.

APPENDIX A

SCHOOL OF MARINE SCIENCE AND ENGINEERING
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITY OF PLYMOUTH

HONOUR'S PROJECTS REGISTRATION

All Final Year BEng and BSc Honours Degree Programmes in Mechanical Engineering/ Marine Technology/Composite Materials Engineering

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Name :-

Degree programme :-

Project Title :-

Project Proposal Outline:-

Project AIMS and OBJECTIVES (continue on back if necessary):

Project Resources: workshops/computing/materials/equipment/technical support requirements; costing and funding specification (if any);

Supervisor's remarks (if any):

PROJECT STUDENT'S SIGNATURE: DATE:

SUPERVISOR'S SIGNATURE(S): DATE:

To be submitted to the Projects Co-ordinator : Dr Y M Dai
via the Faculty Office

APPENDIX B

PROJECT TITLE: The Performance of Marine Screw Propellers :
An Analysis Using Circulation Theory and Open Water Tests

TACK NAME	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
PROJECT SPEC AND LITERATURE SEARCH										
CIRC THEORY PROGRAMMING			(1)							
PREPARATION AND UNDERTAKING OF OPEN WATER TESTS						(2)				
COMPARISON OF RESULTS										
PROJECT WRITE UP									(3)	

(1) Due date of Project Specification and Detailed Plan of Work (Gantt Chart).
(2) Initial Appraisal Interview and External Examiners' Visit (Project Progress Interim Report due).
(3) Project final report and logbook hand in date.

NOTE : THIS IS FOR GUIDANCE ONLY. STUDENTS WILL BE EXPECTED TO PRODUCE A FAR MORE DETAILED PLAN THAN THIS IF POSSIBLE

APPENDIX C

A4 Sheet

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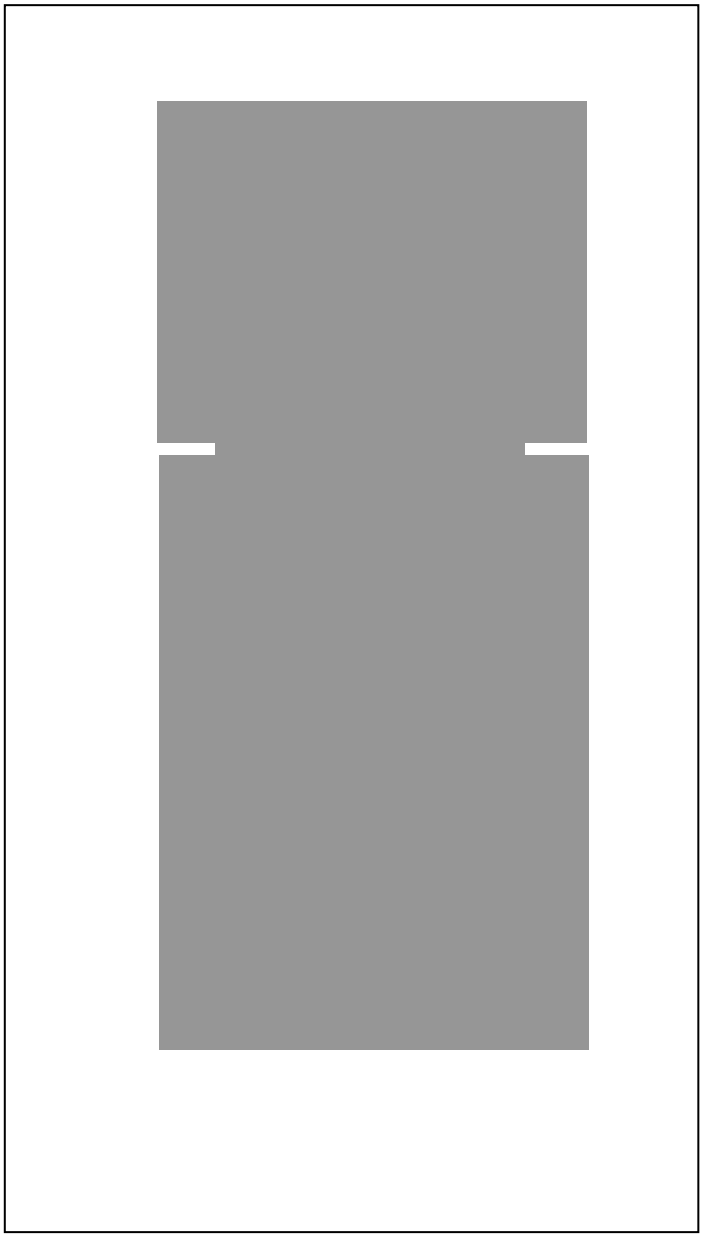

