TITLE PAGE

Executive Summary

The executive summary distills the entire report. The executive summary contains a succinct synopsis of the problem definition, the design description and the evaluation.

It can also include a summary of how the client brief was.

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List of figures

Figure 1: For Figure Purposes

Introduction
Provide a brief introduction to the topic you will be covering.

1. Problem definition

This section provides the background and significance of the project, and technical review

1.1 Problem scope

This is a short paragraph describing what the problem is. The problem being addressed is explicitly stated

1.2 Technical Review

This section describes why the problem is important. It is a long section providing background information of the problem. It brings the reader up to speed to the current state of the community which you are working with. Chances are that the reader is not an expert so it needs to be written as if a non-engineer will be reading the report. Even if the reader is an expert, he or she will appreciate a comprehensive review of the situation.
The review has two parts. The first part is a more detailed background to the community and the problem you are addressing. For example, if the project is the development of a medical device, the background would be a tutorial on the medical condition being treated by the device.
The second part of the review describes all of the prior information **relevant to the problem**, which means all of the existing technology and methods relevant to the problem. This can include commercial products, academic journal articles and theses, and patents.
The technical review will have many citations to the source of the information with citations listed in the Reference section.

1.3 Design requirements

In this section, three to five concrete, measureable design requirements which are driving the design are outlined. Only requirements that can be measured or tested are listed. For each requirement, the source and why it is important would be indicated under subheadings, in a numbered list or in a table. A review the Judging criteria might be included here to ensure design requirements align with the expectations of the community, sustainable development, ethics and technical functionality.

2 Design Options

This section outlines all of the different options available to solve the problem.

2.1 Detail of Option 1

This section outlines the details of this design option and explains how the option meets each of the design criteria assessed previously. This format can be replicated for each subsequent option considered.

The member of the community using the design and how they would feel about its use, by-products and cost to operate should be a consideration.

2.2 Detail of Option 2

Repeat for each option.

2.3 Option Selection

This part forms the final step of a design option evaluation, where each option is compared to all of the other options using the design criteria previously identified to undertake the comparison. A table format is often used to present this information, which can then potentially be replicated in the Executive summary. Some example criteria are cost, environmental impact, community opinion and appropriateness of design.

The preferred option would be identified here, together with a justification for any trade -offs between design criteria.

3 Design Description

This section describes the solution to the problem. It describes both what the solution is and how it works. The areas below are potential areas that might be addressed in a report.

3.1 Summary of the Design

This would include a brief summary of the solution, including a description of what it does and how it works, possibly a scenario for its us, and a clear link showing how the design is a solution to the problem. . Overview line drawings are included, if appropriate.

3.2 Detailed Description

This section contains the detailed description of the design solution.This usually starts with a description of the solution and how it works at a high level, then a functional decomposition of the solution. This is design architecture.

3.2.1 Functional Block Diagram

This is a figure which represents the different functions of the design and how they work together. This is not always appropriate for all designs.

3.2.2 Functional Description

Each of these functions is described in its own section . Try to describe how each of these functions works instead of just saying what they are. For example, if one of your functions of your solution is the gripping of a pencil, describe how the linkages work together to perform this task instead of describing the individual hardware pieces. Provide a sub-heading for each of these functions. It is also important to consider the community and environmental aspects at this point and address any concerns identified.

3.2.3 Manufacturing Procedure

This is a step-by-step procedure required to manufacture the design. You've seen these before with a piece of furniture. They are of the "tab A in slot B" variety. This should leave no ambiguity in the way your product is assembled. Photos and drawings are ideal here but could be placed in an appendix.

4 Design Description Supporting Documents

A tangible product requires a manufacturing plan.
The sections below are suggestions of what could be included in the report.

4.1 Manufacturing Plan (Product)

This manufacturing plan details how someone can either make another or start producing the product that has been designed. The plan should be of sufficient detail such that it could be given to to a machinist and to create a finished product.

4.1.1 Manufacturing Overview

This overview describes the different steps which are involved in the production of chosen design. Think of it like the response to the question, “How is the design made?” This is a high-level description of the manufacturing process.

4.1.2 Part Drawings

Drawings of the product should appear in the manufacturing plan. They can be either CAD or hand drawn, but must not leave any part of the design undefined.

4.1.3 Bill of Materials

Provide a bill of materials needed to construct the product. This would be everything the machinist would have to order, aside from tools, to make it

4.2 Discussion

4.2.1 Strengths and Weaknesses

Now that the report has described how and why our design solution works, its strengths and weaknesses should be described. This should be a candid description of the limitations of your design, discussing possible flaws and offering reasonable counterarguments, to that the reader does not draw independent conclusions.

4.2.2 Next Steps

This section discusses how the project will affect the future workings of the community. As a member of the community, how will the results of the design be used?
The community will not have time to do any new design work. The next steps to take so the community can take ownership of the project should be explicitly stated.. A well thought out hand-off plan is critical to the goal of adding value to the community.

5 Evaluation

In this section, the provided solution is verified looping back to the design requirements established in the first section.

5.1 Evaluation Plan

In this section, restate the three to five design requirements established in the first part. Then give an overview of the test plan for evaluating each requirement.

5.2 Evaluation Results

Detail the results of any testing undertaken on the prototype.

6 Evaluation Supporting Documents

6.1 Evaluation Reports

This section contains the research reports that validate the design criteria. Every design criteria listed is explicitly evaluated.

For each report, provide an introduction, method, results, and discussion section. If the same apparatus or method is used to evaluate different criteria, there is no need to re-describe a previous explanation.

In the introduction, describe the design criteria being evaluated.

In the method, describe the way that the design criteria was tested. The apparatus for this testing might be a prototype, computer simulation, physical experiment, or hand analysis. The testing procedure should also be included.

In the results, describe the results of the testing. This should show the analysis equations and a graph or other graphic result.

In the discussion, the results are evaluatedto interpret their quality and their implications. Describe strengths and weaknesses of the experiment. Describe how the results of this evaluation impact the design.

6.2 Cost Analysis

This section will further detail the cost of the design. These are the costs a community would assume for making the product. This cost would be separate from the cost of any prototype that has been made. Consider reasonable costs for materials and production labor. Contrast these costs with any revenue potential or problems resolved. The idea is to give the community an impression of the value added to them by the design. This section should outline any proposed funding sources to assist in making the project viable.

6.3 Regulatory and Safety Considerations

Describe any regulations which apply to the use or production of the product. List any safety concerns for the use or production of the product. Provide recommendations for each of the concerns listed. There are no ‘outlaw’ unregulated products.

References

This section contains a list of the references cited in the report formatted according to the specified requirements.