# UNIVERSITI TEKNOLOGI MARA

# DESIGN, ANALYSIS AND FABRICATION OF AN ELECTRIC KNIFE SHARPENER

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# CHAPTER ONE
# INTRODUCTION

## 1.1 Background of Study

The knife sharpener is a sharpening tool used to sharpen the cutting edge of a dull knife so that it can become operational once again. It is often made of whetstone and the knife will grind against the whetstone at a certain angle. The steeper the angle, the sharper the knife will be. Different knives have different angles at which they need to be grinded against the whetstone to be sharpened. This automatic knife sharpener is a device that will automatically sharpen the dull edges of the blade. This device can sharpen any knife regardless of the size and it is usually heavy to carry around. This item is the best choice if dull blades were a major trouble during cooking and can also be beneficial to a restaurant kitchen to have one. Due to the weight of the device, it is recommended to put it in the middle of the kitchen where it is easy to reach. This device can also help to avoid any injury that may occur when sharpening the blade since it is a very dangerous process if not handled carefully.

## 1.2 Problem Statement

Knife sharpening is by no means a simple task. Careless mistakes during the sharpening process could lead to serious injuries and resulting in the knife to be broken beyond repairable condition. An electric knife sharpener can help to reduce time spent on sharpening the knife, but an automatic knife sharpener will automatically sharpen the knife once it is being fed a dull bladed knife. This feature allows for better allocation of time during work so that the work in the kitchen could be completed with much more efficiency be it at work or home. Handling a dull knife could become dangerous as more force needed to be applied to the knife for it to cut through the ingredients. As a result, the knife or ingredients are more prone to slide during the cutting process thus increasing the risk of injuries. There are cases where a knife pierces through the hand due to the blade being dull. Amputation of several fingers is also possible when handling

a dull blade since there is a strong force being pressed upon the knife for it to cut through the ingredients.

## 1.3 Objectives

The main objectives of this project are:

a) To design and analyze electrical knife sharpener that can help reduce the time taken to sharpen the knife and all the while reducing the risk of injury while sharpening the knife.
b) To fabricate an electrical knife sharpener that has been designed using SolidWorks.

## 1.4 Scope of Study

The scope of study for this project are:

a) This device is limited to knives with blades of 21 cm or lower.
b) Suited only to household and small restaurant kitchen.
c) Limited to sharpening 1 knife at a time but can be used multiple times.
d) Not suitable with any other types of knives such as cleaver or machete.

## 1.5 Significance of Study

The significance of this study from this project are most significant to housewives or househusbands who spend most of the time in their daily routine to prepare foods for the family thrice or four times a day. With this invention, frequent knives use won't become a hindrance since the knife can be easily resharpened without taking a lot of time which can delay a meal's preparation if done manually because sharpening a dull blade took a long time to complete.

This project can also be used in restaurants when there is a shortage of cooks to do maintenance on the knives. This device can help to sharpen some knives whilst other job is being done to finish the food for the customer. Since this device require less

human attention, the chefs can focus on chopping the ingredients for meals using other knives while the other knives are being sharpened which in turn can save a lot of time and improve the efficiency of the kitchen to dish out meals during peak hour which usually during lunch and dinner.

Besides being beneficial to a certain person and industry, this device can also contribute to the welfare of a society by simply reducing the risk of working with dull blades of a knife. A dull knife tends to cause injuries to the person who handles them such as lacerations and the loss of fingers. A sharp knife can help to reduce the knife relating incident when working with them since the user will be more gentle and less forceful when using sharp knife compared to dull knife which in turn can help to reduce injury cases admitted to the hospital allowing other more urgent cases to be taken care of faster.

# CHAPTER FIVE
# CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

In conclusion, this final year project has achieved the objectives which are to design, analyze and fabricate a simple electrical knife sharpener. The Electrical Knife Sharpener can help to significantly reduce the risk of injury whilst also speeds up the process of sharpening the knife which can save time when preparing food to cook. The electrical component used in sharpening the knife also allows a less skilled operator to operate the machine safely and comfortably. The Electrical Knife Sharpener can be used anywhere be it a professional kitchen or household kitchen since it is portable and does not need a power socket to operate because it uses it battery to operate itself.

## 5.2 Recommendations

To improve the prototype, these are the recommendations:

- Add a clamping system to remove human assistance and secure the knife in the place for sharpening process.
- Replace some part of the thin metal wall with thin transparent acrylic so that the user can see when the blade is sharpened.
- Add another slit at the back of the body so that the other side of the knife can also be sharpened.
- Use higher torque motor to provide more power so that the belt can operate at higher speed.