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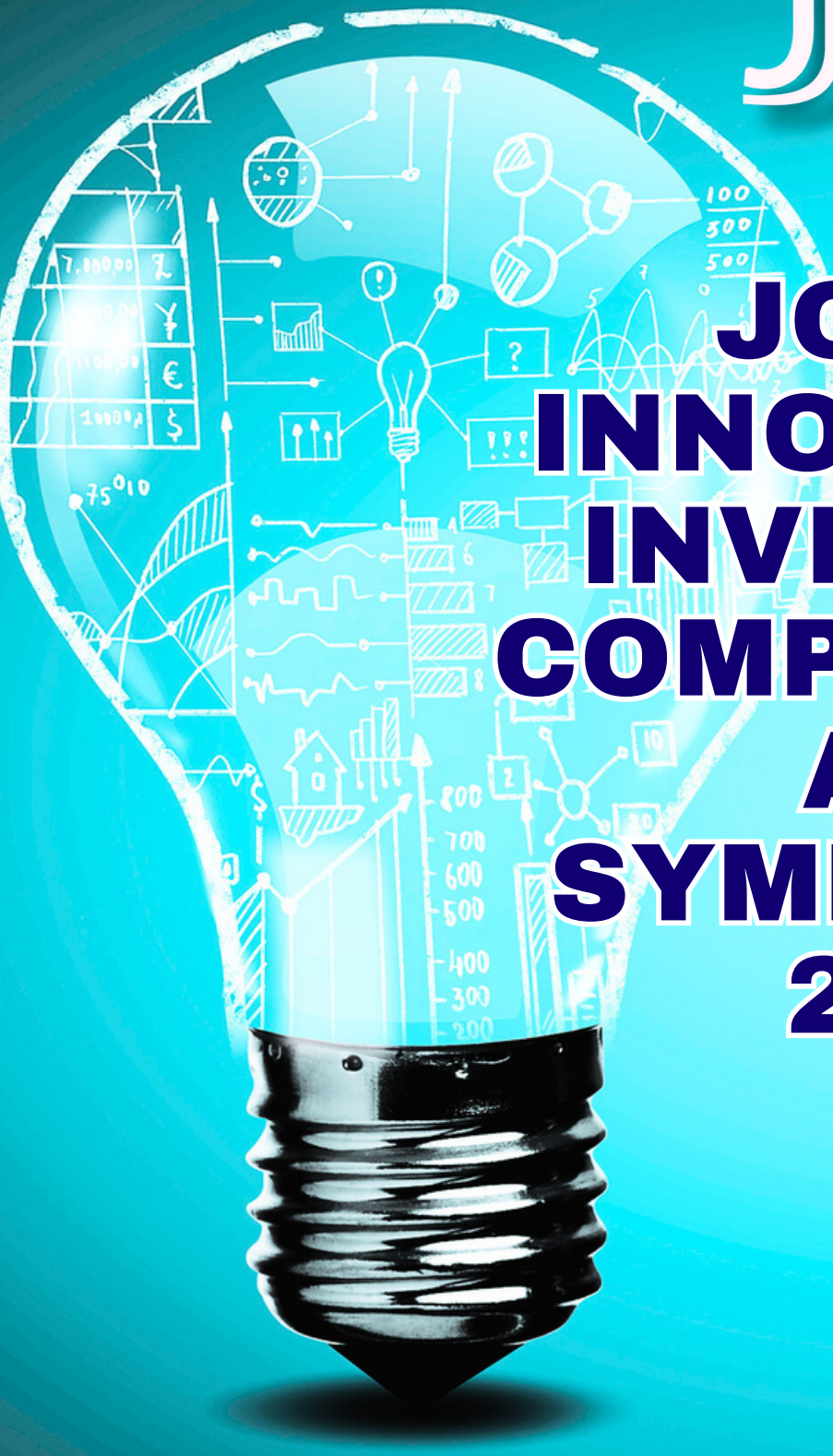

JOHOR INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2023

" Innovation Inspires a Society to be Critical and Creative"

