

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND FABRICATION OF
HYDRAULIC PIPE BENDING
MACHINE**

MOHAMAD ASYRAF BIN ZAINAL

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ABSTRACT

Hydraulic pipe bending machines are used to bend pipes that are made of iron or steel. Standard pipe benders are typically installed in a single location, limiting people's ability to bend a pipe at a specific location, and portable pipe benders are extremely expensive. Due to the difficulties in this situation, the objectives of this project are to create a portable hydraulic pipe bending machine that is both functional and affordable. This project outlined how to design each detail of the pipe bending machine, including the final comprehensive design, the cost of the material, calculations, production specifics, and how to fabricate a hydraulic pipe bending machine that is easy to use for everyone. The results expected from this project are a functionable hydraulic pipe bending machine that can withstand forces that applied to bend the pipe especially for mild steel pipe type with 21 diameter size. A hydraulic jack is required as the main component of the machine that will bend the pipe. In conclusion, this affordable and easily handled pipe bending machine will benefit the user that uses it, especially the people that work in bending pipes.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Piping work is usually done by someone who works with pipes or someone who likes to build things using pipes. It is important to ensure the best and most comfortable way for them to do the work. It is obviously very difficult for them when working with a fixed pipe bender. The time has come to abandon those fixed pipe bending machines. In this project, the pipe bending machine that will be created will be portable. It is very useful and affordable for those who want to use this pipe bending machine because it is easy to handle and has low price tag. In order to use this machine, the pipe that we want to bend will be placed on top of the hydraulic jack. When the hydraulic jack pushes the pipe upward, two ball bearings will be used to hold the pipe in position. Because of the force of the hydraulic jack, the pipe will be bent. The hydraulic pipe bending machine is built with a mechanical engineering concept of strength, which is to calculate the load that this machine can sustain while bending the pipe, and a fluid power concept, where a hydraulic jack will be used in this machine as a force to bend the pipe.

1.2 Problem Statement

Pipe bending machines are becoming increasingly common in today's technologically advanced world. However, most of the pipe bending machines available now are typically installed in a single location, where most of them will always be attached to a workshop table. When using this fixed pipe bender, people can only bend a pipe in a specific location. Other than that, the portable forms of pipe benders that are available to buy in stores these days or online are typically very expensive. In order to solve all these problems, the design of the pipe bending machine and the material that will be used in making it must be emphasized. So, the best design of the pipe bender will be in a portable form where it is easy to be used anywhere and anytime. Additionally, inexpensive and reliable materials will be used to build