



اَوْبُوْرَسِيْتِي تِيْكُوْلُوْجِي مَارَا  
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**DIPLOMA IN MECHANICAL ENGINEERING (EM 110)**

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**REPORT OF FINAL YEAR PROJECT**

**PEDAL OPERATED HACKSAW**

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## **1.0 INTRODUCTION**

### **1.1 OVERVIEW OF THE PROJECT**

This project is named Pedal Operated Hacksaw. As the name indicates, this product operates hacksaw by using pedal. The working mechanism of this project includes the pedal, chain and sprockets. The project's criteria requires students to come up with several concept design of the title chosen based on the morphological chart and finalize the choices made to produce the best product design. Furthermore, Pugh chart analysis is needed to help in decision making by choosing the design with the highest net score.

### **1.2 DESIGN OBJECTIVE**

The objective of building the Pedal Operated Hacksaw are to **reduce work needed to cut materials, reduce the work time, increase cutting accuracy and maintain fitness while working.**

The first objective is to reduce work needed to cut materials. Based on research, it is found that legs are in fact stronger than arms. This is because physically legs are bigger than arms. They also have the biggest bones and carry the most muscle which in turn can support more load than arms. With the creation of a pedal operated hacksaw, by using legs to operate the machine, the machine can take advantage of the extra strength to convert rotational motion to linear motion. By using legs to operate the hacksaw, the operator will need less force to cut material at the same pace as a normal hand operated hacksaw thus reducing the work needed to cut materials.

Next, reducing work time. By reducing the work needed to cut materials, the work time will also decrease. By using pedal operated hacksaw, the operator can easily increase the cutting speed by increasing the input force on the pedal. In addition, the cutting speed of a pedal operated hacksaw can beat a hand operated hacksaw easily. This is because an average human can only produce little force when using a hand hacksaw while a pedal operated compared to a pedal operated hacksaw.

The third objective is to increase cutting accuracy. When using a hand operated hacksaw it is hard to apply even force when cutting materials for a long period of time.

This is due to fatigue after working for so long thus, decreasing the cutting accuracy. The pedal operated hacksaw can counter this because it require just a little force to operate it. Not only that, by using legs to operate the machine, the operator can work a lot longer due to the legs being stronger than arms. Not only does the machine takes less effort to work, it also provide comfort to the operator because the operator is able to sit while cutting materials which will make it easier for the operator to apply even input force on the pedal.

The last objective is to maintain fitness while working. The pedal operated hacksaw has the same concept as a bicycle which focus on training the core of the body. In this era, it is hard to find the time to get enough exercise due to time spent at work. Using this machine will help those who use it to lose fat at the same time getting work done.

### **1.3 SCOPE OF THE PROJECT**

#### **Project Name**

The name of this project is Pedal Operated Hacksaw. Pedal Operated Hacksaw is a prototype of a machine that only uses mechanical gadgetry and avoids electric power. Despite the size of this product, it helps to ease the cutting of materials, helps in transmitting higher force to cut with lesser efforts, reducing working time and increase the accuracy of cutting. This Pedal Operated Hacksaw can help users who need to operate the normal saw on daily basis.

#### **Project Scope Statement**

The Pedal Operated Hacksaw also has its own limitations. Considering the height of the vice, there is a limit of size of objects that can be cut through. For example, a cylinder object with a diameter of 1 meter will not be able to be placed under the vice. Next, by the size of the frame of the pedal operated hacksaw, it is safe to assume that the product is somewhat portable. It can be easily moved but is not practical to be moved every time just like a table. It is more practical to have a fixed place to set up the product.