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APPENDIX D

ADVANCED CONTROL STRATEGIES

FOR STARSHIPS

by

JAMES T KIRK

School of Marine Science and Engineering
Faculty of Science andTechnology
University of Plymouth

Honours project submitted in partial fulfilment of the
requirements for the degree of
BEng (Hons) in Mechanical Engineering

May 2056

Supervisor Dr F Gordon

APPENDIX E

General Risk Assessment Form: The School of Marine Science and Engineering

Date: **Assessed by:** **Activity/Location**

Work Activities	Hazards	No. at risk	Controls in place at present	L (1 – 2)	M (3 – 4)	H (6 – 9)	Assessed risk			Comment
							Low	Med	High	

SIGNATURE: _____ *(Responsible Person)*

PRINT: _____

SIGNATURE _____ *(Head of School/Dept)*

PRINT: _____

DATE _____

REVIEW DATE _____

Conduct Risk Assessment in conjunction with Code of Practice

Risk Rating Matrix

			Likelihood **(see Table 3)**		
			Unlikely	Likely	Almost Certain
			1	2	3
Severity **(see table 2)**	Major	3	**M**	**H**	**H**
	Moderate	2	**L**	**M**	**H**
	Minor	1	**L**	**L**	**M**

	Priority	Action requirements
L	***Low 1 – 2 rating***	***Risk acceptable without further controls/actions. No need to report***
M	***Moderate 3 – 4 rating***	***Need for further measures to treat this issue. Requires routine monitoring***
H	***High 6 – 9 rating***	***Urgent need to mitigate against adverse consequences, and formal reporting/managed communication***

INFORMATION SHEET NO 1

Guidance on Risk Assessment

Stage 1 – Analysis of Tasks

In order to ensure that all hazards that staff and others might face are identified, it is best to first consider the workplace and all the tasks that are carried out in the organisation. It is necessary to define what is meant by task. A task can be something as simple as changing the wheel on a car or as large and complex as refurbishing a new building. The more complex the task, the more it is necessary to split it into all its component parts so that it will be broken down further into more manageable tasks which can then be individually examined. Each of these tasks is then examined in terms of its activities, use of plant and equipment, use of substances and materials, processes, and the place where it is carried out.

Stage 2 – Hazard Identification

After breaking down a task into its component elements (i.e. activities, plant, materials etc.) the next stage is to identify the hazards involved. It is important not to be side-tracked into identifying things as hazards that are in fact not hazards. This can waste time and result in a failure to address the real issues and to consider proper control measures. For example, failure to wear eye protection when using a grinder is not a hazard, it is the abrasive wheel which is the hazard. Not wearing eye protection is a failure to comply with a control measure and is a factor that will be taken into account when analysing and evaluating risk. Similarly, damage to an electricity extension lead is not a hazard, the hazard is the electricity itself. The damage exposes a hazard and is therefore an unsafe or dangerous condition and again will be taken into account when assessing the risks. By identifying electricity as a hazard, questions can be asked about the appropriateness of electrical tools in the task being assessed, or the possibility of reducing the risk of electrocution at source by providing low voltage tools could be considered. If the damage to the lead is the hazard identified it is likely that the only control measure considered would be to repair the lead and possibly set up a maintenance regime.

By identifying that the substance, machine, method of work has some potential for harm, such as a form of energy, a physical condition or a chemical, physical, psychological or biological property may help to avoid making lists of unsafe conditions.

