

GUIDELINES FOR WRITING THE TECHNICAL REPORT FOR THE ASME SOLAR SPLASH PROJECT

THE BASICS

A substantial technical report documenting your design is due from each team participating in the ASME Solar Splash. The report describes the design and the process through which you arrived at the design.

The length of the Main Body of the report should not exceed 20 pages, where additional material may be contained in appendices. Within that page limit describe your work fully and concisely. [Note: a 2 page limit is imposed on the „Current Design & Problem Definition“ section, unless this is an “all new” boat design being reported. This limitation is to focus the report on the work you have done to prepare for this year’s competition – not work done in previous years.]

The four most important jobs that the report must accomplish are (1) to describe the problem statement, (2) to describe the design alternatives, (3) to describe the chosen concept, and (4) to describe the detailed design. Organize the report so that these four appear in order. Do not plunge right into a description of the detailed design without first presenting the big picture of the chosen concept. Do not describe the chosen concept without providing the reader with a clear description of the problem statement.

Certain information is required to be submitted by the teams in the Technical Report. See below under the “Details” section, especially the parts associated with the Cover Sheet and the Required Appendices.

THE AUDIENCE

Write your report as if it were the document you would love to have had when you started out on the project. That is, you are writing to your peers who have some engineering expertise but who are not familiar with the project. Thus, it is extremely important to set the scene with a good description of the problem statement.

FORMAT

Single space with ample (1.00" left and right, 1.00" top and bottom) margins on all sides. Number each page in sequence including those in appendices. Use either indentations (allows more words per page) or a blank line to mark new paragraphs, not both. Make your report visually pleasing, an important part of communicating the information.

HEADINGS

Main headings are larger type size, all caps, and bold. A space is left above and below main headings.

Subheadings

Subheadings are regular size type, first letter caps only, bold, and underlined. A space is left above the subheading but the text starts directly below.

Sub-subheadings. A space is left above sub-subheadings and the text begins on the same line after a period and a space. The sub-subheading is indented, underlined, regular-sized type, and bold.

VISUALS, FIGURES, AND TABLES

As engineers, you have the gift of being able to communicate through visuals as well as through words. Annotated line drawings which describe the problem statement and design concepts can replace many words. Take care in the design of the drawings. If hand-lettered, use guidelines. Make sure they are not cluttered. A good caption is not merely a title, but is descriptive and explains the figure or table. [Note: the caption for a table goes above the table, while the caption for a figure goes below the figure!] All tables and figures must be referred to in the text!

Plots/graphs are a great way to present test data. Please take care in formatting a plot and/or table so it is readable and informative. Use a computer-based package if possible.

SOURCE INFORMATION

If your design reached a point where you use (or recommend) specific components such as motors, bearings or materials, include complete information about the component(s) in an appendix. This means listing the part name, part number, company name and company address.

REPORT ORGANIZATION

Some of the sections are described in more detail below. Feel free to modify to fit your needs.

Cover Page
Executive Summary
Table of Contents

{MAIN BODY -- 20 PAGES MAX.}

Current Design & Problem(s) Definition(s)

- Current design (previous years)
- What the problem(s) is
- Product design specification (design requirements)

Design Concepts

- Alternatives
- Rationale for choice

Design Description

- Detailed description
- Supporting analysis

Design Evaluation

- Prototype construction
- Test procedures
- Test results
- Discussion

Project Management

- Team member organization and responsibilities**
- Project planning and schedule**
- Financial and fund-raising**
- Strategy for team continuity and sustainability**

Conclusions and Recommendations

- Strengths/weaknesses
 - Where we go from here
 - Were goals met
 - Reflection on the design process
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References
Appendices

Please note that the Cover Page, Executive Summary, Table of Contents, References and Appendices do not count in the 20 page limit.

WRITING REFERENCE

The ASME has published a manual for writing technical papers for publication, "MS-4: ASME Paper." Part II of the manual, "Writing a Paper." will provide insight into many formats, techniques, units and other issues which will arise during preparation of your report.

DETAILS ASSOCIATED WITH SPECIFIC SECTIONS OF THE REPORT

COVER PAGE

Should contain:

- Project title**
- Date**
- Team members**
- Project advisor**

We encourage you to be inventive with the front page. Consider including an illustration or a graphic which best defines the project. Experiment with size and style of title. Use your graphic design abilities to create a cover that is both professional and wants to make the reader turn the page. Think about using color in the figure. Be careful; going overboard with graphic design can make your report look silly and amateurish.

EXECUTIVE SUMMARY

Two pages (max.) for the busy executive who will read no further. Your job is to condense all of the design into two pages. Make sure the most important parts of the problem statement, your design and your recommendations are here. Imagine that your report goes to the CEO along with 20 other reports. She has no time to read 21 fifty page reports and will make a decision to fund one of them based on what she sees in the Executive Summary. Probably the most important part of the report you will write. Do it last, but leave yourself plenty of time.

