Belt Sander Machine Project Report

BELT SANDER MACHINE

A technical report on the working and design of a belt sander machine with electric foot pedal control.

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Abstract

This project report presents the design and construction of a belt sander machine, incorporating an electric foot pedal for hands-free operation.

The primary goal of this project was to build an efficient, cost-effective, and functional prototype suitable for

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light workshop tasks.

The machine uses a DC motor and belt mechanism to achieve sanding, with electronic control enabled through a foot pedal.

Introduction

A belt sander is a tool used for shaping and finishing wood and other materials.

It consists of an electric motor that turns a pair of drums on which a continuous loop of sandpaper is mounted.

This report outlines the objectives, components, and mechanisms involved in creating a working model of such a machine.

Literature Review

Previous developments in sanding machines include handheld devices and industrial belt sanders.

The incorporation of foot pedals has been largely limited to high-end models.

This project takes inspiration from both DIY and industrial designs to develop a hybrid solution.

Problem Definition and Requirement Analysis

The key problem addressed is the manual handling of materials while switching the machine on/off.

By using a foot pedal, we allow continuous control without interrupting handwork.

Requirements included durability, ease of maintenance, cost-efficiency, and safety.

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Design and Implementation

The machine consists of a metallic frame, belt drive, motor, and wooden work platform.

The electric foot pedal is connected in series with the power supply to the motor, acting as a switch.

Components include:

- Frame (iron square rod)

- DC motor (12V)

- Pulley and sanding belt

- Foot pedal (toggle mechanism)

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Figure 1

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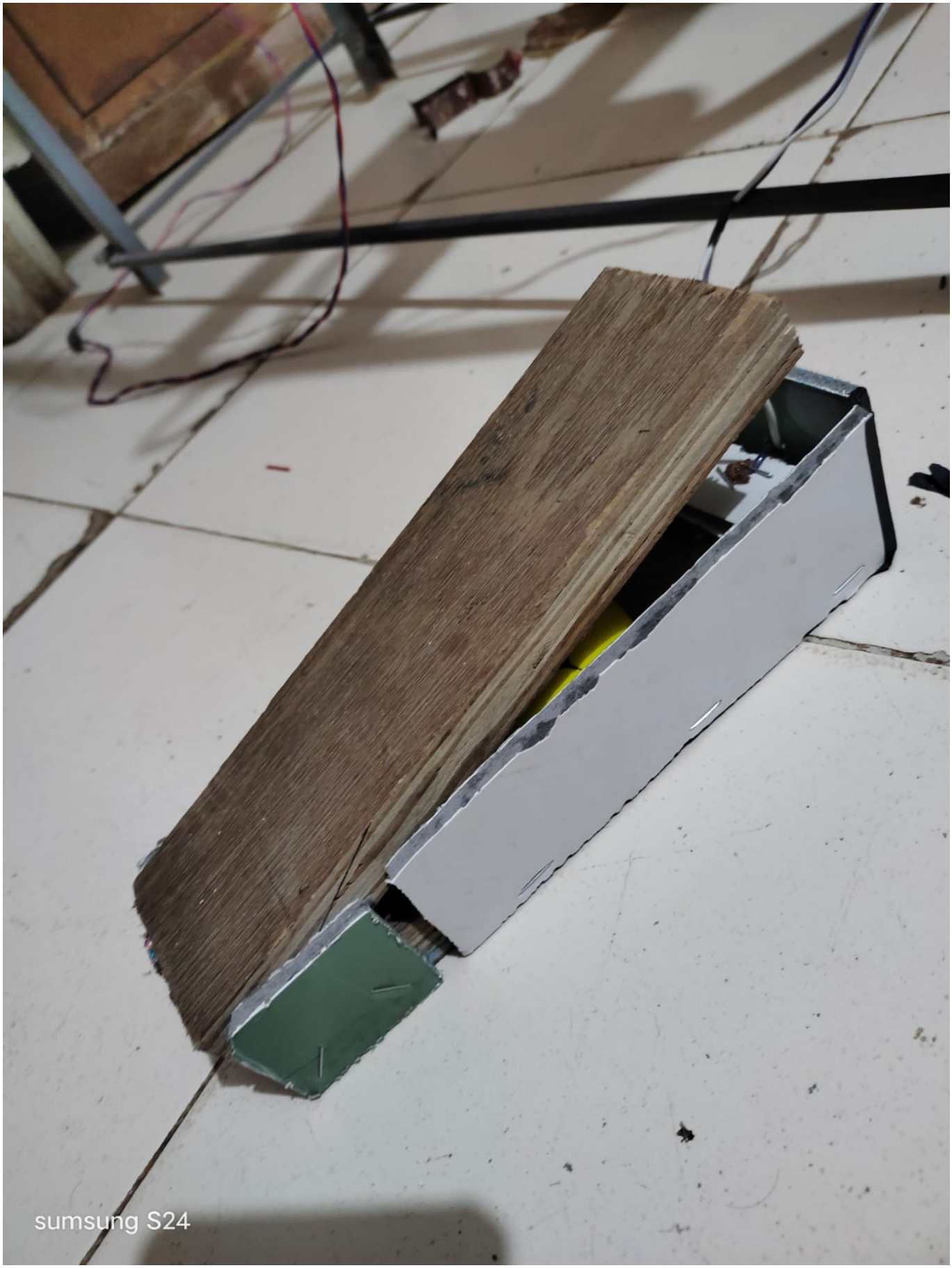

Figure 2

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Results and Discussion

The prototype was successfully constructed and demonstrated effective sanding operations.

Using the foot pedal, the operator can start and stop the motor with ease, enhancing safety and precision.

The sanding output was consistent across different wood surfaces.

Conclusion and Future Work

This project achieved a basic yet functional belt sander with foot control.

Future improvements may include speed control, dust collection units, and enhanced safety guards.

The integration of microcontroller-based automation could further refine the model.

REFERENCES

1. Mechanical Design of Machine Elements - U.C. Jindal

2. DIY Belt Sander Projects, Hackaday.io

3. Electrical Pedal Control Circuits - Basic Electronics Handbook