

Some Notes on Report Writing

Based on grading on the first report on conceptual design, the followings are some notes you need pay attention to in order to make your 2nd and final report more professional.

1. COMPONENTS IN A TECHNICAL REPORT

A formal technical report generally contains the following components:

Cover Page: the cover page includes the following information in general.

- Title of the project/Report
- Logo (if you have one)
- Team name and team number
- Team member's name
- To whom it is submitted
- Date it is written
- Other necessary information

Abstract: An Abstract is a brief summary of a report. It is written for technical readers, and normally appears as a single paragraph. It is worth pointing-out that an abstract is a complete entity in itself: it is not part of the body of your report. Normally the abstract includes the following key elements:

- Succinct problem statement, 1-2 sentences
- What was done
- How it was done
- Significant results (quantified where possible)
- Conclusion, including brief evaluation and/or recommendation

Executive Summary: An executive summary is a brief overview of the report. It is prepared for non-technical readers (such as managers). The readers of it usually are not interested in the technical details, thus generally it is written in plain language. An executive summary is similar to an abstract, but is generally longer. An executive summary generally runs within 2 pages; while an abstract, in most cases, may be just one paragraph.

Table of Contents: contains page numbers of the titles and subtitles of different sections of the report.

Introduction: a brief description of the problem, how it was approached, and what procedure was used to solve it. It provides background information about the report and the project.

Development: describes the details of the project, such as background review, conceptual design, methods, procedures, techniques, analysis, fabrication, and project plan etc.. This section

usually has subsections such as Conceptual Design, Preliminary design, Aerodynamic analysis, Structural analysis etc.

Discussion: a discussion of the findings and other important issues relating to the project.

Conclusion and Suggestions: This section is a brief summary of what the findings were and what the significance of the work is. Suggestions for future work are also included here in some cases.

References: This is a list of the books, reports, papers, Internet sources, and computer software that were used to complete the project and write the report. All references listed must be cited in the report; if no references are cited, don't list any. References are listed in the same order in which they were first cited.

Appendices: Any materials such as method, drawings, intermediate results, etc which is not the primary concern of, but is used in, the project can be put into an appendix. Computer programs developed and used to solve a problem usually go in an appendix unless the purpose of the project is the development of the program itself. Appendices are numbered (or lettered) and are attached to the end of the report in numerical (or alphabetical) order. The order must be the same as the order in which the appendices were first cited in the report. All appendices must be cited by number (or letter) in the text of the report.

Some other optional components in a report include **title page**, **letter of transmittal**, **acknowledgement**, **table of figures and tables** etc.

2. SOME COMMON ISSUES IN 1ST REPORT

- **Cover Page:** some reports have no cover page
- **Format:** some reports take paper format. For such an relatively-large project, it is not appropriate.
- An **Executive Summary and/or an abstract** should be included.
- **Table of Contents** should be included. Pay attention to the format of TOC. For example

Table of Contents

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- Label and caption of figures go to the bottom of the figures. For example

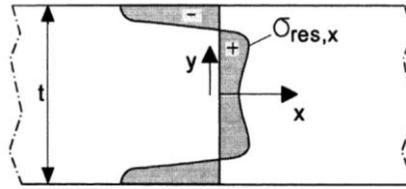


Fig. 4.1 A residual stress distribution is an equilibrium distribution.

- Label and caption of tables are on top of the table, for example.

Table 21.1 Standard Glare grades [8].

| Glare grade | Sub-grade | Metal sheet thickness (mm) and alloy | Prepreg orientation* in each fibre layer** | Main beneficial characteristics |
|-------------|-----------|--------------------------------------|--|-----------------------------------|
| Glare 1 | – | 0.3–0.4 7475-T761 | 0/0 | fatigue, strength, yield stress |
| Glare 2 | Glare 2A | 0.2–0.5 2024-T3 | 0/0 | fatigue, strength |
| | Glare 2B | 0.2–0.5 2024 | 90/90 | fatigue, strength |
| Glare 3 | – | 0.2–0.5 2024 | 0/90 | fatigue, impact |
| Glare 4 | Glare 4A | 0.2–0.5 2024 | 0/90/0 | fatigue strength in 0° direction |
| | Glare 4B | 0.2–0.5 2024 | 90/0/90 | fatigue strength in 90° direction |
| Glare 5 | – | 0.2–0.5 2024 | 0/90/90/0 | impact |
| Glare 6 | Glare 6A | 0.2–0.5 2024 | +45/–45 | shear, off-axis properties |
| | Glare 6B | 0.2–0.5 2024 | –45/+45 | shear, off-axis properties |

*The rolling direction is defined as 0°.

**The number of orientations in this column is equal to the number of prepregs in each fiber layer.

- The reference should be listed in a standard way. Normally for a technical report like this project, it is not adequate just listing web references. Some technical book or papers should be included. Besides, every item in the reference list should be cited in the report.
- Equations appearing in the report should be numbered in series. For example

$$\frac{\Delta E}{R} = 6.81 \times 10^3 (K) \quad (11)$$

3. THE 2nd REPORT

The 2nd report mainly covers the calculation, analysis and detailed design part. It is not necessary to repeat the contents already covered in the 1st report. However, an introduction section is needed for a smooth transition. It should cover at least the following topics

- 1 Introduction
- 2 Aerodynamics Design and Analysis
- 3 Stability and Control Analysis
- 4 Structure Design and Analysis
- 5 Other necessary analysis
- 6 Fabrication Consideration
- 7 Lab Test and Result (if you have)
- 8 Discussion on Design Change (if you have one)
- 9 Project Management and Future work
- 10 Technical drawing package (stand alone or in the appendix)

4. The Final Report

The final report is a comprehensive report covering the whole project. A suggested outline by SAE is shown as below.

Cover Page

Table of Contents

List of Figures and Tables

List of Symbols and Acronyms

1.0 Introduction

- Objective
- Requirement Statement
(*good place to insert a Figure that lists the design requirements*)

2.0 Design Process

2.1 Research

1.1.1 Discussion of Concepts

1.1.2 Discussion of previous design/concepts/publications

1.1.3 Test & Experiment

(Don't be reticent to describe knowledge gained from previous competition entries)

2.2 Design Analysis and Review Process

Discussion of results

2.3 Design Selection Process

Why certain design was selected over others (*vehicle configuration selection*)

(In 2.2 and 2.3, *explain the team's thought processes and engineering philosophy that drove them to their conclusions*)

3.0 Calculations (*equations, Calculation, Charts, and/or Tables*)

3.1 Performance

- *Drag analysis including three-dimensional drag effects*
- *Power plant performance including both static and dynamic thrust,*
- *Performance prediction*

3.2 Stability and Control

Aircraft stability and control

3.3 Aircraft Sizing

Wing plan form design including airfoil selection

3.4 Weight Build-up and Analysis

3.5 Structural Analysis

(In 3.1 through 3.5, *detail the methods, procedures, and where applicable, the calculations used to arrive at the presented solution*)

4.0 Innovations (write only to innovations incorporated in the design – don't create words to fill a section. Leave blank if there is nothing to say. However, the team should be challenged to address all topics in the design)

4.1 Process/methods

4.2 Design

4.3 Application

4.4 Construction

4.5 Use of Computer Aid Design Tools

References

Appendix

I would suggested adding the following topics

- Test and Evaluation
- Discussion and Justification of Design Change
- Discussion on Project Management

You can adjust the order of topics according to your need or you can even create your own outline as long as the main topics are covered.