MAIN BODY/PROJECT SECTIONS

The specifics here will depend on your particular report. Take care in organization and always keep the reader aware of the big picture. Convince the reader that a design process was followed. [Note: a 2 page limit is imposed on the „Current Design & Problem Definition“ section, unless reporting an “all new” boat design.]

CONCLUSIONS AND RECOMMENDATIONS

If not done so in the main body, here is where you assess your design, even if it is a paper one. Discuss the strengths and weaknesses of the design. Discuss what's next to do. In addition, this section should contain some reflections on the design process. Were you satisfied with the process? Did you stick to your original plans? How would the team improve the process if assigned to another project?

REFERENCES

Reference citations should have a standard format that engineers can understand. Citations should be in the text and references listed in a section titled "References" that appears at the end of the report but before the appendices. Do not use footnotes for citations. Here are two suggestions for citation style. First you can cite by author name and year (Durfee, 93). For multiple citations, separate by semicolons (Durfee, 93; Mantell, 92). If citing a vendor product sheet or a data book, use the vendor's name in the citation (PML 94). In the reference section, list the citations alphabetically by author's last name. Here are three fanciful examples, one for a journal article, one for a book and one for a vendor data sheet. Journal and magazine names and book titles should be italicized or underlined.

Durfee, W., How to design good, *Journal of Good Engineering Design*, vol 15, pp 30-40, 1993.

Mantell, S., How to Design Great ABC Publishers, Minneapolis MN, 1992.

PMI Electric Motors, Motor Data Sheet 1994.

A second method for citations is to number the references in alphabetical order and cite by number (1). If multiple citations, separate with commas (2, 3). The reference list is then formatted as above but with the numbers added.

(1) Durfee, W., How to design good, *Journal of Good Engineering Design*, vol 15, pp 30-40, 1993.

(2) Mantell, S., How to Design Great ABC Publishers, Minneapolis MN, 1992.

(3) PMI Electric Motors, Motor Data Sheet 1994.

This method is used by many journals, but has the disadvantage of being harder to add references and coordinate with multiple authors while still getting the numbering straight. Other citation formats are possible. Look in books and journal articles for ideas.

APPENDICES

The appendices should include any supporting documentation related to the design that would interrupt the flow of information if included in the main body of the report. Material which appears in appendices may include: parts drawings, assembly drawings, vendor data sheets, calculation results, long equation derivations, software source code and test results. Each appendix is numbered/lettered and appears in the table of contents.

Required Appendices

There should be three “Required Appendices”:

Appendix A: Battery Documentation (see Rule 7.12.21);

Appendix B: Flotation Calculations (see Rule 7.16.2); and

Appendix C: Proof of Insurance (see Rule 2.8).

Each appendix should start with a few sentences describing what the appendix contains, unless it is obvious, such as a vendor data sheet. Avoid appendix inflation when possible. For example, when including data sheets, only include those portions that were relevant to your project. If a data sheet lists many part numbers or part options, be sure to circle the one you selected for your design.

Appendices which list components selected for the design should include at least the following for each part: (1) component name, (2) complete model or part number, (3) price, (4) manufacturer (who makes the part, including name, address and telephone number). Similar information should be documented for services you used (e.g. a professional machine shop) or purchased (e.g. a software package). All appendices should be referred to in the body of the report. If you can't find a place to do this in the report, the material probably is not worth including as an appendix.

PHRASES AND WORDS WHICH SHOULD NOT BE IN YOUR REPORT

Here's a list of favorite words, phrases and punctuation errors that tend to crop up in the work of novice report writers. You can probably add your own. Let's eliminate them from all output.

<u>Phrase to Eliminate</u>	<u>Suggested Replacement</u>
plugged into the equation	placed into the equation
figure out	determine
junk	(eliminate)
figure 2-8	Figure 2-8 (capitalize)
Fig. 2-8	Figure 2-8
appendix 1	Appendix 1 (capitalize)
a lot of	considerable
cheap	inexpensive (or low cost)
assumptions had to be made	assumptions were required
can't	cannot
didn't	did not
to quickly design	to design quickly
The first thing,	First,
a couple of	two
OK	(eliminate)
in order to	to
fairly	very
very	(try dropping)
looked at	considered
fairly good	good
decided upon	determined
in between	between
significantly	(try dropping)

SPELLING

There should be NO spelling errors. One spelling mistake drops your professional credibility down to near zero.

Scoring Criteria for Technical Reports for Solar Splash

The following is the point system the judges will use in scoring your report:

1. Organization	15 points
How well does the report follow the guidelines? Does it contain all of the elements mentioned in the section REPORT ORGANIZATION? Points are deducted in this category for exceeding 20 pages in the main body and/or 2 pages in the Current Design section.	
2. Technical Content	40 points
How technically informative is the report? How well does it detail the design process, analysis, performance and results of testing?	
3. Style	15 points
Includes writing clarity, grammar and spelling.	
4. Graphics	20 points
Quality and professionalism of drawings and graphs.	
Total	<hr/> 90 points