

**UNIVERSITI TEKNOLOGI MARA**

**DESIGN, ANALYSIS AND  
FABRICATION MINI SANDER  
BELT MACHINE**

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## **ABSTRACT**

A machine is equipment that is created to make work easier. It is a tool that amplified the effect of human effort. Currently, there are a lot of available machines in the market which comes in every size and prize. The problem with machines nowadays is it expensive and hard to get the mini size. Thus, this project was carried out with the objective of designing and fabricating a mini electrical sander belt. The machine will go through a design process using SOLIDWORKS and fabricated using drilling, cutting, and grinding process. The materials that will be used are aluminum. The possible outcome should be by turning on the switch, the sander belt will start operating and can be used for the grinding process of the small item like shaping the knife and reshaping the drill bit. It is concluded the expected mini machine will be a lot more useful for small projects and affordable for most users.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of Study

Sanders are essential tools used in various industries, including woodworking, metalworking, and automotive, to achieve smooth and polished surfaces. One sander that has gained popularity is the belt sander machine. Belt sanders utilize continuous abrasive belts to remove material quickly and efficiently from the work piece [1].

The belt sander machine consists of a motorized drive unit that powers the abrasive belt, a flat working table, and a tensioning mechanism to keep the belt taut. The abrasive belt moves in a continuous loop over the table, allowing the user to manipulate the workpiece against the abrasive surface. The size and grit of the belt can be customized to suit different material removal requirements.

The primary objective of using a belt sander is to achieve rapid material removal while maintaining a smooth and uniform surface finish. These machines are widely used for tasks such as levelling surfaces, removing paint or varnish, and shaping or finishing wood and metal.

Over the years, advancements in belt sander technology have led to the development of more powerful and efficient machines. Innovations include features like variable speed control, dust collection systems, and ergonomic designs to improve user comfort and productivity [2]. Furthermore, the availability of different abrasive materials, such as aluminium oxide, silicon carbide, and zirconia, has expanded the capabilities of belt sanders.

The study aims to explore the performance characteristics and applications of belt sander machines in different industries. It will investigate factors such as belt grit, speed, and pressure that affect material removal rate and surface quality. Additionally, the research will analyze the influence of different work piece materials and shapes on