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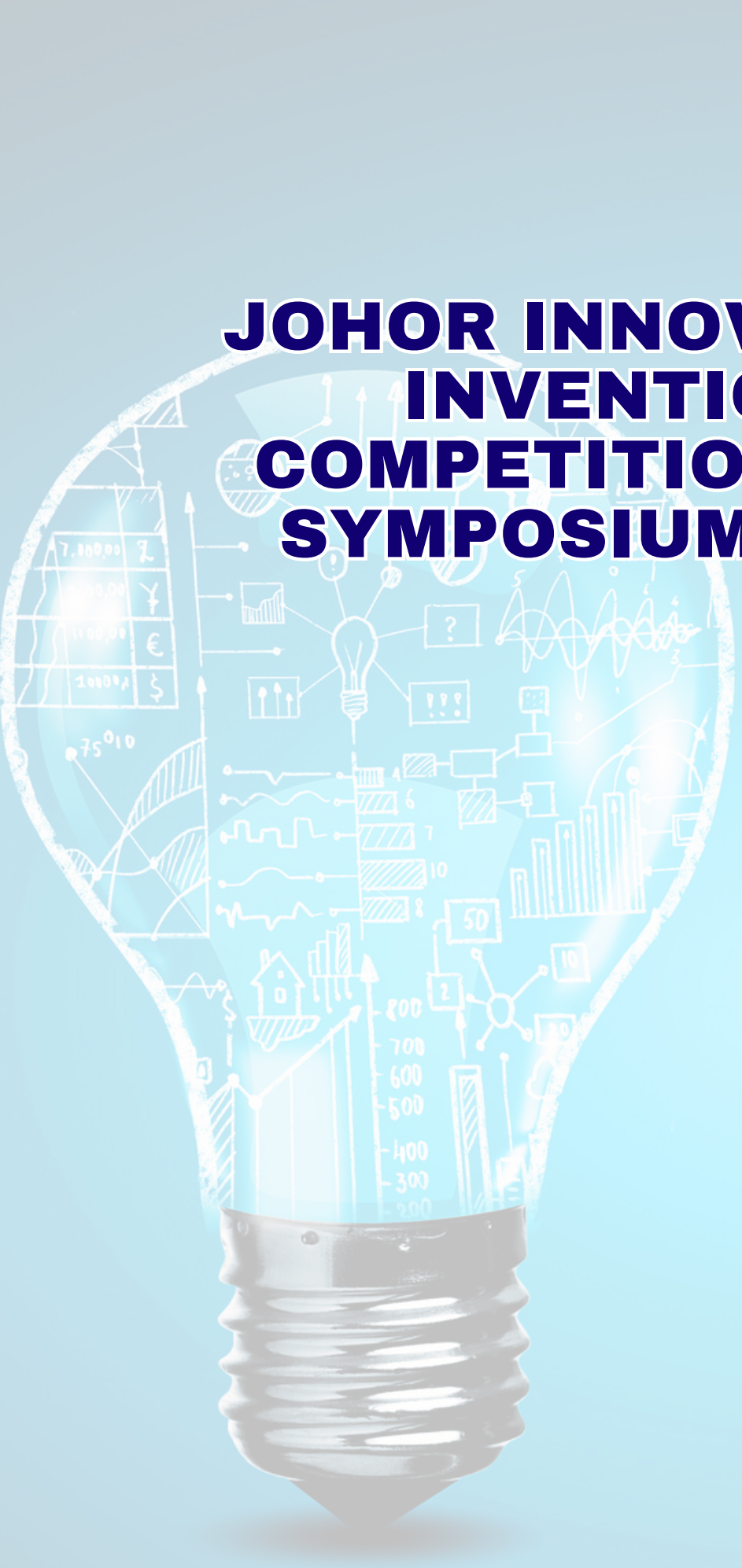

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Editors-in-Chief

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Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor Innovation Invention Competition and Symposium 2023 (JIICaS2023), where JIICaS2023 is a virtual platform for all creative minds to share and present their invention and innovation. The extended abstracts are divided into two categories, which are Category A (Higher Educational Student/ Any Recognized Institutional Students in Malaysia) and Category B (Primary/ Secondary School Students / Special Education School Students in Johor). Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students from both categories and get some ideas to develop future innovation products.

A107

TABLETOP BELT SANDER MACHINE

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ABSTRACT

Carpentry activities often necessitate the use of a belt sander machine to expedite the shaping and finishing of products. However, conventional belt sander machines' high cost proves impractical for smaller-scale projects, creating a barrier to accessibility. To address this issue, the project's objective is to develop a tabletop belt sander machine, tailored for finishing on a smaller scale.

The innovation involves integrating a disc sander machine with the belt sander, resulting in a versatile single tool that combines two essential processes. The machine's frame, constructed from mild steel, houses a dual shaft 12 V motor, enabling it to function as both a belt and disc sander. Moreover, equipped with a speed controller, users can conveniently adjust the belt and disc rotation speeds to meet specific requirements. The tabletop belt sander machine is affordable for users with smaller carpentry projects, providing a practical alternative to costly and oversized equipment. The compact design ensures efficient space utilization while maintaining a reasonable operating speed suitable for diverse tasks.

In conclusion, the potential impact of this innovation extends to enhancing accessibility and productivity in the carpentry industry, offering a cost-efficient and practical solution for shaping and finishing wood and materials on a smaller scale. The compact, versatile, and budget-friendly nature of this machine opens new opportunities for diverse woodworking projects.

Keywords: Belt sander, Disc Sander, Small-scale, Carpentry.

1.0 INTRODUCTION

Tabletop belt sander machines are commonly used in woodworking and metalworking industries for sanding, smoothing, and shaping various materials. These machines are valued for their efficiency in removing stock material quickly and achieving a smooth finish. However, the performance and usability of tabletop belt sanders can vary significantly across different models and brands. This variation often leads to challenges for users, including inconsistent sanding results, difficulty in maintaining accurate angles and dimensions, and concerns about safety. Moreover, as technology advances and user expectations evolve, there is a growing need to address these issues and design tabletop belt sander machines that are more precise, user-friendly, and efficient.

