UNIVERSITI TEKNOLOGI MARA

MINI LATHE MACHINE

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ABSTRACT

Lathe machines are a common machine found in various workshops. There are a few different types of lathe machine such as CNC lathe machine, engine lathe machine, and bench lathe machine. Multiple operation can be performed using them such as cutting and turning. Lathe machines are made up of three general parts and they are headstock, tailstock, and the bed. One problem for this project is the bed of the mini lathe machine. The bed is a critical component that holds the headstock and the tailstock. To avoid the machine shifting excessively, the bed must be sufficiently heavy to stabilize the entire structure of the machine. The workpiece that will be machined will be limited to wood. Wood is much softer and less dense than other metals making it easier to shape. However, this also introduces a new problem which is the waste product that is produced. There are two objectives for the project. The first is to design a prototype of a mini lathe machine using Solidworks. The second objective is to fabricate a mini lathe machine based on the design prototype. The engineering analysis will reveal the area with the highest stress and the factor of safety. Detail design drawing will also be included to give a clearer picture of the machine.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Lathe machines are a vital tool that is found in many workshops. It rotates a workpiece along an axis of rotation to carry out various applications such as cutting, grinding, knurling, drilling, facing, and turning[1]. One type of lathe machine that is in demand is the bench lathe. This is because it is compact, versatile, and easy to use. Its ease of use is also why it is most used for education and training purposes.

There are generally two types of uses for lathe machines that fall under industrial uses and artisanal uses. Industrial uses may produce small parts for a vehicle or components for a building on a bigger scale. On the other hand, an artisan will work metal, wood, and plastic to create furniture such as tables and chairs[2].

There are three main components to the lathe machine: headstock, tailstock, and bed. The headstock is a crucial piece of the lathe machine as it holds the main spindle, gears and motor. It also holds and rotates the workpiece. The tailstock is at the other end of the lathe machine. It can be used to hold taper taps to make threads. It can also be used to provide support for the workpiece. The bed holds the important parts such as the headstock and the tailstock. It must be secure and sturdy to prevent any shifts during the process[1, 3].

1.2 Problem Statement

To give a visual representation of this machine is that it will be a miniature bench lathe machine. This introduces a problem to the bed of the bench lathe. The bed is a critical component that holds the headstock which will hold and rotate the workpiece, and the tailstock which will stabilize the workpiece. To avoid the machine shifting excessively, the bed must be sufficiently heavy to stabilize the entire structure of the machine[1].

Due to the size of the motor, the workpiece that will be machined will be limited to wood. Wood is much softer and less dense than other metals making it easier to shape.