Stage 3 – People at Risk

When considering who is at risk, it is important to consider not just those directly involved in the activity but also those who may be affected by the activity, for example because they are in the vicinity or have a related task. Individuals within a group may face different levels of risk, depending upon personal qualities such as competence, experience, age, ability, physical condition or pregnancy. The management regulations require employers to specifically consider pregnant workers, new mothers, persons under 18 years of age and those especially at risk. The following is a list of groups and individuals within those groups who may be at risk from hazards.

1. Operators involved in activity and other employers in the workplace could include the following

   Skilled operators, trainees and new workers, young workers, old workers, pregnant workers, workers with a breathing disability, partially sited workers, workers with impaired movement, lone workers, shift workers

2. Maintenance and Cleaning Workers - may be workers shown in category 1 above

3. Contractors – may be workers shown in category 1 above, regular contractors, first time contractors.

4. Visitors to the workplace may be regular, first time

5. Passers by and members of the public may include adults, children, blind persons, disabled persons, persons with prams, those from nearby schools, those from nearby hospitals, trespassers etc.

Stage 4 – Analysing Risk

As explained risk comprises two elements, likelihood and severity. Both of these need to be analysed as part of the risk assessment. The severity of harm is awfulness of the outcome of an accident. i.e. anything from minor injury to death, to one person or to many. The likelihood of harm is estimated frequency of the harm occurring i.e. never to very frequent. The analysis of the factors of severity and likelihood are important to enable a balance of risk against the cost of the measures provided/to be provided.

Severity

Factors affecting severity of risk include the following. Numbers of people that may be affected, level of energy for example voltage pressure heat noise, concentration for example full strength or diluted acid. Toxicity of a substance if the hazard is a substance. A hazard can have varying levels of severity, for example the severity of harm as a result of an electric hazard can vary with the voltage. The severity of harm from a fall can vary with the height fallen.

Likelihood

Factors affecting the likelihood of harm include numbers exposed to hazard, frequency of exposure, length of exposure, types of persons exposed environment and measures provided to control the hazard. Likelihood can be affected by conditions in the workplace, for example a short trailing cable stuck to the floor with people in an office where one person works is unlikely to cause someone to trip, a long unsecured cable across the floor of a busy supermarket is very likely for someone to trip.

Control Measures

It is also important to examine existing control measures as part of the risk assessment as this affects the likelihood of harm occurring. The more effective the measure to protect against a hazard the less likely it is harm will result. Control measures can be divided into two types, safe place and safe personal measures. Safe place measures are engineering or hardware solutions which try to make the workplace, plant, materials, substances as safe as possible. There are various safe place measures which vary in terms of the effectiveness of reducing risks. This varying effectiveness can be ranked to produce a hierarchy of control as follows.

1. Controls which eliminate the hazard

2. Controls which should reduce the hazard at source

3. Controls which should reduce exposure to the hazard by means of physical measures that protect everyone and individuals, these can be further classified into the following hierarchy

    a) Controls which enclose a hazard either fully or partially, example

        i) machine guards
        ii) noise produced in an enclosure around a machine
        iii) insulation on electrical equipment

b) Controls which remove people from the hazard, example a barrier around an excavation, uninsulated high voltage electrical conductors strung at high level pylons, dangerous parts of a machine sited in an inaccessible place

c) Controls which reduce contact with the hazard

   i) a trip device in the machine
   ii) general ventilation

Safe personal measures are usually applied after safe place measures to further reduce any remaining risk. Safe personal controls include

- protective clothing
- instruction
- training
- a defined procedure for the tasks
- permit to work system
- signs
- information

Specific legislation determines the specific control measures in some cases but where there are no specific measures are mentioned, you must be practical.

Stage 5 – Evaluating the Risk

Risk Rating – the factors of severity and likelihood of harm from hazard can each be placed on a scale against numbers or words, in other words assess how likely and how severe the harm resulting from a hazard could be and assign two numbers or words to it. The two factors of severity and likelihood are multiplied together to give a risk rating which may be useful in prioritising action to control the risk.

David Morton
Safety Officer