



MECHANICAL ENGINEERING DESIGN [MEC32]

MUHAMMAD ANAQI BIN SAHARUDDIN	2017253894
MUHAMMAD AIMAN MUHAIMIN BIN ABDULLAH	2017220994
IDLAN AIDID BIN MOHD AIZUDDIN	2017220966
AIN SOFEA BINTI AMRAN	2017253764

CHAPTER 1

INTRODUCTION

1.1 **BACKGROUND**

Grinder is one of the useful equipment when it comes to cutting tools or used for sharpen it. Most of the time we found it been use at the workshop that helps users to shape it or cutting the workpiece. There are many types of grinder such as cylindrical grinder, centreless grinder, internal grinder, surface grinder and tools and cutter grinder [1].

The theme for Faculty of Mechanical Engineering final year project are ‘Prototype of Mini Machine’. Our mini machine called ArianaGrinder which represent that it safe to use and have feminist touch in making it. This machine have the abrasive wheel for grinding and polishing that can produce a nice finishing edge of the workpiece [1]. This machine is one of the portable grinder that easy to handle and light. Most of it is used for small tools and it suitable for used at the kitchen.

The design concept is chosen based on the discussion in between all group members and the help of our supervisor. We analyse the best design through the sketches we have made in phases and to achieve the objective. The sketches were given rough dimension before it constructed in three dimension view using Solidworks 2017 software to give overview for the design.

Before the prototype were constructed, the list of the components and materials have been made to give an overview for the groupmate of what need to be bought and some of it we have to fabricate it. The bill of material were taken to compare the total cost of the project and the exact price of the grinder. Then the material that have been fabricate according to desired measurement and specification to make a good prototype based on the design early.

Finally the model have to go through testing process that conducted to see if the prototype functions as the way it needed to be and does it safe to use the prototype. The list of drawbacks, strengths and recommendation are listed for the future improvements.

1.2 PROBLEM STATEMENT

A sharp knife is safer than a dull knife. A dull knife can slip off food and cut the user. The excessive force needed to make a dull knife cut causes the user to lose control. For example, the knife can break out of the material being cut and cause injury. In a time, we use the whet stone and honing steel to sharpen the knife [5]. Using it requires significant skill and practice because of need the right angle to sharpen it so the knife is sharp. Moreover using this also take out a lot of time to sharpen the knife. As the result, will cause work very slowly. Nowadays, knife also can sharpen by using grinder machine but unfortunately the grinder machine is too big and heavy so it requires a lot of space. Hence, it is hard to use and store.

1.3 OBJECTIVE

The objective of this project is:

- a) To analyse the best design of the grinder to face the problem while using it.
- b) To design a new and innovative type of grinder that can be used to sharpen knife conveniently.
- c) To fabricate the best machine that can sharpen knife in a short period.

1.4 SCOPE

The main scope of the product design is among users who use sharp tools such as housewives, housecooks and chef that are having the same problem of having a blunt knife so they didn't waste their money to buy a new knife. This grinder is safe to use for those first timer user and easy to do maintenance. The study includes basic mechanical equipment such as abrasive belt, motor, bearing and shafts.

1.5 METHODOLOGY

The research is by doing online survey is the easiest way to do the research. There were equally 57 participants that are response to the online survey. Most of the responder gave a feedback about the problem of the blunt knife in their daily basis. Other than that, the team members also have interviewed 5 different restaurants and ask about the problem that being faced to the blunt knife. The figure 1.1 shows the flow chart of the grinder process

2.1.2 Description and estimation of market size

Our final project is to produce mini machine that apply mechanical element in it and make it useful for the user. The prototype is called ArianaGrinder which is the portable grinding machine that can sharpen variety of small tools. This machine consider the torque of the machine that suitable for the tools, the stabilization of the grinder to overcome the vibration while use it and how fast can it be to grind the tools without ruin it. This project consider the electrical element as the energy supply that convert electrical energy to kinetic energy.

Based on the stated above, the main purpose of the mini machine is to ease the job by make the simple machine that can sharpen tools. The machine can be stored and not taking a huge space for it, we make it simple so that the user can easily perform the maintenance work so that it last long more than the expected lifetime if it. Thus, we make it stable so that it is easy to handle and feel safe for using it.

Based on the benefits of the grinder, the target of our market is mostly within Malaysian including Borneo peninsular that did not expose with this mini grinder. This product will boost the buyer value and enhance a better quality of our tools.

8.2 WEAKNESS

Although that the project runs very well, the project members spotted some minor weakness that could be improved for the future. For example, the selection of material for the product. For team members, to get a good material required a lot of money. Because of that, there are limitation on what we can achieve in this project. Other than that, the experience of team members in innovation of the product. Most of member in the team have a small experience in creating a product, because of that team members need to learn everything step by step to get a solution on every difficulty that comes through this project. Many experimenting is done to make this project run smoothly without any problems and because of that time management for every person in the group is not according to original plan.

Other than that, in this project team member constantly change the idea from a original idea when facing the a problem. The changes of plan make this project difficult because time was being waste for thing that been made from the original plan. Lastly, the project members encountered a lot of distractions along completing the project such as another group project, tests, assignment, quizzes and many more that come not only from this specific subject but many more subject. Thus, there is not much time for improvement that we could do to make the project better than it is now and some may not meet our initial expectation. The project may not be seemed too perfect, but overall getting the function and messages being delivered are the main point in undergoing the project.