UNIVERSITI TEKNOLOGI MARA

DESIGN AND FABRICATION OF AN AUTOMATED LED BULB REPLACEMENT DEVICE

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ABSTRACT

The goal of this project is to make changing burned-out or broken lightbulbs easier for users. The high location of the lightbulb is the issue and changing it will need the use of a ladder. The aims to develop an automated LED bulb replacement system that saves time on bulb changes while still offering a safe environment for users. The project's methodology includes concept generation, which involves gathering the necessary requirements, concept generation which entails evaluating the concept's goals to add some improvement, careful material selection, prototyping thorough testing, adherence to safety regulations and using SolidWorks for product design. One of the anticipated results is an adjustable lightbulb replacement gadget that is safe to use and adaptable to different home settings. This project is significant because it has the potential to improve efficiency, safety, and convenience in daily life, which will benefit the household.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

The component of a traditional LED is a semiconductor, which is what is known as "solid-state lighting" technology, or SSL. To put it simply, an LED generates visible light when an electrical current flows through a microchip that illuminates the tiny light sources known as LEDs. [1]. High power LEDs are very effective and bright when used as lighting sources. LED lighting is one of the newest trends in the lighting business because of the introduction of LEDs as lighting devices. [2].

Almost everyone will have changed a lightbulb at some point in their lives. Even though changing a lightbulb can be a short procedure, it's crucial to know how to recognize potential risks and take precautions against them.[3]. Sometimes, light fixtures are placed in high or awkward positions, and it is challenging to reach the bulb safely. Removing an old bulb can sometimes be tricky, especially if it's been screwed in tightly or if the glass has shattered, leaving sharp edges. Then, interference from other fixtures or objects such as nearby objects or fixtures can obstruct access to the light bulb, requiring extra effort or creative solutions to reach and replace it.

The current solution for this issue involves using suitable tools, such as utilizing a stable ladder, to reach high or difficult-to-access light fixtures safely. But incorrect ladder usage or negligence while using the ladder can lead to accidents and injuries, especially if safety precautions are not followed Ensure to turn off the power supply to the light before starting the process of changing the bulb to reduce the risk of electrical injury. Then, people can wear gloves for their safety, protecting their hands from glass shards if the old bulb breaks while being removed, and survey the area, checking the surrounding area of the light fixture to ensure there are no obstacles blocking access, and if there are any, considering relocating or lifting those objects.

Several limitations had been determined during few observations attended and to overcome those problems, this study of enhancement of a new design and fabrication of an automated led bulb replacement device had been conducted comprehensively to come out with solutions that would improve the current problem.