The existing tabletop belt sander machines in the market exhibit several limitations and deficiencies that hinder their overall effectiveness. These issues include inconsistent sanding results, difficulties in achieving precise angles and dimensions, and safety concerns due to inadequate safety features. Additionally, many of these machines may not incorporate the latest technological advancements, such as automated controls and dust collection systems, which can improve both the quality of work and the user experience. Therefore, there is a pressing need to conduct a comprehensive study and research effort to identify the key

challenges and areas for improvement in tabletop belt sander machines. By addressing these issues, we aim to develop innovative solutions and design improvements that will enhance the performance, accuracy, and safety of these machines, ultimately benefiting users in woodworking, metalworking, and related industries.

2.0 OBJECTIVE

The primary goals of this project include designing a cost-effective mini belt sander machine for small tools and creating a versatile machine capable of both sanding and finishing processes, resulting in a smooth surface.

3.0 DESCRIPTION OF INNOVATION/METHODOLOGY

A functional tabletop belt sander machine had been successfully constructed from mild steel and equipped with belt and disc sander for an efficient woodworking process. Figure 1 shows the photo of the fabricated product and Table 1 summarizes the final product specifications.

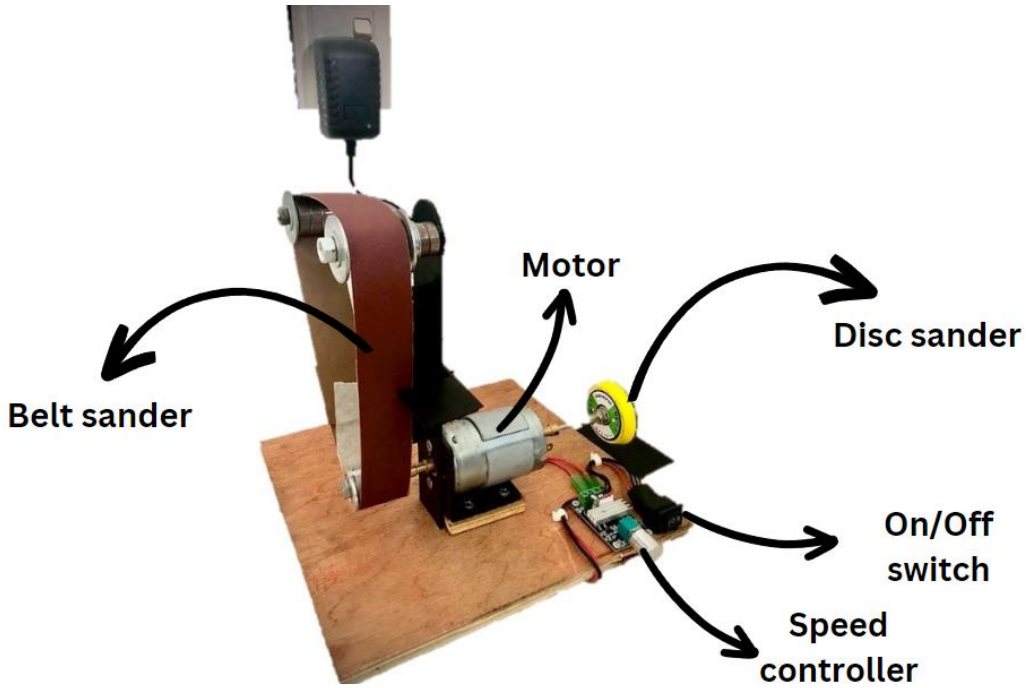

Figure 1: The isometric view of the fabricated Tabletop Belt Sander Machine

Table 1: Tabletop Belt Sander Machine specifications

No	Components	Specifications
1	Body Frame Materials	Mild Steel, Plywood
2	Weight	2.5 kg
3	Length	280 mm
4	Width	250 mm
5	Height	230 mm
6	Voltage	12V
7	Torque	0.305 Nm

4.0 ADVANTAGE/IMPACT/RESULTS/NOVELTY

The tabletop belt sander machine offers several advantages. Firstly, it is easy to handle due to its speed controller, allowing users to adjust the speed as needed for different materials, simplifying the sanding, and finishing processes. Secondly, it is cost-effectiveness thus making it an attractive option for potential buyers. Thirdly, maintenance is minimal, primarily requiring the replacement of the worn-out belt or disc sander. Lastly, it enhances productivity as it combines both sanding and finishing processes, providing a smoother surface, and it offers flexibility in its applications, accommodating various materials and allowing precise speed control for small and delicate tasks.

5.0 CONCLUSION

In conclusion, the development of the tabletop belt sander machine represents a significant innovation in the field of carpentry equipment. This project addresses the challenge of accessibility and cost-effectiveness by creating a versatile tool that combines the functions of a belt sander and a disc sander in a single, affordable unit. The integration of a dual shaft 12 V motor and a speed controller adds flexibility to the machine, allowing users to tailor its performance to specific tasks. This compact and efficient design not only saves space but also caters to the needs of smaller-scale carpentry projects, offering a practical and cost-efficient alternative to larger, more expensive equipment. In doing so, it opens new opportunities for carpenters and woodworkers, making the finishing and shaping processes more accessible and efficient.