UNIVERSITI TEKNOLOGI MARA

MINI AGRICULTURE SHOVEL

WITH CUTTER

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ABSTRACT

The project will help people to spend less on agriculture tools as this mini agriculture shovel with cutter is a multipurpose tool and it will not be a problem to store as the product is compact and portable. The objectives of the project are to design a mini agriculture shovel with cutter and to analyze the mechanical systems involve in the product. The product was designed firstly with a concept design sketch and later on proceeded to be finalized using SolidWorks software. After researching on how to fabricate the finalized design, the material of the product was then chosen as well as the price of raw materials were surveyed. Then, the product was fabricated using grinding, drilling, hammering and other machining techniques. The fabricated working prototype was able to do two task which are shovelling work and cutting work. After a few testing of its functions, the product has its advantages as well as disadvantages. The advantages of the product is that it is a multipurpose product, user friendly and cost saving. Meanwhile, the disadvantages are it requires force to do cutting work and its only able to do light shovelling work. The design of the product plays a big role for the mechanical systems of the product to work properly. This is why there are optimum parameters that needed to be considered when designing the product. After considering all the parameters, the product was fabricated and it achieved the objectives of the project. Some improvement can be applied to the design of the product to increase the quality such as make the shaft cylindrical instead of flat and add spring to the design of the product.

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TABLE OF CONTENTS

CHAPTER TWO
LITERATURE REVIEW

2.1 Shovel

According to Cambridge Dictionary [1], shovel is a hand tool that is used for lifting and transferring loose materials such as soil, coal, sand or small items that resemble sand, such as cement sand. The shovel is a basic tool that have evolved over hundreds of years of use in a variety of applications. When prehistoric humans transitioned from gathering wild foodstuffs to growing plants, they most likely began with a digging staff, which they later flattened to improve performance. Sheathing the shovel in iron boosted its longevity, and it eventually evolved into the tool we know today.

A shovel blade is now manufactured using two primary ways. The first stamps blanks from a flat sheet of steel. The blank is then pressed into the shape of a shovel blade through a series of stamping procedures. The blade can be forged from a bar in the second way. After the bar steel has been displaced over dies, the rolling process can be used to obtain thickness at wear and strain areas and thinness where excess weight is undesirable.

The shovel is a hand tool with three parts, a large blade at the tip, wood in the middle and a holder at the other hand. The overall length of the shovel which includes the blade, shaft and handle should be about elbow height when it is put on the ground. Shovel blades are often composed of sheet steel or hard polymers and they are quite durable. Shovel rods are typically composed of glass reinforced polymers (glass fibres) or wood (particular varieties such as ash or maple). Today, we know that numerous shovels have been constructed in various forms and that numerous spades have been constructed in various shapes. Blades are one of the changes that have been made to the shovel front. Figure 2.1 shows a mini basic design of a shovel.